CHAPTER TWO

LITERATURE REVIEW AND RESEARCH METHODOLOGY

2.1 Literature Review

Before going into details, one question that needs to be raised here is does efficient taxation really matter? Actually, a policy can never be determined by only relying on efficiency considerations. The fact that taxation results in excess burden does not prove the inefficiency of the tax policy but should be viewed as obtaining something beneficial for society in terms of public goods or income distribution (Rosen, 1995). Hence, to know whether the benefits are large enough to justify the costs, Rosen suggested that excess burden is included in the calculation of social cost.

Musgrave, (1973) outlined several criteria for a "GOOD" tax structure. Among others are:

1. The distribution of the tax burden should be equitable. Everyone should be made to pay his or her 'fair share.'
2. Taxes should be chosen so as to minimise interference with economic decisions in otherwise efficient markets. Such interference imposes 'excess burdens' that should be minimised.

3. Where tax policy is used to achieve other objectives, such as to grant investment incentives, this should be done so as to minimise interference with the equity of the system.

Excess burden is thought to be the loss of welfare above and beyond the tax revenues collected. Thus, when we study about excess burden we should be focusing on its incidence on individuals or households-size distribution of income. We should not only following the classical economists who have studied the incidence problem in terms of the impact of tax burdens on the suppliers of capital, labour, and land (Musgrave, 1973).

To make the analysis manageable, Musgrave, (1973) grouped the households’ category according to income classes. The household disposable real income can be defined as \( \text{DRY} = \frac{E - T_y}{P + T_s} = \frac{DY}{GP} \), where \( E \) is earnings, \( T_y \) is income tax, \( P \) is the price (at factor cost) of products bought, and \( T_s \) is the sales tax addition thereto. \( DY \) is disposable or after-tax money, and \( GP \) is the market price. \( \text{DRY} \), as seen in the equation is subject to both direct and indirect tax effects. From this equation, Musgrave, (1973) identified the applicable relationships
between the level of income and the pattern of sources as well as the level of income and the pattern uses. Tax on capital income tends to be more progressive than a general income tax, tax on wage income tends to be regressive, and tax on luxury products tends to be progressive, whereas tax on mass-consumption items tends to regressive.

With regard to income distribution, Musgrave, (1973) concluded that the total effect of taxes on distribution depends not only on how progressive particular taxes are, but also on the overall level of taxation and on the underlying distribution of income. Measuring changes in distribution can easily be done using the Lorenz Curve and Gini Coefficients.


The Gini Coefficients was estimated to be 0.41 in 1957/58, 0.44 in 1967/68, 0.50 in 1970, 0.50 in 1973, and 0.57 in 1976/77 (Jomo, 1981). The income
inequality was also reflected in the income shares going to various income groups. The income share of the top 20 percent of the household increased from 48.6 percent of total income in 1957/58 to 55.9 percent in 1970 and 61.9 percent in 1976 (Jomo, 1981). At the same time the income of the lowest 40% did not seem to increase but decrease in amount. It declined to 11.06% in 1970 and 10.3% in 1976 from 15.9% in 1957/58 (Jomo, 1981).

Ismail, (1977) concluded from his study that tax revenue that accounted for more than one-fifth of Gross Domestic Product (GDP), could be a favourable tool for income distribution. The conclusion was derived from the fact that the ratio of tax revenue to GDP from 1960 – 1973 increased from eight hundred and eighty two million ringgit to two thousand seven hundred and fifteen million ringgit. Thus, the share of GDP channelled through the government also increased from 17.8 percent in 1970 to 23.6 percent in 1973. This substantially increased the impact of government revenue on the distribution of income. Ismail, (1977) pointed out that personal income tax revenue amount to twenty seven percent of the tax revenue sources in 1973 compared to a collection of only twenty one percent in 1960.

IRB's objective on the revenue collection is to collect the right amount of tax in a more cost-effective manner without undue burden to the tax-paying public. Relying on the facts that the rich pays more tax compared to the poor, the
progressive income tax was not supposed to burden the poor. Income tax rates for resident individuals for example is zero percent for the first RM2500 and thirty percent for income exceeding RM150,000. In a glance, this shows that the income tax is progressive.

