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MALAYSIA'S TAX STRUCTURE – ALIGNING TAXES TO HIGHER INCOME COUNTRY

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Abstract

After four decades of rapid, inclusive growth averaging 6.4% pa since 1970, due to successful transformation of the economy from an agriculture to a modern and open economy, Malaysia needs to embark on painstaking reforms to launch its trajectory to a higher growth path. Among the urgent reforms is taxes, which need a restructuring from direct and commodity taxes with overdependence on oil and gas, to a more diversified tax base. Its tax dependence on the oil and gas sectors for revenue reached a 41% high of GDP in 2009, before settling to 14% with the introduction of GST/SST. The long-run elasticity of tax burden is -0.25, which implies that GDP growth will be reduced by 0.25% for every 1% increase in tax burden, compared with -0.27 for OECD countries. In general, taxes are negatively correlated with economic growth, even after taking into account the different types of taxes. The structure of taxation showed that GST is most sensitive to economic growth and has the highest impact. Among taxes, GST, PIT and CIT are negatively correlated to growth whereby for every 1% increase in taxes, economic growth will be reduced by 0.17%, 0.06% and 0.06% respectively. PROTAX and OTHTAX are positively related to GDP growth.

Keywords: Dutch Disease, Correlation, Tax Buoyancy, Tax Elasticity, ARDL, Granger Causality, Gini Coefficient

JEL Classifications: C22, E62, H21

1. Introduction

This paper's purpose is to evaluate on an analytical and comparative framework, Malaysia's trajectory path towards a higher income country, using the experiences of OECD countries in the period 1990-2015. The tax measures that will be evaluated are Corporate Income Tax, the Personal Income Tax, Property Tax, Labor Tax and the Value-Added Tax or GST. There are competing theories about how taxes affect economic growth. Past studies reveal a variation in key parameters of taxes on economic growth.

However, in our review of the literature, past empirical evidence indicate that the tax structure will have differential impact on economic growth. A priori our view is that different taxes will have an impact on economic growth, however significant or otherwise, which can be negated by government expenditure. Our expanded research will focus more on the effect of taxes on economic growth due to corporate income tax, goods and services tax, labor tax, personal income tax and tax on property. This paper will adopt these widely-accepted models of taxation and

growth. The data are sourced from OECD and Datastream. The data will cover 26 years of annual observations, 1990-2015.

Malaysia, which is blessed with abundance of natural resource, is afflicted with symptoms of a Dutch disease, caused by an overdependence on oil and gas revenues. This has resulted in a narrow tax base and distorted relative pricing. While taxation is obviously a fundamental source of income to fund government expenditure, it affects relative prices, which in turn can influence consumption and production patterns. Malaysia has a lower tax burden when compared to most G8 and BRIC economies. It collects about 16.9% of GDP in tax revenues, compared with the OECD average of 34.3% in 2016 (OECD, 2016). There is, therefore, large room to improve tax revenue in the country.

The contribution of this paper is to assess and answer the following research matters: i) the differential effects of tax structures on economic growth ii) the ranking of tax impact on economic growth and iii) calibrating tax structure shifts to promote more economic growth, using a correlation analysis and a ARDL cointegration model.

The rest of the paper is constructed as follows. Section 2 presents level of taxation in Malaysia whereas Section 3 reviews the literature on impact of tax structure on economic growth from a Keynesian and Classical perspective. The data used and the methodologies employed in this paper are discussed in Section 4. In Section 5, the results are presented and discussed. Section 6 derives the policy implications in the paper and Section 7 concludes.

2. Level of Taxation in Malaysia

Malaysia has a lower tax burden when compared to most G8 and BRIC economies. It collects about 16.9% of GDP in tax revenues, compared with the OECD average of 34.3% in 2016 (OECD, 2016). Figure 1 below shows that Malaysia's tax/GDP ratio has been trending downwards from 1991 to 2015. The tax revenues trend in Malaysia does not show significant changes over the last ten years. There is, therefore, large room to improve tax revenue in the country.

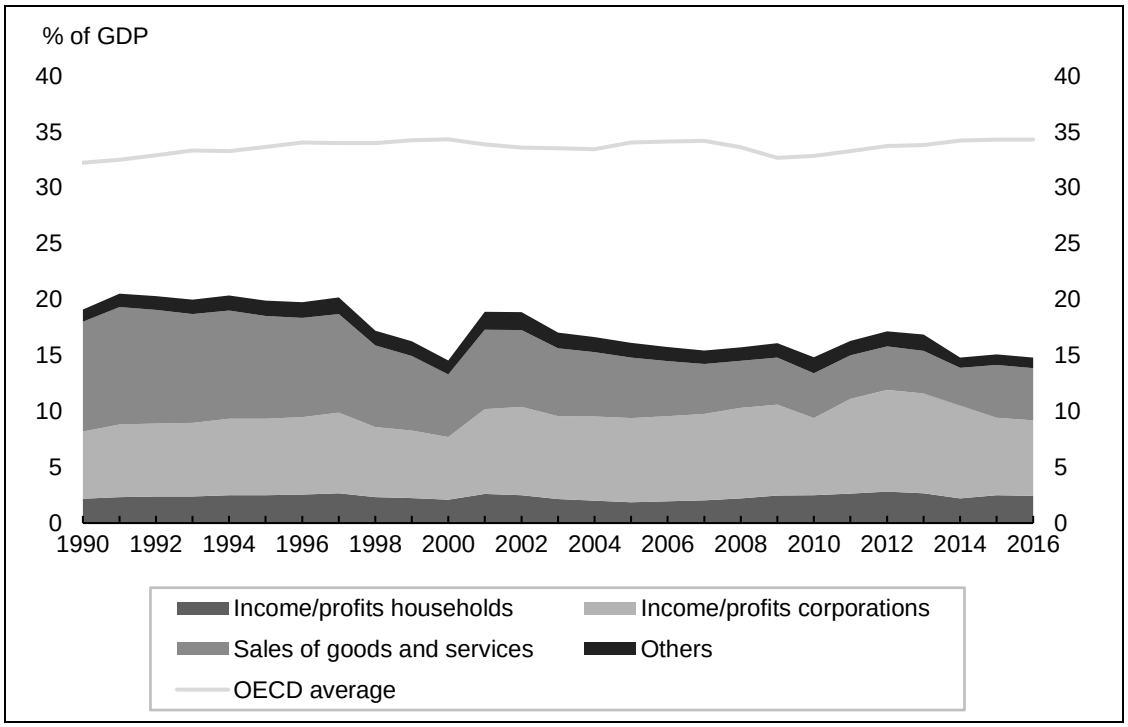

Figure 1. Malaysia vs. OECD – Tax Revenue as % of GDP
Source: OECD (2016) and Central Bank of Malaysia (BNM) (2016a, 2016b)

