



## **Modeling the Influence of Attractive Petroleum Fiscal Regime Dimensions on Marginal Fields' Investment Climate in Malaysia**

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### **ABSTRACT**

Attractiveness of a country petroleum fiscal system plays significant role in investment location decisions of multinational oil companies. This study modeled the influence of attractive petroleum fiscal regime dimensions on marginal oil fields' (MOFs) investment climate in Malaysia. The dimensions examined in this study are fiscal administration/economy, fiscal certainty, fiscal efficiency, and fiscal equity/neutrality. Data was collected through survey of accounting, business and taxation experts' within Malaysian MOFs subsector. It was analyzed using partial least square – structural equation modeling version 3 and Special Package for Social Science version 19. The results showed that fiscal certainty, fiscal efficiency and fiscal equity/ neutrality were found to have significant positive influence on MOFs investment climate, adversely insignificant influence of fiscal administration/ economy on MOFs investment climate was reported. The result has established weaker link between petroleum fiscal regime administration and MOFs' investment climate in Malaysia, thus highlighting the scope for improvement on this dimension. Therefore, it is recommended that concerned authorities should consider strengthening of the administrative framework of MOFs' fiscal regime, thereby enhancing its investment climate. To the best of our knowledge this is the first study that employed the use of experts' perception in modeling the influence of attractive fiscal regime dimensions on oil and gas fields' investment climate, and eventually investment location decisions.

**Keywords:** Attractive Petroleum Fiscal Regime, Investment Climate, Investment Location Decision

**JEL Classifications:** M4, M48, Q4, Q48

### **1. INTRODUCTION**

Upstream oil and gas operations have been characterized by enormous investment capital requirements associated with different types of operational risks (Pongsiri, 2004). Moreover, increasing global hydrocarbon depletion has render many profitable oil provinces mature, posing more challenge to its investment attractiveness (Zanoyan, 2005). Thus, profitability of these provinces is reduced by fields' maturity while cost rises (Zanoyan, 2005), leading to negative effect on favorability of investment climate. In Malaysia, with the first oil lunched in 1910 in Miri Sarawak, the production reached its all time peak in 2004 (Economic Transformation Program, 2010; Manaf et al., 2014), hence growing number of marginal oil fields (MOFs) having equal

capital requirements with larger fields but low investment return. Saidu and Mohammed (2014) posited that the extent to which a country improve investment climate or attract investment into its oil and gas sector depends on many factors including attractive fiscal system.

To improve the investment climate in its MOFs Malaysian government has taken several fiscal measures that are likely to enhance its fiscal regime attractiveness, which eventually will improve the fields' investment climate. These fiscal measures include: (1) Tax rate reduction from 38% to 25%, and change of tax-type from petroleum income tax to company income tax, (2) accelerated capital allowance from 10 to 5 years, (3) waiver of export duties of 10% for oil produced and exported from MOFs,

(4) investment allowance of 60-100% of capital expenditure, (5) transfer of qualifying capital expenditure is allowed between non-contiguous petroleum arrangements, lastly, (6) change of operating arrangement from production sharing contract to risk service contract (RSC). The expectation is that these fiscal changes will increase the attractiveness of its fiscal regime thereby enhancing investment climate and attractiveness. Thus, the objective of this study is to model the influence of attractive petroleum fiscal regime dimensions on MOFs' investment climate in Malaysia. The second part is literature review on investment climate and attractive petroleum fiscal regime. This followed by methodology as the third part. Discussion and conclusion formed the last part of the paper.

## 2. LITERATURE REVIEW

### 2.1. Investment Climate

Early scholars of investment climate such as Stern and Stern (2002) defined the concept as current and future policy, institutional and behavioral issues which influence investment's risks and returns. Policy is related to exchange rate, fiscal and monetary procedures. Institutional issues relate to bureaucracy, financial and legal systems. Behavioral issues are concerned with basic infrastructures that affect investors' decisions such as electricity, transport networks and communication. Investment climate has also been defined as wide-range of factors relating to legal, fiscal and political factors that can position country as a preferred investment destinations by foreigners entrepreneurs and accelerates the willingness of domestic ones to invest at home (Phillips, 2006). In World Bank's report titled "World Development Report," investment climate was defined as location-specific factors which enable companies to profitably invest, expand and create jobs through incentives and opportunities made available them in a given country (Mundial, 2004). By implication the incentives and opportunities available to companies can significantly enhance their profitability and expand their businesses in countries concerned.