However, research done by McLure, (1972) showed that the tax incidence by income size groups in 1957/58 was U-shaped. It simply meant that there was regressivity at the lower income levels and progressivity towards the top of the income level. Ismail, (1977) also proved that Malaysian effective tax rates exhibit a U-shaped pattern for the years 1968, 1970, 1973, and 1979. This confirmed that the tax burden was much more regressive than what was thought so.

Progressive tax means that the higher the income the more the tax is paid. Proportional tax is defined as no changes in the amount of tax paid as the amount of income increases. Regressive tax on the other hand means that the higher the income, the lower is the payment of tax.

Daniel Suits, (1977) proposed one widely known method of measuring the degree of progressivity or regressivity. He adopted a figure similar to the Lorenz curve but in which the accumulated percent of tax burden is plotted vertically against the accumulated percent of income on the horizontal axis.
Suits, (1977) defined the index of progressivity $S$ in terms of $K$, the area of the triangle $OAB$, and $L$, the area of triangle $OABC$. Mathematically, the index is calculated as: $S = \frac{(K - L)}{K} = 1 - \frac{L}{K}$. For a proportional tax, $L=K$, so $S=0$. In the extreme case where the highest earner bears the entire burden, Lorenz curve lies along the sides $OA$ and $AB$ so $L=0$ and $S=+1$. With a regressive tax, Lorenz curve arches above the diagonal where $L=2K$ and $S=-1$. Studied conducted on the United States individual income taxes showed that the individual income tax was progressive. The index was 0.17 in 1966 and 0.19 in 1970.

Figure 2.1.1 Basis of the Suits' Index

Kakwani, (1977) made use of the Gini index as a new measure of tax progressivity. The Gini index of income is defined as one minus twice the area under the Lorenz curve. Kakwani's measurement of tax progressivity concerns on the concept of tax elasticity. By letting $T(x)$ as the tax paid by an individual with income $x$, tax system is proportional when the elasticity of $T$
with respect to \( x \) equal one for all \( x \), progressive when the elasticity exceeds one and regressive when the elasticity is less than one. In short, tax system is progressive, proportional, and regressive when the marginal tax rate is greater, equal, and less than the average tax rate. The measure of progression proposed by Slitor, (1948) is:

\[
\frac{dt(x)}{dx} = \frac{m(x) - t(x)}{x}
\]

where \( t(x) \) is the average tax rate at the income level \( x \) and \( m(x) \) is the marginal tax rate at the same level of income.

According to Habito, (1984) major limitation of most progressivity indices, particularly the Suits’ index is its partial equilibrium orientation. Because it is computed simply by accounting for the direct incidence of a tax, all tax shifting through general equilibrium interactions are completely overlooked. Thus, the index is an incomplete measure of the redistributive effects of a tax system.

Habito, (1984) further emphasised that the analysis should directly measure the post-policy change distribution of income, and not progressivity. His argument lies on three supports. Firstly, the progressivity index is a less transparent indicator of the distributive effects of a tax change for a government policymaker than a direct measure of income distribution such as the well-known Gini index. Secondly, progressivity index can be perceived as a subjective measure. Thirdly, progressivity index could be a misleading indicator of redistributive effects of a tax as it is only sensitive to relative
magnitude of the tax burden across households, and not to the absolute magnitude of the tax.

A study had been conducted by a group of Economists on 'Optimal Non-linear Income Taxation for the Alleviation of Poverty.' Among the lessons from the Welfarist economists quoted by the authors are (Kanbur, Keen, & Tuomala, 1991):

1. The marginal rate of tax should everywhere be non-negative (while it may be optimal for the average rate of tax on the least well-off to be negative, it cannot be desirable to subsidise their earnings at the margin)

2. The marginal tax rate on the lowest earner should be zero, so long as everyone supplies some labour at the optimum

3. The marginal rate of tax on the highest earner should be zero, so long as wages in the population are bounded above

Simulations suggest that zero may be a bad approximation to optimal marginal tax rate in the tails of distribution, and if it is optimal for some not to work then the optimal marginal tax rate at the bottom of the distribution can be shown to be strictly positive (Tuomala, 1990). The income poverty minimisation theory to reduce poverty gap is to have higher net income induced by lowering the marginal tax rate. The poverty gap would be reduced by the amount of $G_x s$
from the following equation \( t[z(n)] = \frac{G_s s}{\lambda} - \frac{\mu(n)\mu_s s_n}{\lambda f(n)} \) [Note: see Appendix A for details of equation.]