For comparisons of overall tax burden, tax/GDP ratios are commonly adopted in international publications, in general, reflecting the performance of the country's tax revenue collecting agency. The tax ratio can also indicate the extent of any tax gap, or how much tax potential is not being realized. The tax ratio approach shows that the revenue performance of taxation institutions in Malaysia is far from optimal in comparison with that of developed countries. However, the tax/ GDP ratio is affected by households' transfers in the form of benefits, due to different tax rates on transfers and earnings. For some transfers, taxes are imposed at lower rates, which will impact tax/GDP ratio. There could be reasons for their low tax ratios – poor enforcement by tax authorities or lack of voluntary compliance by taxpayers. Not all taxpayers pay the taxes they should: non-compliance can take the form of underpayment of taxes due, under-reporting of income or not reporting it at all. With all these conceptual and statistical problems involved, the level and structure of taxation would be a better focus. Across OECD countries, the tax/GDP ratio rose uniformly by 6 percentage points in the period 1975-2008. This has stabilized in the recent period.

Although there are differences among tax instruments in the tax burden distribution, the bulk of most OECD countries revenue come from goods and services tax, personal and corporate income and taxes on social security (low for most developing countries). Table 1 shows the unweighted OECD average for the three main taxes as a share of total tax revenue, where some are endogenously driven while others are due to government induced policy. Table 1 shows how globalization and structure of open economies may also be factors affecting the OECD countries taxation trend.

Table 1. Evolution of the average tax mix in the OECD Vs Malaysia, % of total revenues

OECD						
Year	PIT	CIT	SSC	Property	Goods	Other
1990	30.3	7.8	23.1	5.6	31.3	1.9
1995	26.1	8.1	26.4	4.8	33.0	1.5
2000	25.6	9.7	25.3	5.3	32.1	2.1
2005	24.1	10.1	25.3	5.4	32.1	3.0
2010	23.6	8.3	27.0	5.2	32.5	3.4
2015	24.3	8.1	26.3	5.5	29.8	6.1
Malaysia						
1990	11.0	31.7	0.0	3.1	45.2	9.0
1995	14.0	32.2	0.0	3.0	40.8	10.0
2000	13.5	39.2	2.0	3.0	31.3	11.0
2005	9.9	48.4	2.0	4.0	28.7	7.0
2010	15.1	48.4	2.0	4.0	23.6	7.0
2015	14.8	44.8	2.0	3.0	30.4	5.0

Source: OECD (2016)

As shown in Figure 1, over the last thirty years, the main patterns for the OECD unweighted average can be summarized as follows:

- In developed OECD countries, income tax is the main contributor of state revenue. In most OECD countries, the regressive impact of indirect taxes is mitigated by personal income tax (PIT) systems that are progressive and help provide good social security systems. This has resulted in fairly constant share of PIT/total tax revenue for the United Kingdom, Italy, Greece and Austria, compared to France, Iceland, and Canada, PIT's share has increased considerably. In Malaysia, the share of PIT/total tax revenue has been constant at around 10-15% of revenue.
- Compared to developing countries, where the redistributive effect of income tax is not optimized; thereby indirect taxes feature strongly in the structure of taxation in developing countries. In a number of developing countries, indirect taxes/ total revenue is as high as

62% in Brazil. Table 1 shows that Malaysia's 45.2% indirect taxes/total tax revenue in 1990 has declined to 30.4% in 2015.

- For social security contributions/total tax revenue, the share has increased steadily to about 27% in 2007, while the shares for Netherlands, Italy, Spain and France have decreased. The share of Social Security Contributions (SSC) is the main difference with OECD countries (26.3%) where in Malaysia, the share is only 2%. This reflects the social security benefits for workers in most developing countries where workers are not as well provided for.
- In the majority of OECD countries, corporate income tax/total tax revenue has improved to account for 8-10%. In developing countries, the proportion of CIT outweighs tax revenue from PIT. In Malaysia, being a commodity producing countries, CIT from some of these commodity producing companies are the mainstays of CIT which occupy a share of 45% of total tax revenue in 2015. CIT is easier to levy because businesses are obliged to produce audited financial statements. For developing countries, this might indicate a lack of compliance by individual taxpayers, whereby PIT collection has been unsatisfactory and non-optimal.
- The share of consumption taxes/total tax revenue (specific and general consumption taxes) has declined, although the contribution of consumption of goods and services tax in total consumption tax revenue has shifted to higher general consumption taxes, particularly VAT/GST. The share of general consumption taxes/total tax revenue ratio among OECD countries - Belgium, Unites States, and Italy has stagnated, while this ratio has declined in Turkey, France, Iceland, Norway and Austria. In Malaysia, of the 30.4% share of goods/total tax revenue, the SST's share is only 6-11%, except for 2015 which rose to 18.22% inflated by GST's contribution.
- The share of property taxes/total tax revenue ratio (which include items such as "immovable property, net wealth, inheritances and legal transactions") has stagnated for the majority of OECD countries except for Korea, Luxembourg, Spain, Ireland and France where there is a more than 25% increase since 1980, while in New Zealand there is more than 25% decline. In Malaysia, property/total tax revenue ratio of 3% is still low. The taxes collected from the property sector come from the property companies through payment of corporate income taxes rather than individuals through property taxes.

3. Literature Review

In our review of the literature, studies have tried to improve on the methodology to measure impact of taxes on economic growth and whether there is a feedback from economic growth to taxes. Evidence from the literature as postulated by Myles (2000) stated that the financial or economic capacity of any government depends on the fiscal resources available to it, the revenue base of the government, and the way these resources are generated and utilized.