Despite the conceptualization of investment climate as location-specific variables measured by many indicators, Ho et al. (2006) argued that investment climate is shaped by only two factors: Policies and resources. In Ho' (2006) investment climate conceptualization, policies means regulations and procedures related to investment decisions, while resources mean infrastructures such as communication, electricity, and transport available in particular investment location. It was opined that investment climate is a concept shaped by government policies and infrastructures (Keola, 2008). Another study posited that important factors such as access to finance, bureaucracy, corruption and infrastructures are variables that defined investment climate (Hallward-Driemeier, 2005). This assertion is based on the fact that, when infrastructures are poor, government is corrupt, lots of bureaucratic bottle-neck, and financial system is poor, the investment climate would be weak and firms may find it difficult to grow. The situation will be reversed when the aforementioned factors are functioning smoothly. More recently, in bio-based industry eleven-points were used in defining investment climate. These are consortium structures, food safety regulation, infrastructure, investors' enlightenment, public funding, research

and development funding, policy, public procurement, standards, regulations, and tax policy (Dammer and Carus, 2014). It can be summarized from the above definitions that investment climate is defined mainly by corruption, infrastructure, policy and regulations.

Notwithstanding, the bulk of literature on investment climate especially in relation to foreign direct investment, total factor productivity and firm performance, only few comprehensive measures are available (Hallward-Driemeier et al., 2006). Within the few measures, different range of approaches for measuring and assessing investment climate are available (Hallward-Driemeier et al., 2006; Silva-Leander, 2005; Smith and Hallward-Driemeier, 2005). Literature documented that measures of investment climate is industry specific. Thus, oil and gas industry has own peculiar measures. For oil and gas industry the measures emerged from the work of Zanoan (2005), with its first presentation in 2004 at a conference in Netherlands. Subsequently, the idea was published in *Oil, Gas and Energy Law* in 2005. Vahan Zanoan was a President and CEO of a Washington-based Petroleum Finance Company. He proposed ten-points for assessing investment climate of oil and gas sector projects in producing countries. Zanoan's ten-point include energy policy, sector strategy, effectiveness of National Oil Company (NOC), the role of International Oil and Gas Companies (IOGC), NOC/IOGC linkage, investment motivation of IOGC, clarity and transparency, bureaucracy, fiscal regime and realistic assessment of geological potentials. These ten-point measures were further applied by other scholars such as Risco Energy Investments Limited, which is upstream petroleum consulting company incorporated in Singapore and operating in South East Asia. Four surveys were conducted by Risco Energy in South East Asian Oil Producing Countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar Philippines, Thailand and Vietnam.) using ten-point proposed by Zanoan which in total defined oil and gas project investment climate (Graham, 2013). These four surveys were conducted over the period of 2005 to 2013. The important contribution made by Risco Energy's surveys was proposing four dimensions of oil and gas project investment climate from Zanoan's ten-point indicators. The dimensions proposed are strategy (measured by energy policy, strategy, effectiveness of NOC and role of IOGC), participation (measured by NOC/IOGC linkage and investment motivation of IOGC), operating environment (measured by clarity and transparency and bureaucracy) and risk and reward (measured by fiscal regime and geological potentials). It is evident from the foregoing that oil and gas project investment climate measures proposed by Zanoan's (2005) and subsequently investigated in others studies clearly reflect oil and gas project investment attractiveness.

### 2.2. Attractive Petroleum Fiscal Regime

Petroleum fiscal regime has been defined as a principle guiding the sharing of oil and gas wealth between government and investors (Nakhle, 2010). Petroleum fiscal regime encompasses taxation, fiscal arrangement, state participation and bonuses. The criteria for defining attractive petroleum fiscal regime are derived from the classic principles of judging tax system efficiency laid down