The study opens a wider view on income poverty minimisation theory in addition to the other welfarists' literature. Kanbur, Keen, & Tuomala, (1991) came up with the conclusion that the marginal tax rates at the bottom of the gross distribution income should be strictly negative. They also added that if it is optimal for everybody to work, poverty alleviation calls for marginal subsidy on the earnings of the very poorest and if given continuity, there exists an interval over which a negative marginal rate is appropriate. The numerical simulations conducted provide us with one important feature that is the high marginal tax rate of the poor exceed sixty percent and in all cases they exceed fifty percent. Thus, the theory that points out towards lower marginal rates on the working poor is borne out.

Effects of personal income tax policy on savings could be considered as one of the most important considerations for developing countries. One important criterion concerns would be the effects on the level of savings. The developed countries generally overlook the mobilisation of savings because organisations of financial and capital markets guarantee a great deal of automatic mobilisation. However, mobilisation of savings cannot be
overlooked in developing countries as they should be a target of tax policy (Wahab, 1972).

In Sudan, the personal income tax, by defining taxable income to include interest (and dividends) offers no incentive for savings. In reference to income group, the low-income scale views the presence or absence of a tax on interest and dividends as irrelevant to their struggle of life. The high-income group is more concerned about the presence or absence of a tax on interest not only due to the a higher propensity to save but also high marginal tax rates in that income bracket imply high tax rate on interest.

The middle-income group concerns on the presence or absence of tax on interest is ambiguous. It depends on whether they are 'target' savers, 'residual' savers, or 'fixed ratio' savers. The conclusion in the case of Sudan is that the middle-income group is predominantly residual-savers, that is they save whatever is left from their income after meeting a fixed level of consumption. In this case, the middle-income group saving is not a function of the rate of interest and a tax on interest income does not discourage them from saving. However, on balance, the present personal income tax in Sudan tends to have a disincentive for saving.
Ismail, (1977) concluded from his study that savings are likely to decrease as a result of a progressive individual income tax. A more progressive tax implies that savings will be reduced. But the magnitude of the reduction depends on whom the tax is assessed. Ismail, (1977) found that high-income groups tend to have a high marginal propensity to save. However, empirical evidence regarding the responsiveness of savings to changes in individual income tax rates was not available. Not that research has ever been done involving the matter, but just that such changes are really impossible to measure. Looking at the degree of progressivity of the Malaysian personal income tax policy, that is mildly progressive, Ismail, (1977) concluded that the magnitude of savings affected by income tax is very small. Thus, he finalises his statement that savings have remained relatively constant regardless of the changes in the income tax.

2.2 Theoretical Framework

The theoretical framework used in this research is based from the theory and studies developed and conducted by different researchers. Following Kanbur, Keen, & Tuomala, (1991) there exists certain relationship between tax rates and poverty level. Whereas following Wahab, (1972) and Ismail, (1977) there exists relationship between savings rate and the interests exempt from tax.
Thus, to analyse the relationship between the mentioning variables, the best method is to use statistical analysis. The analysis is regression models that will be run under the E-views program.

To achieve the first and fourth objective, Suits’ progressivity index is used as a measure to calculate Malaysian personal income tax progressivity level. There is no theoretical framework to be used to accomplish the last objective. The last objective will be answered through critical observations and analysis of IRB’s stated objectives.

2.2.1 Regression Analysis

Regression analysis will be used to understand the effects of personal income tax policy on the mentioning areas. The regression form is:

\[ L = \alpha_0 + \alpha_1 + \alpha_2 + \ldots + \alpha_k + \varepsilon \]

The \( \alpha \)'s are the parameters (independent variables) of the equation and \( \varepsilon \) is the error term. The parameters show how changes in the independent variables affect the dependent variable (\( L \)).
The model that will be used in this study is a compact model. The lists of variables are:

PS = Total private savings

Poverty = Rate of absolute poverty

TRA = Average marginal tax rate for income group less than RM 2,500

TRB = Average marginal tax rate for income group between RM 2,500 and RM 10,000

TRC = Average marginal tax rate for income group between RM 10,000 and RM 50,000

TRD = Average marginal tax rate for income group between RM 50,000 and RM 100,000