The way these resources are utilized will have an impact on economic growth. The rise in tax revenue from the higher tax rates will provide the Government discretionary spending on public expenditure on goods and services. With such public expenditure on health-care, infrastructure, education and highways with the higher revenue generated and spent, there will be economic growth generated. This redistribution of wealth in taxing the rich more than the poorer income groups will generate economic growth depending on their marginal propensity to consume of different income groups. Barro (1990) and Glomm and Ravikumar (1994) claim that returns to private investors will be higher with such spending on public goods and thereby sustained economic growth. In addition, tax/GDP is normalized with such feedback from taxes to expenditure. The higher GDP growth rate will result in higher GDP, which will reduce the tax/GDP average rate. Previous researches, which ignore the endogeneity issue of tax and GDP, have contributed to the overestimation of the negative tax impact on GDP growth. In their computation, the business cycle should be ignored when estimating the impact of tax on GDP. Tax rate and GDP growth rate are endogenously determined as they affect one another. With higher growth rates, a nation's per capita GDP will increase and as a result will place them into a higher income

tax bracket. The government will collect more taxes from this movement to a higher income tax bracket. Our view is that economic growth is jointly determined with taxation.

3.1. A Keynesian Perspective from Empirical Evidence

From the literature, a good number of studies are consistent with the views and arguments of Keynesian philosophy and this includes the following contributions: Abata (2014) investigates the impact of tax on the Nigerian economy using a descriptive survey approach by employing a simple percentage and narration response in 2012. The result shows that, while inefficiency in the tax administration affects the revenue generation in Nigeria, tax revenue has a significant impact on government budget implementation and by extension to output growth. Likewise, in a regression analysis of the impact of tax on GDP growth in Nigeria, Ojong *et al.* (2016) found no relationship between CIT and GDP in the period 1986-2000, while a positive and significant relationship exists between Petroleum Profit Tax and non-oil tax revenue and the growth of the Nigerian economy.

Similarly, using data from 1986Q1-2014Q4, on a neoclassical Solow growth model and Toda-Yamamoto causality test, Iyke and Takumah (2015) reveal a strong unidirectional causal relationship from tax revenue to economic growth in Ghana. Therefore, economic growth depends on tax revenue. The government should therefore, introduce more policies to improve the tax scope in order to generate more revenue from taxation.

In another development, Umeora (2013), using a linear regression model, studied the effects of value added tax revenue on the economic growth of Nigeria over the period 1994-2010. The result from the study shows that tax revenue has a significant and positive effect on the gross domestic product within the review period. Similarly, using an OLS regression model, Akwe (2014) examines the impact of non-oil tax on economic growth in Nigeria, where non-oil tax revenue has a positive and significant impact on economic growth in the period 1993-2012.

In addition, using a Cobb-Douglas regression model and descriptive statistics from 1994-2010, empirical findings from Izedonmi and Okunbor (2014) on Nigeria shows that, total tax revenue significantly accounts for 92% variation in the GDP. This high explanatory power indicates that total tax revenue is an essential element as well as an important determinant of economic growth in Nigeria. Moreover, Ogbonna and Ebimobowei (2012), using granger causality test to examine the impact of petroleum profit tax on the economic growth in Nigeria for the period of 1970 to 2010, reported that petroleum profit tax does granger causes gross domestic product. This implies the existence of a long-run equilibrium relationship between economic growth and petroleum profit tax in Nigeria.

Likewise, Onwuchekwa and Aruwa (2014), utilizing an OLS regression model, studied the impact of value added tax revenue on economic growth in Nigeria from 1994 to 2011, which showed that tax revenue contributes significantly to the aggregate economic performance of government and economic growth of Nigeria. Although, GDP growth is volatile, tax revenue growth is steadier and not as volatile.

In another development, using an ARDL Bound testing technique and VAR on different types of tax and RGDP from 1986 to 2012, results from Ihendinihu *et al.* (2014) in a study that assess the equilibrium relationship between tax and output growth in Nigeria indicate that aggregate tax revenue has a positive and significant effect on economic growth; explaining about 73.4% of the total variation in RGDP. The study, therefore, holds the view that, there exist a long-run equilibrium relationship between total tax revenue and economic growth in Nigeria.

3.2. A Classical View from Empirical Evidence

In an early attempt to examine the relationship between tax revenue and output growth under the Classical assumptions, the contribution of Skinner (1987) reveals the negative relationship between tax and growth. Engen and Skinner (1992) employed a Neo-classical aggregate production function on a panel data from 107 developing countries spanning 1970-1985, and the study reveals that taxation is negatively correlated with output growth rate in the above period.

Njogu (2015) examines the effects of value added tax revenue on economic growth in Kenya using Poisson regression model from 1990 to 2014. The study found that a percentage

change in the incidence rate of GDP is an increase of 7% for every unit decrease in tax revenue. Similarly, with regard to the effect of tax revenue on economic growth, Eugene and Abigail (2014) examine the effect of tax policy on economic growth in Nigeria by applying time series regression analysis from 1994 to 2013. The result shows that indirect tax has a strong and a significant positive relationship with the level of economic growth while direct tax shows a weak relationship with economic growth in Nigeria within the period under review.

In a similar analysis, Ebrahimi and Vaillancourt (2013) assess the impact of tax on the output growth of Canadian province from 1981-2010 using a fixed-effect panel regression model. The study shows that taxation has a negative impact on per capita GDP growth rate for the Canadian provinces, but this impact depends on the structure of taxation. For instance, the negative impact of personal income tax is less on growth rate compared to corporate income tax and consumption tax which has higher negative effects. Using OLS regression analysis on annual data from 1954 to 1986 to examine the effects of tax revenue on output growth in Taiwan, Wang and Yip (1992) show that the total tax rate does not have a significant effect on the long-run growth rates of private output, production and consumption factor inputs. This result is due to the positive effect of consumption taxation balancing the negative effect of factor taxation on economic growth.

Dackehag and Hansson (2012) applied a fixed-effect regression model on a panel of 25 rich OECD countries for the period 1970-2010 to examine the influence of tax on economic growth and discover a negative relationship between taxation and economic growth. In addition, there exists a non-linear relationship between personal income tax, corporate income tax and economic growth, where low levels of income tax positively influence economic growth and vice versa.