by Adam Smith in 1776 (Miller and Alalade, 2003). Though Adam Smith might not have had petroleum in his mind, his canons can be applied to evaluate attractiveness of a country's petroleum fiscal regime. Of these canons, first is canon of equity which measures the ability of government to collect tax from taxpayers based on their affordability. In oil and gas perspective to ensure equity, the OGC should pay tax based on profit margin after capital cost recovery (Miller and Alalade, 2003). Second is the canon of certainty which measure the extent to which the government ensure stability in the fiscal terms so that OGC can make an accurate estimate of their tax liability in due course as they expect no alteration to the current terms in the foreseeable future. Certainty of what OGC will actually pay as taxes enable them to make right investment decision on whether or not to exploit oil under a particular investment climate. Third is the canon of convenience, under this canon government is expected to give consideration to the timing of paying fiscal taxes and charges by OGC. Last is the canon of economy which requires that the petroleum fiscal regime should be designed in such away not distorts the decision of investors. Otherwise, reserve would remain unexploited leaving the government with no revenue and OGC with no economic benefits. Thus, Adam Smith canons can be guiding principles if the state desire is to make the fiscal regime attractive. Consequently, for petroleum fiscal regime to be attractive it has to have certain attributes such as adaptability, administrative framework, certainty, clarity, efficiency, equity, flexibility, neutrality, progressivity, risk sharing, profit sharing, stability and transparency (Mohammed, 2012; Ogunlade, 2010; Treasure, 2012), which are in line with Adam Smith's canons of judging efficient tax system. Therefore, attractive petroleum fiscal regime is defined in this study as a regime characterized by adaptability, administrative framework, certainty, clarity, efficiency, equity, flexibility, neutrality, progressivity, profit sharing, risk sharing, revenue rising potential, stability and transparency.

### 2.3. Relationship between Attractive Petroleum Fiscal Regime and Investment Climate

Petroleum fiscal regime is one of the important factors consider by investors when deciding investment destinations among oil and gas producing countries (Shimutwikeni, 2011). Studies highlighted that attractiveness of country's fiscal regime features significantly on it chances to attract both foreign and domestic investment into its oil and gas sector (Akhigbe, 2007; Oldianoson, 2004). It is emphasized that OGCs can endure investment in oil fields with low return on investment, low per barrel profit and project NPV if fiscal regime is attractive; neutral, stable and commensurate investor take (Akhigbe, 2007). In globalized world today investment is now becoming dependent upon global tax policies and fiscal regimes which eventually have an impact on flow of investment into a country (Kondrashov, 2013). Thus, many countries overhaul their fiscal regime in order to make it attractive so as to be a preferred destination for investment capital, talent and innovation (Roy, 2013). It has been stressed that petroleum fiscal regime design influences the perception regarding competitiveness of oil and gas basin; when petroleum fiscal regime is carefully designed it is regarded as an invitation for investors to lend their capital in a particular oil and gas basin (Nakhle, 2010). Though not a direct relationship but a model proposed by Manaf et al. (2014) proposed

that attractive petroleum fiscal regime can stimulate the influence of petroleum taxes and incentives on MOFs' investment climate. This implied the possible influence of attractive petroleum fiscal regime on MOFs' investment climate in Malaysia.

Moreover, the influence of attractive fiscal regime on oil and gas investment climate was highlighted by theory of economic rent (Nakhle, 2007; Wessel, 1967). Economic rent is defined as the difference between gross revenue and actual cost incurred in exploring oil and gas resources (Dickson, 1999), which means profitability. Thus, economic rent in essence defined investment climate. In fact, it was argued that a stable and progressive fiscal regime captures economic rent (Nakhle, 2007). A fiscal regime that captures economic rent has the potentiality of improving investment climate. In fact, Saidu and Mohammed (2014) clarified that country's fiscal system is one of the factors influencing its oil and gas investment attractiveness. And specifically, US-Commercial Law Development Program (2013) posited that predictable tax rate and its stability predicate FDI in oil and gas sector, thus, highlighting the relevance of taxation in gas investment. Owing to these conceptual and theoretical highlights this study will empirically investigate the influence of attractive fiscal regime dimensions on MOFs' investment climate in Malaysia.

Owing to lack empirical evidence on the influence of attractive petroleum fiscal regime on investment climate and location decisions, the argument towards the development of the hypothesized relationship has been developed logically in line with constructs operational attributes. Fiscal administration and economy of petroleum fiscal system refers to the administration framework and transparency in the fiscal system (Manaf et al., 2016). Ideally, when strong administrative framework exist with transparent operating modalities it would be likely to persuade investors to believe that the country is fair enough in designing fiscal system that will not be skewed towards the government, thus, influencing their investment location decision towards such a country. Following this argument, this hypothesis is postulated.