TRE = Average marginal tax rate for income group above RM 100,000

FS = Rate of fiscal incentives for savings

Hypothesis A is derived from the Income Poverty Minimisation Theory (Kanbur, Keen & Tuomala 1991):

'To reduce the poverty gap is to have higher net income induced by lowering of the marginal tax rate'

Since poverty gap is actually impossible to derive, following Todaro (1997), absolute poverty is a better indicator to actually delve into the poverty level.
Hypothesis A (Null Hypothesis): Absolute poverty remains unchanged with the changes of the marginal tax rate.

\[ Poverty = \beta_1 + \beta_2 TRA + \beta_3 TRB + \beta_4 TRBC + \beta_5 TRD + \beta_6 TRE + \epsilon \]

Hypothesis B is based on the study done by Wahab (1972) in Sudan who concluded that:

'Personal income tax, by defining taxable income to include interest (and dividends) offers no incentive for savings'

Hypothesis B (Null Hypothesis): Private savings remain unchanged with changes in interests (with respect from savings) being exempt from tax

\[ PS = \beta_1 + \beta_2 I\cdot S + \epsilon \]

2.2.2 Mathematical Calculation

2.2.2.a Calculation of Marginal Tax Rates

Marginal tax rate is defined as the changes in taxes paid with respect to changes in income. The following is an example of calculation in the year 1980 for income group between RM 10,000 and RM 50,000.
Table 1: Sample calculation of Marginal Tax Rates

<table>
<thead>
<tr>
<th>Total Income (RM)</th>
<th>Δ in income</th>
<th>Tax Paid (RM)</th>
<th>Δ in tax paid</th>
<th>Marginal Tax Rate (MTR)</th>
<th>Average (MTR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the first 10,000</td>
<td>1,050</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On the first 15,000</td>
<td>5,000</td>
<td>2,050</td>
<td>1,000</td>
<td>(1,000 / 5,000) = 0.20</td>
<td></td>
</tr>
<tr>
<td>On the first 20,000</td>
<td>5,000</td>
<td>3,300</td>
<td>1,250</td>
<td>(1,250 / 5,000) = 0.25</td>
<td></td>
</tr>
<tr>
<td>On the first 25,000</td>
<td>5,000</td>
<td>4,800</td>
<td>1,500</td>
<td>(1,500 / 5,000) = 0.30</td>
<td></td>
</tr>
<tr>
<td>On the first 35,000</td>
<td>10,000</td>
<td>8,300</td>
<td>3,500</td>
<td>(3,500 / 10,000) = 0.35</td>
<td></td>
</tr>
<tr>
<td>On the first 50,000</td>
<td>15,000</td>
<td>14,300</td>
<td>6,000</td>
<td>(6,000 / 15,000) = 0.4</td>
<td>0.30</td>
</tr>
</tbody>
</table>

2.2.2.b. **Calculation of Suits' Index of Progressivity**

The curve of the Suits' Index is concave up and increasing. Thus, it is part of a parabola. The curve of a parabola has the equation of \( y = ax^2 + bx + c \)

Hence, three points that lie on the curve need to be chosen as values in determining the value of \( a, b, \) and \( c \). Following is an example for the year 1980.

The three points chosen are: \((0, 0), (37.98, 25.59), \) and \((100, 100)\)

The substitution of these values in the equation provides the value of:
\[
\begin{align*}
a &= 0.005259986 \\
b &= 0.474001405
\end{align*}
\]
Integration needs to be used in order to obtain the area under the curve.

\[ I = \int_{0}^{100} 0.005259986x^2 \, dx + \int_{0}^{100} 0.474001405x \, dx \]

\[ I = 0.0017533287 x^3 \bigg|_{0}^{100} + 0.237007025 x^2 \bigg|_{0}^{100} \]

\[ I = 4123.335725 \]

Knowing the formula of a triangle \( \text{Area} = \frac{1}{2} \times \text{base} \times \text{height} \): the area under the 45-degree line is equivalent to 5,000.

Thus, the Suits’ index of progressivity for the year 1980 is:

\[ S = 1 - \frac{4.123.335725}{50000} \]

\[ S = 0.175332855 \]

Chart 1: Progressivity Table

<table>
<thead>
<tr>
<th>Extreme Regressivity</th>
<th>Proportional</th>
<th>Extreme Progressivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>0</td>
<td>+1</td>
</tr>
</tbody>
</table>