4. Data and Methodology

4.1. Data

Data from 1990 - 2015 are extracted from Annual Reports from Malaysia Ministry of Finance (MOF) (2016) and Central Bank of Malaysia (BNM) (2016a) and Statistical Bulletin (Central Bank of Malaysia (BNM), 2016a). Control variables such as human capital (education), inflation rate, population growth and physical capital (% of GDP) were collected from World Development Indicators (WDI) provided by World Bank organizations. The data for investment as a percentage of GDP and human capital is cross-checked from Penn World Tables, version 7.0 (PWT 7.0).

Descriptive and analytical approaches are used in this study to assess the Malaysian tax structure. A correlation analysis is adopted to assess the relationship among the components of the Malaysian tax structure (INCTAX, PIT, CIT, GST, LABTAX, PROPTAX and OTHTAX) and economic growth. The descriptive statistics of the variables used in the regression are shown in Table 2.

From Table 2, it can be seen that all macroeconomic variables (except for DLGDPPC) are normally distributed. The large difference between maximum and minimum is explained by the large standard deviation for each variable. The Jarque Bera normality test showed that the variables (except of DLGDPPC) follow a normal distribution with a probability of <0.05. Average GDP growth for the period 1990-2015 is 3.5% pa with a maximum growth of 7.2% and minimum of 10.1% during the recession year of 1998. During the same period, investment as a share of GDP averaged 28.5% pa while the tax burden averaged 17.4% pa and population growth rate is 2.1% pa. The above correlation result is a step in testing the specification of an equation for causation, where an ARDL approach to cointegration is adopted, in this paper, to verify the cointegration between Malaysia's tax structure and economic growth. Since most time series are not stationary, a unit root test is first conduced for cointegration, before conducting a causality and a long-run relationship test (Granger, 1986; Engle and Granger, 1987).

Table 2. Descriptive Statistics of Variables in Regression

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
DLGDPPC	0.035	0.041	0.072	-0.101	0.04	-2.098	7.434	37.27
GDPPC	24293.79	23158.5	33861	15427	5171.11	0.14	2.05	0.99
LHUMCAP1	3.47	3.51	3.93	2.04	0.47	-1.45	5.03	13.03
HUMCAP1	34.41	33.22	50.9	7.71	12.46	-0.28	2.48	0.59
LGDPPC	10.08	10.05	10.43	9.64	0.22	-0.21	2.18	0.85
LPHYCAP	3.31	3.21	3.78	2.88	0.26	0.64	2.06	2.52
PHYCAP	28.49	24.9	43.64	17.84	8.06	0.85	2.13	3.61
POP	2.07	1.95	2.7	1.47	0.42	0.14	1.43	2.54
TAXB	17.44	16.64	20.52	14.4	2.04	0.31	1.6	2.35
LTAXB	2.85	2.81	3.02	2.67	0.12	0.22	1.64	2.05
LINCTAX	2.31	2.31	2.44	2.04	0.11	-0.94	3.8	2.77
LGST	1.53	1.47	1.86	1.29	0.2	0.3	1.62	1.51
LPROTAX	-0.53	-0.57	-0.29	-0.69	0.11	0.75	2.66	1.56
LABTAX	0.26	0.25	0.3	0.24	0.02	0.87	2.66	2.11
LPIT	0.74	0.78	0.99	0.46	0.15	-0.14	2.28	0.4
LCIT	2.08	2.11	2.21	1.74	0.12	-1.54	4.98	8.96
LOTHTAX	-0.67	-0.66	-0.46	-0.84	0.11	0.29	2.24	0.6

Sources: Central Bank of Malaysia (BNM) (2016a, 2016b), World Bank (2016), CIA (2016)

4.2. Research Methodology

To capture which tax structure has the most influential impact on economic growth, this paper divides the analysis into two parts. First, this paper analyzes the correlation between different types of taxes (personal income tax, corporate income tax, property tax, labor tax and consumption taxes) and economic growth, controlling for human capital, physical capital and population.

Then, we will use an ARDL cointegration analysis to relate taxes to economic growth and the control variables of human capital, physical capital and population. Tax structure on personal income, corporate income, consumption, property and labor will be the focus of interest among taxes and how they relate to per capita GDP growth. In an equation, some of these variables such as human capital, physical capital and population will be held as control variables and a partial analysis is conducted holding these variables constant when interpreting the coefficients.

In diagrammatic form, this is shown in Figure 2, where the factors affecting per capita GDP growth rate are illustrated. In this approach, there are limitations in that i) a joint empirical comparison of the effect of different taxes on per capital GDP growth cannot be undertaken and ii) that not all potential effects between different taxes and their institutions can be explored. The described effects are partial, since the effect of one tax on GDP per capita and its determinants are assessed holding all other taxes constant.

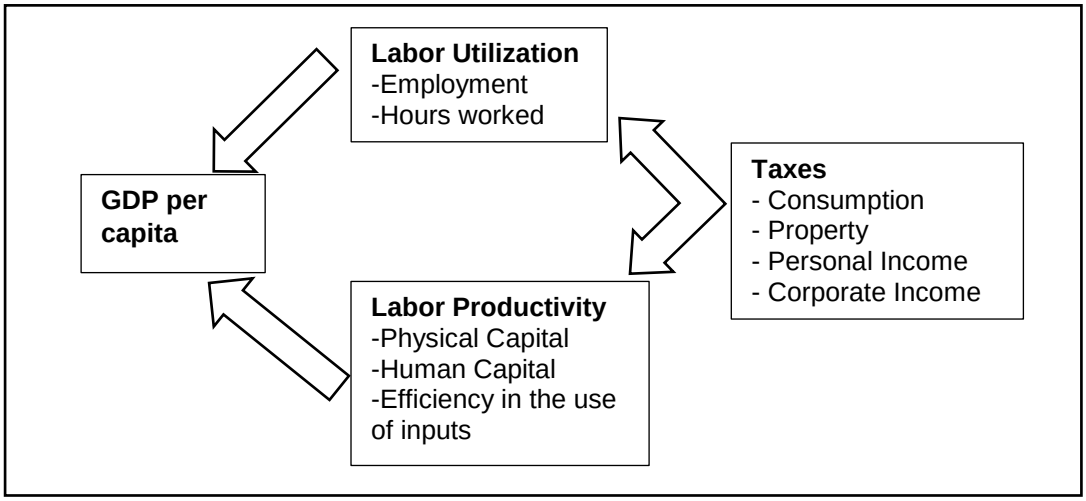

Figure 2. Determinants of GDP
Source: Author's compilation

The initial regression analysis testing the tax rates on labor, consumption and corporate income will be performed as follows:

$$GDP\ per\ Capita\ Growth = \alpha + \beta_1 InitialGDPperCapita + \beta_2 PhysicalCapital + \beta_3 HumanCapital + \beta_4 PopulationGrowth + \beta_5 CorporateTaxRate + \beta_6 LaborIncomeTaxRate + \beta_7 ValueAddedTaxRate + \epsilon \quad (1)$$

where α constant term and ε is the error term in the regression. GDP per capita is real GDP per head of population aged 15-64 years expressed in constant prices and in logs. The logarithm of initial GDP per capita was used as a convergence variable in the analysis. Physical capital is the ratio of gross fixed capital formation to GDP. Human capital is proxy by years of schooling of the population from 25 to 64 years of age. Population growth is growth rate of the population aged 15-64 years in percent. Overall tax burden is the ratio of Government tax revenue to nominal GDP.

5. Findings

For cointegration, a necessary but not sufficient condition is to determine whether each of the variables is stationary and, its level of stationarity. The Augmented Dickey-Fuller (ADF) and the Philips-Perron (PP) tests are carried out for stationarity tests, the results of which are reported in Table 3.

Except for TAXb (significant at 5%), the results showed that the components of Malaysia's tax structure are stationary at 1%, on first differencing. One can conclude that all variables are stationary at 5%, implying that these variables with intercept terms are integrated of order 1. Both the tests from the PP and ADF methods, confirmed the above results. The PP tests are more stringent and robust, when compared to the ADF, as its results are valid even when the error terms are heterogeneous and serially correlated. After conducting the unit root tests, a correlation analysis is conducted among Malaysia's tax variables. The correlation analysis indicated a negative and statistically insignificant relationship between the variables TAXB, CIT, PIT, GST, LABTAX, PROTAX, OTHTAX and real GDP (growth) in the period 1990-2015. Based on correlation theory, a correlation coefficient of less than 0.5 is a weak compared to above 0.5 which is considered strong.

Table 3. Unit Root Results (Malaysia)

Variables	Levels			First Difference		
	Lag	ADF Statistic	PP Statistic	Lag	ADF Statistic	PP Statistic
dlgdppc	1	-3.9878**	-4.5757**	1	-6.6394***	-17.0046***
lgdppc	5	-4.5296***	-2.9218	1	-3.9878***	-4.5757***
lhumcap1	1	-1.7937	-6.8239***	0	-6.09139***	-5.7705***
lphycap	0	-1.9454	-2.0067	0	-5.2427***	-5.2815***
ltaxb	0	-3.2735	-3.3440*	2	-4.0749**	-8.2046***
pop	2	-1.3909	-1.8218	2	-4.0309**	-2.2417
linctax	3	-4.4014**	-7.1870***	3	-4.8258***	-10.0879***
lcit	1	-4.7660***	-3.4838*	3	-4.8948***	-9.2909***
lpit	0	-2.4153	-2.4622	1	-4.1347**	-5.4112***
lgst	0	-1.6847	-1.6056	0	-5.3354**	-5.3354***
llabtax	0	-2.6981	-2.6981	2	-4.1200**	-13.3551***
lothtax	3	-3.2244	-2.4201	4	-3.8550**	-5.1691***
lproptax	0	-2.4298	-2.4298	0	-5.9295***	-6.4628***

Note: *, ** and *** represent 10%, 5% and 1% significance level respectively.
Sources: Author's own compilation

The correlation matrix revealed a negative correlation coefficient, (-0.43) between economic growth and TAXB, and (-0.46) between economic growth and INCTAX, both of them statistically significant at 10% level. The correlation coefficient (-0.40) between economic growth and PIT and a negative correlation of (-0.08) between economic growth and GST.[1] Once we compare the findings for Malaysia's with Santiago and Yoo (2012), it is seen that Malaysia's correlation of Tax variables with GDPPC is relatively higher than most countries. The negative impact of tax burden (LTAXB) on GDPPC growth is reflected in the HIC countries unlike the LIC and MIC countries which has a positive impact. Similar as Santiago and Yoo (2012), physical capital has the highest correlation across countries (LIC, MIC and HIC). For human capital, Malaysia and HIC countries have a negatively correlation with GDPPC as in Santiago and Yoo (2012). The Malaysian government does not depend solely on taxation policy to promote economic growth. The goals of taxation policy are to create a conducive economic environment, infrastructure development, basic social amenities that will contribute to higher output of goods and services. The Government's use of tax expenditure and other micro policies are to create an environment for growth through infrastructure spending.

5.1. Tax Elasticity and Buoyancy

The tax/GDP ratio measures the tax revenue collected by a government to income that a country receives for its output of goods and services. Traditionally, this tax/GDP ratio has been used to measure how various countries' taxes performed. Generally, it can be concluded that developing countries have lower tax ratios as compared to developed countries. When comparing the tax/GDP ratio among countries, economists can gauge how much the economy of a specific government is funded by tax collection. Malaysia's tax to GDP ratio of 18% is low compared to an average of 34% for OECD countries in 2016. Our regression results of tax buoyancy by regressing tax revenue against GDP show an elasticity coefficient of 0.87 which means for every 1% increase in GDP, was followed by a 0.87% increase in tax revenue. This is low by international standard where an elasticity coefficient of greater than one is preferable to demonstrate a buoyant tax system.

Once a correlation relationship exists between the components of tax structure (CIT, GST, Protax, Labtax, PIT and Othtax) with economic growth, it is important to establish whether the relationship is uni-directional or bi-directional. This is done using the Granger Causality method (Engle and Granger, 1987) after testing for unit-root to confirm stationary.