H<sub>1</sub>: Administration/economy of petroleum fiscal regime will be positively related to MOFs' investment climate in Malaysia.

Certainty in fiscal petroleum fiscal system implied that the regime for the foreseeable future (Miller and Alalade, 2003). This will enable oil companies to make an accurate estimate of its tax liability ahead as they expect no alteration to the current terms in the foreseeable future (Manaf et al., 2016). In searching for investment location, oil companies will be more likely to decide for a location with some level of certainty in its fiscal terms, as they expect the investment climate to be favorable thereby influencing their location decisions. Following these argument, the following hypothesis is formulated.

H<sub>2</sub>: Certainty of petroleum fiscal regime will be positively related to MOFs' investment climate in Malaysia.

Efficiency of petroleum fiscal regime is another factor that will likely influence investment climate and eventually investment location decisions as investment are looking for favorable investment climate in deciding their investment destination. Efficiency in

petroleum fiscal regime implied that the regime simple, flexible, increase investment, predictable and progressive for the investors (Manaf et al, 2016). Thus, a fiscal regime with these attribute will likely influence investment climate, and eventually location decisions. Following these insights, this hypothesis is developed.

H<sub>3</sub>: Efficiency of petroleum fiscal regime will be positively related MOFs' investment climate in Malaysia.

Equity in fiscal regime means that government to collect tax from oil companies based on their affordability in line with the profitability of their operations. Such that oil companies will pay tax based on profit margin after capital cost recovery (Miller and Alalade, 2003). It also implied that such regime should have a justifiable risk and return sharing mechanism within the fiscal arrangement. When this is assured, OGC will assume that the investment climate will be favorable to them, hence, deciding to invest in such a country with neutrality and equitable risk/reward sharing mechanism. In line with this argument, the following hypothesis is postulated.

H<sub>4</sub>: Equity/Neutrality of petroleum fiscal regime will be positively related to MOFs' investment climate in Malaysia.

Drawing from the above hypotheses, the research model which depicts the direction of the relationship between the dimensions of attractive fiscal regime and investment climate is discussed hereunder.

### 2.4. Research Model

It is evident from the foregoing conceptual and theoretical evidences that attractive petroleum fiscal regime may influence the oil and gas project's investment climate. It is clear that the fiscal regime that captures economic rent can encourage investment in oil and gas industry. Moreover, it was posited that fiscal regime neutrality, fiscal regime stability, and fiscal regime flexibility can influence country upstream oil and gas investment attractiveness (Saidu and Mohammed, 2014). Moreover, Nakhle (2007) also noted that fiscal stability and fiscal complexity influences the investment decisions in oil and gas industry. In line with these evidences the following model is proposed with seeks validate to the influence of attractive petroleum fiscal regime dimensions on MOFs' investment climate in Malaysia.

Therefore, Figure 1 modeled the influence of attractive petroleum fiscal regime dimensions on MOFs' investment climate, hence proposed to be validated in this study.

## 3. METHODOLOGY

### 3.1. Population and Sample

The study has a total population of 361 respondents who are oil and gas staffs with job specializations as: Oil and gas Accountants, auditors, tax consultants, business development managers and contract managers. The respondents are employed by 16 institutions in three clusters (government, industry and practitioners). These are: Four government institutions for government cluster; eight private oil companies for industry cluster; and four accounting firms for practitioners' cluster. All these institutions are related to MOFs, directly or indirectly.

Based on the total population of 361 respondents, the sample of the study stood as 186, with 5% precision level and 95% confidence interval (Krejcie and Morgan, 1970). In order to maximize response rate 361 questionnaires were distributed; however, only 123 were returned representing 66.13% of the sample. This response rate is considered adequate in line with Sekaran (2003) who posited that a response rate of 30% is adequate for a survey study. However, 120 cases were finally used for the analysis due to deletion of 3 cases resulting from data screening and meeting the requirements of structural equation modeling (SEM). Failure to delete those cases may affect the statistical accuracy of path estimates in the study (Tabachnick and Fidell, 2007). Data screening was performed using Special Package for Social Science version 19.

### 3.2. Measurements

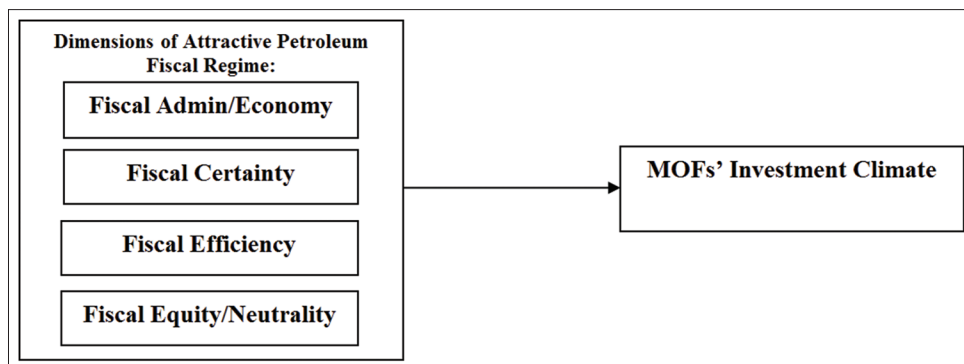
#### 3.2.1. MOFs' investment climate

Ten-point measures of oil and gas fields' investment climate developed by Zanoayan (2005) were used in this study. The ten-points are; energy policy, sector strategy, effectiveness of NOC, the role of IOGC, NOC/IOGC linkage, investment motivation of IOGC, clarity and transparency, bureaucracy, fiscal regime and realistic assessment of geological potentials. All the ten items were measured using 7 Likert scale; (1) strongly disagree, (2) disagree, (3) somewhat disagree, (4) neutral, (5) somewhat agree, (6) agree, to (7) strongly agree. The ten items were used in previous studies such as Risco Energy(2013) and (Graham, 2013).

#### 3.2.2. Attractive petroleum fiscal regime

Measures of attractive petroleum fiscal regime were underpinned by classic principles of judging tax system efficiency laid down by

Figure 1: Influence of attractive petroleum fiscal regime dimensions on marginal oil fields' investment climate



Adam Smith in 1776 (Miller and Alalade, 2003). These principles are canons of equity, certainty, convenience and economy. Therefore, fourteen items were derived from the literature for the operationalization of these four canons; adaptability, administrative framework, certainty, clarity, efficiency, equity, flexibility, investor revenue raising potentials, neutrality, progressivity, risk sharing, profit sharing, stability and transparency (Ajayi, 2008; Akhigbe, 2007; Ambakederemo, 2010; Amoako-Tuffour and Owusu-Ayim, 2010; Menezes, 2005; Mohammed, 2012; Ogunlade, 2010; Okobi, 2009; Oldianoson, 2004; Onyeukwu, 2008; Oyinlola, 2008; Sarsenbayev, 2010; Shimutwikeni, 2011; Tordo, 2007; Treasure, 2012). The 14 items were group into four dimensions through factor analysis. These are fiscal administration/economy, fiscal certainty, fiscal efficiency and fiscal equity and neutrality which were measured using two, two, seven and three items respectively. Similar to investment climate, seven-point Likert scale was used in operationalization of the fourteen items: (1) Strongly disagree, (2) disagree, (3) somewhat disagree, (4) neutral, (5) somewhat agree, (6) agree, to (7) strongly agree. It is expected that the fourteen items will directly capture the respondents' perceptions on attractiveness of petroleum fiscal regime applied to MOFs.

### 3.3. Analytical Procedures

For exploring the four dimensions of attractive petroleum fiscal regime, in line with theory- principles of judging efficient tax system - Adam Smith in 1776 (Miller and Alalade, 2003), factor analysis was conducted to explore the theatrically proposed four dimensions of attractive fiscal regime using the fourteen items derived from the literature. In this, principal component analysis was utilized using four fixed factors highlighted by the theory (Pallant, 2010; 2011).

For main analysis on the relationship between attractive petroleum fiscal regime dimensions and MOFs' investment climate, partial least square (PLS) SEM was used. This is owing to the small sample size (Hair et al., 2011; Ringle et al., 2005).