[1] The correlation matrix tables are not provided to save space. It is available upon the request.

In Table 4, the Granger Causality tests among components of the Malaysian tax system indicate the direction of causality – bidirectional or unidirectional. The results show that TAXB, INCTAX CIT, PIT and GST do not granger cause economic growth, while economic growth unidirectional causes TAXB. Similarly, all the components of tax system do not granger cause one another, except for GST and CIT which unidirectional causes TAXB and there is a bidirectional effect between INCTAX and TAXB.

Table 4. Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.	Comments
LTAXB does not Granger Cause DLGDPPC	23	0.53798	0.593	
DLGDPPC does not Granger Cause LTAXB		4.69427	0.0229	DLGDPPC ⇨ LTAXB
LCIT does not Granger Cause DLGDPPC	23	0.38379	0.6867	
DLGDPPC does not Granger Cause LCIT		2.46683	0.1130	
LPIT does not Granger Cause DLGDPPC	23	0.24921	0.7821	
DLGDPPC does not Granger Cause LPIT		0.3469	0.7115	
LINCTAX does not Granger Cause DLGDPPC	23	0.19018	0.8284	
DLGDPPC does not Granger Cause LINCTAX		0.96884	0.3985	
LGST does not Granger Cause DLGDPPC	23	0.32064	0.7297	
DLGDPPC does not Granger Cause LGST		0.79056	0.4687	
LGST does not Granger Cause LTAXB	24	3.60899	0.0469	LGST ⇨ LTAXB
LTAXB does not Granger Cause LGST		2.60354	0.1002	
LCIT does not Granger Cause LTAXB	24	7.3863	0.0042	LCIT ⇨ LTAXB
LTAXB does not Granger Cause LCIT		2.15745	0.1431	
LINCTAX does not Granger Cause LTAXB	24	5.82351	0.0107	LINCTAX ⇔ LTAXB
LTAXB does not Granger Cause LINCTAX		2.9248	0.0781	
LPIT does not Granger Cause LTAXB	24	0.13243	0.8768	
LTAXB does not Granger Cause LPIT		0.64433	0.5361	
LPIT does not Granger Cause LCIT	24	1.15302	0.3368	
LCIT does not Granger Cause LPIT		0.16086	0.8526	
LGST does not Granger Cause LCIT	24	0.45261	0.6426	
LCIT does not Granger Cause LGST		0.31115	0.7363	
LINCTAX does not Granger Cause LCIT	24	1.15023	0.3376	
LCIT does not Granger Cause LINCTAX		1.71942	0.2059	
LINCTAX does not Granger Cause LGST	24	0.43517	0.6534	
LGST does not Granger Cause LINCTAX		0.20383	0.8174	
LPIT does not Granger Cause LGST	24	0.90587	0.4209	
LGST does not Granger Cause LPIT		0.41042	0.6691	
LPIT does not Granger Cause LINCTAX	24	1.65671	0.2172	
LINCTAX does not Granger Cause LPIT		0.13878	0.8713	

Sources: Author's own compilation

5.2. ARDL Cointegration Analysis

Given the weakness of the traditional cointegration approaches, this paper used the ARDL Bound testing approach developed by Pesaran *et al.* (2001) for cointegration analysis. The ARDL technique does not require pretests for unit roots, as this method uses the F-test (Wald test) to test for the long-run relationship between economic growth and taxes. Long-run relationship of the series is said to be established when the F-statistic exceeds the critical bound value. In testing for cointegration, the ARDL is preferable because of the following reasons:

- Small sample size, where the Bound-testing F-statistics of the ARDL modelling perform better than Johansen and Granger, which require a larger sample size to meet reliability criteria.
- System of equations to estimate long-term relationship for the Johansen method, the ARDL used a single equation.
- Regression variables in an ARDL approach take sufficient number of lags to reduce the intensity of serial correlation of residuals compared to the Johansen approach. A dynamic error correction model (ECM) can be derived from ARDL through simple linear transformation. The ECM merges the short-run dynamics with the long-run stable equilibrium without losing long-run information.
- Nature of the stationarity of the data is different, then the use of the ARDL Bounds test is appropriate. A unit root test is not necessary if a conclusion can be made from the Bounds test for cointegration (Pesaran *et al.* 2001) using the I(0) and I(1) criteria. However, the model breaks down for I(2) integration.
- In estimation of regressions with unbiased results, appropriate specification of the ARDL helps to resolve the endogeneity problem and residual serial correlation (Harris and Sollis, 2003).

The ARDL (Pesaran *et al.* 2001) model for this study is specified as follows:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \beta_0 x_t + \beta_1 x_{t-1} + e_t \quad (2)$$

In long-run equilibrium

$$y_t = y_{t-1} \quad x_t = x_{t-1}$$

rewriting equation (2) as

$$y_t - y_{t-1} = \alpha_0 + (\alpha_1 - 1) y_{t-1} + \beta_0 (x_t - x_{t-1}) + (\beta_0 + \beta_1) x_{t-1} + e_t \quad (3)$$

and

$$\Delta y_t = \alpha_0 + \beta_0 \Delta x_t + \gamma_1 y_{t-1} - \sigma_1 x_{t-1} + e_t$$

The estimated model can be rewritten as:

$$\Delta \mathrm{LGDPPC}_{\mathrm{it}} = -\emptyset_i (\mathrm{LGDPPC}_{\mathrm{it-i}} - \theta_1 \mathrm{LPHYCAP}_{\ it} - \theta_2 \mathrm{LHUMCAP}_{it} - \theta_3 \mathrm{LTAXB}_{\ it} - \theta_4 \mathrm{POP}_{\ it}) + b_{1i} \Delta \mathrm{LPHYCAP}_{it} + b_{2i} \Delta \mathrm{LHUMCAP}_{it} + b_{3i} \Delta \mathrm{LTAXB}_{it} + b_{4i} \Delta \mathrm{POP}_{t-i} + e_{1t} \quad (4)$$

In Equation (4), $\Delta \mathrm{LGDPPC}_{\mathrm{it}}$ refers to the difference in log of real per capita GDP, LPHYCAP is physical investment, LHUMCAP1 represents stock of human capital, LTAXB is overall tax burden, POP is population growth and Δ is the first-difference operator. LINCTAX, LPIT, LCIT, LGST, LLABTAX, LPROTAX, LOTHTAX are the other taxes we tried to investigate.