## 4. ANALYSIS AND RESULTS

### 4.1. Demographic Profile in the Respondents

Table 1 presents the demographic profiles of the respondents. The demographics examined include age, gender, qualification, and employer.

From Table 1, it is evident from the above that 35.8% are <30 years of age, 37.5% aged 30-39 years, 19.2% aged 40-49 years, and the remaining 7.5% are 50 years and above. Of these ages, 64.2% are male, while 35.8% are female. Majority of the respondents, about 81.7% have possessed diploma/degree/professional qualifications, while the remaining 18.3% have master degrees/PhDs. Government institutions employ 26.7% of the respondents, private oil companies employ 57.5%, the remaining 15.8% are employed by accounting firms.

### 4.2. PLS Path Modeling

This study follow two-step process of PLS path modeling for the model evaluation (Hair et al., 2011; Henseler et al., 2009). The first step is measurement model evaluation, which covers the

evaluation of indicator reliability, internal consistency reliability, convergent validity and discriminant validity. The second step is structural model evaluation, which covers evaluations of significance of path coefficients, R-squared value, effect size ( $f^2$ ), and predictive relevance. For the structural model, the exercised was performed using 5000 bootstrapped samples and 120 cases in line with the recommendation of Hair et al. (2011), and Hair et al. (2013).

#### 4.2.1. Measurement model evaluation

Figure 2, Tables 2 and 3 present the results of measurement model evaluation. In Table 2, the result of items loadings, composite reliability (CR) for internal consistency reliability and average variance extracted (AVE) for convergent validity was presented. The thresholds are 0.70 for items loading, 0.70 for CR and 0.50 for AVE (Hair et al., 2011; Hair et al., 2012; Hair Jr. et al., 2013). In Table 3, the result for discriminant validity was presented. It is required that for construct to achieve discriminant validity, its square-root of AVE must be higher than its correlation with any other construct in the model (Fornell and Larcker, 1981; Hair et al., 2011).

Result in Table 4 showed that all the items have meeting required 0.40-0.70 and above, CR are all >0.70, and AVE are all >0.5. This implied that the constructs meet the requirements for indicator reliability, internal consistency reliability and convergent validity respectively (Hair et al., 2011; Hair et al., 2012; Hair Jr. et al., 2013).

Table 2 showed that the square-root of AVE of each latent construct is higher that its correlation with any other construct within the model. In essence, all the constructs satisfied the requirement for discriminant validity (Hair et al., 2011; Hair et al., 2012; Hair Jr. et al., 2013).

The results in Figure 2, Tables 2 and 4 revealed that the data has satisfied the measurement model requirement. Therefore, the study proceeded to structural model evaluation.

**Table 1: Demographics profile of the respondents**

Demographic profile	Frequency (%)
Age	
<30 years	43 (35.8)
30-39 years	45 (37.5)
40-49 years	23 (19.2)
50 and above	9 (7.5)
Total	120 (100)
Gender	
Male	77 (64.2)
Female	43 (35.8)
Total	120 (100)
Qualification	
Diploma/Degree/Professional Qualification	98 (81.7)
Masters/PhD	22 (18.3)
Total	120 (100)
Employer	
Government institutions (Government)	32 (26.7)
Private oil companies (industry)	69 (57.5)
Accounting firms	19 (15.8)
Total	120 (100)

4.2.2. Structural model evaluation

Results of structural model evaluation are presented in Figure 3, Tables 3-7. Table 3 presented that result of significance of path coefficients for hypothesis testing, which were evaluated using t-statistics and P values. Table 5 presented the result of coefficient of determination-R-squared which was evaluated using Falk and Miller (1992), who proposed that R-squared of 10% is the minimum acceptable. Table 6 presented the result of effect sizes based on Chin (1998) and Cohen (1988) who classified effect sizes of 0.02, 0.15 and 0.35 as small, medium and large respectively. Table 7 presented the result of model predictive relevance using cross-validated redundancy. The criteria is that any model with predictive relevance  $Q^2 > 0$ , has a predictive relevance (Geisser, 1974; Stone, 1974).