The results of Tables 5 and 6 show the coefficients in the long-run, from the ARDL model with error correction version (ECM). The estimates for short-run coefficients with ECM approach are also shown. The ECM shows the speed of adjustment whereby the balance in a dynamic model is restored. The coefficient indicates how slow or fast the speed of adjustment to its equilibrium growth path will be achieved, where the results must be statistically significant with a negative sign. As shown in Banerjee *et al.* (1998), if we have a highly significant error correction term, this is further proof of the existence of a stable long term relationship.

Table 5. ARDL Cointegration Results

Dependent Variable: GDP (dlgdppc)			Dependent Variable: GDP (dlgdppc)		
Variable	Coeffcieint	t-statistic	Variable	Coeffcieint	t-statistic
LPHYCAP	0.19***	8.08	POP	-0.19**	-2.80
LOG(HUMCAP1)	-0.01	-0.65	LPHYCAP	0.24***	3.86
LOG(TAXB)	-0.25***	-3.84	LOG(HUMCAP1)	0.04	1.18
POP	-0.21***	-3.93	LPIT	-0.06	-1.24
@TREND	-0.01**	-2.91	LGST	-0.17	-1.83
			LCIT	-0.06	-1.28
			LPROTAX	0.16	1.31
			LOTHTAX	0.02	0.43
			@TREND	-0.01**	-2.68

Note: *, ** and *** represent 10%, 5% and 1% significance level respectively.

Our expectation is for a negative sign for ECM and to be statistically significant. The results on Table 6 showed that the coefficient of the ECT(-1) is estimated to be -0.78 and statistically significant at 1%, which suggest that 78% of deviation from long-run growth path is corrected in the following year. When other taxes are added to the model, the deviation from the long-term growth path is -0.93, which suggest that 93% of the deviation from long-term growth is corrected in the following year.

From Table 5, the long-run coefficients of ARDL are estimated using the OLS with the lags determined by the Schwartz Bayesian Criterion. All variables (Phycap, Taxb and Pop) are significant at the 5% level, showing long-run effect on economic growth. Physical investment (LPHYCAP) has a positive and significant relationship with economic growth at 1% level in the short-run and in the long-run. This implies that a 1% increase (increase in LPHCAP) will increase economic growth by 0.19% in the short-run and long-run. Intuitively, the impact of physical investment will increase Malaysia's GDP, thereby output positively. Physical investment is a driver of Malaysia's growth in the 1990s. When other taxes are added in, the above conclusion remained the same as LPHYCAP remained the largest contributor to Malaysia' growth with a coefficient of 0.24 and statistically significant in the long-run and short-run.

Table 6. Coefficient of ECM

Dependent Variable: DLGDPPC			Dependent Variable: DLGDPPC		
Variable	Coeffcieint	t-statistic	Variable	Coeffcieint	t-statistic
C	1.09**	13.36	C	0.26***	13.96
DLOG(TAXB)	-0.21***	-4.50	D(POP)	-0.66***	-11.51
CointEq(-1)[1]	-0.78***	-4.19	DLOG(HUMCAP1)	0.23***	8.93
			D(LPIT)	-0.23***	-8.93
			D(LGST)	0.04	1.71
			D(LCIT)	0.00	0.06
			D(LPROTAX)	0.11***	3.72
			D(LOTHTAX)	-0.03**	-2.53
			CointEq(-1)[2]	-0.93***	-15.01

Source: Author's compilation

The other three determinants of GDPPC growth, human capital, population and tax burden are negatively related to GDPPC growth. As the economy embarks towards higher income status, human capital needs to the main driver. However, in the 1990-2015, human capital is negatively correlated with GDP growth, with a 1% increase in human capital reducing GDP growth by 0.01% but statistically insignificant. The quality of Malaysia's education has been increasingly emphasized. A reform of the education system is in the blueprint if Malaysia were to strive for higher income status. Similarly, higher population growth will impact GDPPC growth negatively, a 1% increase in pop growth rate will reduce GDPPC growth by 0.21%.

A dependence on taxes (direct taxes is a major component of tax revenue) will affect Malaysia's drive towards higher income because direct taxes (being a major component of total tax revenue) impact growth negatively from the burden of taxation. The long-run elasticity of tax burden is -0.25, and statistically significant at 1%, which implies that a 1% increase in tax burden will reduce GDPPC growth by 0.25%. This can be compared with the findings from Arnold (2012) who reported a tax burden -0.27 for OECD countries. Adding the components of taxes to the equation showed that human capital is positively related to economic growth and statistically insignificant with a coefficient of 0.04. Among taxes, PIT, CIT and GST are negatively correlated to growth but not statistically significant, as a 1% increase in taxes will reduce economic growth by 0.06%, 0.06% and 0.17% respectively. PROTAX and OTHTAX are marginally positively related to GDPPC by 0.16% and 0.02% respectively. In general, taxes are negatively correlated with economic growth in the long-run, even after taking into account the different types of taxes but statistically insignificant. GST is most sensitive to economic growth and has the highest impact, followed by CIT and PIT in terms of impact on GDPPC.

Cointegration tells us that there is a long-run relationship between variables. However, there could be a short-run deviation from the long-run equilibrium. Cointegration does not indicate the process of short-run adjustment to bring about long-run equilibrium. Thus, we will proceed to the error-correction model (Table 6) to examine the short-run dynamics.

Adding other taxes to the model showed that in the short run, physical capital and human capital, have a significant positive impact on economic growth. The empirical results in Table 8 revealed that in the short -run human capital (LHUMCAP1) and physical investment (LPHYCAP) are positively related to economic growth while POP is negatively relative to economic growth. The result for the long-run and short-run also showed that physical investment (LPHYCAP), human capital (LHUMCAP1) and population (POP) have high significant impact on economic growth in Malaysia. The adjusted coefficient of determination (R^2) is 0.8077 which shows high significance of the model, indicating that 80.8% of the dependent variable was explained by model. Among components of taxes, PIT and OTHTAX are negatively correlated with growth, while CIT, GST and PROTAX are positively related to economic growth.

Table 7. ARDL Cointegration Tests by Using Taxb

Variables	F-stats	Cointegration	Lag Optimal
f(GDDPC, PHYCAP, HUMCAP, POP, TAXB)	22.8607***	Cointegration	1, 0, 0, 1, 0
	Critical Value	Lower Bound (I, 0)	Upper Bound(I, 1)
	1%	3.81	4.92
	5%	3.05	3.97
	10%	2.68	3.53

Note: *, ** and *** represent 10%, 5% and 1% significance level respectively.
Source: Author's estimation

Table 8. ARDL Cointegration Tests by Using Other Taxes – PIT, CIT, GST, PROTAX, OTHTAX

Variables	F-stats	Cointegration	Lag Optimal
f (GDDPC, PHYCAP, HUMCAP, POP, PIT, CIT, GST, PROPTAX, OTHTAX)	9.0155***	Cointegration	1, 1, 0, 1, 1, 1, 1, 1, 1
	Critical Value	Lower Bound (I, 0)	Upper Bound(I, 1)
	1%	2.93	4.06
	5%	2.38	3.41
	10%	2.13	3.09

Note: *, ** and *** represent 10%, 5% and 1% significance level respectively.
Source: Author's compilation

The hypothesis of no cointegration deals with H_0: $\theta_1 = \theta_2 = \theta_3 = \theta_4 = 0$ and H_1: $\theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq 0$ is an alternative hypothesis of cointegration.

For small sample sizes of 30-80 observations, we use the critical values from Narayan (2005) to compare the F-statistics. These values show one set of statistics for variables that are I(0) and another set for variables that are I(1). If the computed F-statistic fall within the upper and lower critical bounds, the decision is that the test is inconclusive. If the F-statistic falls below the lower critical bound, the decision is that the test shows no co-integration. If the calculated F-statistic exceeds the upper critical bound value, the decision is that the test shows that there is cointegration, therefore we reject H_0. In Tables 7 and 8, our computed F statistic equals 22.8607, which exceeds the upper bound (5.06) critical value reported at the 95% critical level for 24 observations. The decision is to reject the null hypothesis of no co-integration and accept the hypothesis H_1: that the variables in the model are cointegrated and that there is a long-run relationship.

6. Policy Recommendations

The following policy implications are recommended:

i. Improve revenue collection to a turnaround position from a decline: Compared with the experience of other countries that are on a higher income level, tax revenue/GDP is less than half of OECD average of 34%. Malaysia acted to cut fiscal spending to achieve fiscal stability when faced with lower oil revenue. Chung and Ong (2017) estimated that oil price has a significant impact on government expenditure arising from revenue impact, impacting expenditure by 0.48% for every 1% change in oil price. Increasing the marginal income tax rate to 28% from 25% and introducing GST in April 2015 were among measures the Government implemented to address the fiscal deficit. In the medium-term, a more sustainable revenue trajectory for a fiscal medium term plan is needed as part of the tax reform so that measures to support social and communications infrastructure for rural projects, healthcare and social protection can be realized.

ii. Restructure Indirect taxes especially the GST: With an informal sector (including foreign workers) of an estimated 1.7 million, taxes on consumption spending will be a suitable and optimal tax structure to prevent leakage. More than 350,000 Malaysians commute to work in Singapore and tourists from overseas will help to bolster consumption taxes substantially. Reducing compliance costs and distortions can be achieved with a differential tax system as shown in OECD countries. When GST was first introduced in 2015, this had helped to address the long-term decline in indirect tax revenue and a structural shift in oil revenue from declining oil prices. Although the initial 6% GST rate was low by international standards, it was successfully implemented and boosted revenue beyond expectations, despite the rising number of exempt items when compared to OECD and Korea.

iii. Broaden the tax base to contribute to a more progressive income tax system: Traditionally, Malaysia's main source of tax revenue is from corporate income tax and taxes from state-owned oil companies' profits. Diversifying and broadening the tax base will complement measures to support industrial and environmental objectives of the government as well. Only 10% and below of Malaysians above the age of 15 years paid tax which skewed the contribution from the high income threshold. Low-income households are sheltered by tax exemptions as the tax burden fall on the middle and high-income earners. Recently, the government raised the top marginal tax rate for high income earners to 28%, which still remained below the 45-55% bracket in OECD countries. This will contribute to higher tax revenue from personal income tax.

Among the components of taxes, the share of property taxes to total revenue is insignificant. Adjusting and basing it on the rising property values, the contribution of property taxes to total revenue will increase, along with a higher property tax rate. Although property assessment rates fall within the ambit of the state governments, the tax reform agenda should

accommodate fiscal decentralization. Malaysia lacks a tax on inheritance. Such a tax will help to promote a progressive tax structure and reduce wealth and income inequality (Brys *et al.* 2016).

7. Conclusion

Malaysia's overall tax collection and distribution system has a lot to catch up for inclusive growth when benchmarked against OECD and international standards. To achieve high income status, tax reform should be prioritized, amongst others, as its population ages against a background of addressing a fiscal deficit.

Tax reforms are needed to broaden the overall tax base, resize the sources to uncover additional resources to fund needed programs for inclusive growth. In addressing medium-term sustainability on the fiscal accounts, an overall review of the tax base is needed to look into additional reforms that have not been introduced or previously considered. Tax/GDP ratio has fallen to below 20% and trending down if not addressed, compared to an average of 34% for OECD and high income countries.

Among taxes, PIT and OTHTAX are negatively correlated to growth as a 1% increase in taxes will reduce economic growth by 0.23% and 0.03% respectively. CIT and GST are marginally positively related to GDP growth while the lagged impact of these taxes will reduce GDP growth by 0.09% and 0.27% respectively. In general, taxes are negatively correlated with economic growth, even after taking into account the different types of taxes. PIT is most sensitive to economic growth and has the highest impact. CIT and GST are not as sensitive and their impact is offset by higher GDP growth. Over the medium time-span, it is important that the government focus on strengthening its tax collection administration to cut off leakage and in reducing the number of tax exempt items.

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