Table 3 is used in testing four hypotheses formulated under Figure 1. Hypothesis 1 postulated that effective administration/economy of petroleum fiscal regime will be positively related to MOFs' investment climate in Malaysia. The result from Table 3

failed to support this hypothesis ( $\beta = -0.012$ ,  $t = 0.123$ ,  $P = 0.451$ ). This is in line with Lee (2013) who posited that there are still scope for improvement in relation to transparency and governance of oil and gas sector in Malaysia. In this case, Centre for Public Policy Studies (n.d.) claimed that there are limited information made available on the operations and revenue administration for oil and gas sector in Malaysia, thus, recommended that provision should be made for the disaggregation of all fiscal payments such as royalty and taxes in disclosure and reporting of oil and gas revenues; thereby improving petroleum fiscal administration.

Hypothesis 2 proposed that certainty of petroleum fiscal regime will be positively related to MOFs' investment climate in Malaysia. The result in Table 3 supports this hypothesis ( $\beta = 0.155$ ,  $t = 1.381$ ,  $P = 0.084$ ). This result is consistent with the disclosure of Bank Negara Malaysia that the government commitment in enhancing economic certainty improves business investment climate in Malaysia (Bank Negara Malaysia, 2012).

Table 2: Discriminant validity

Latent constructs	Fiscal Admin/ Economy	Fiscal certainty	Fiscal efficiency	Fiscal equity/ Neutrality	Investment climate
Fiscal Admin./economy	0.905				
Fiscal certainty	0.408	0.895			
Fiscal efficiency	0.529	0.621	0.781		
Fiscal equity/Neutrality	0.351	0.518	0.526	0.837	
MOFs' investment climate	0.240	0.393	0.420	0.393	0.747

Table 3: Path coefficients for hypotheses testing

Hypotheses	Beta	SE	T statistics	Sig.	Decision
Fiscal admin/economy->MOFs' investment climate	-0.012	0.100	0.123	0.451	Not supported
Fiscal certainty->MOFs' investment climate	0.155	0.112	1.381	0.084*	Supported
Fiscal efficiency->MOFs' investment climate	0.226	0.096	2.352	0.009***	Supported
Fiscal equity/Neutrality->MOFs' investment climate	0.198	0.092	2.152	0.016**	Supported

\*10% significance level, \*\*5% significance level, \*\*\*1% significance level, all 1-tailed test

Figure 2: Measurement model

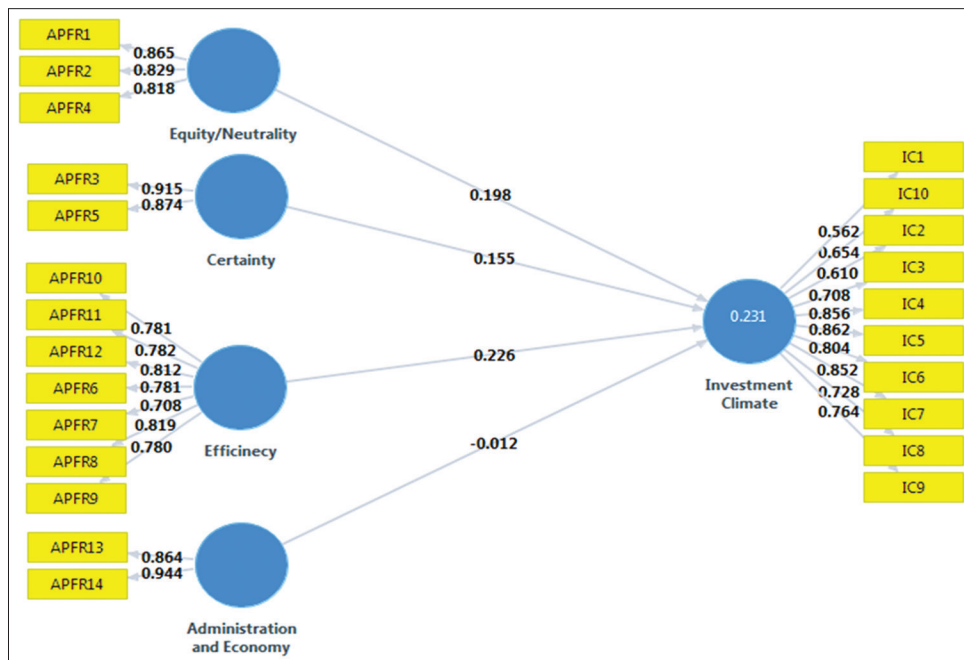


Figure 3: Structural model

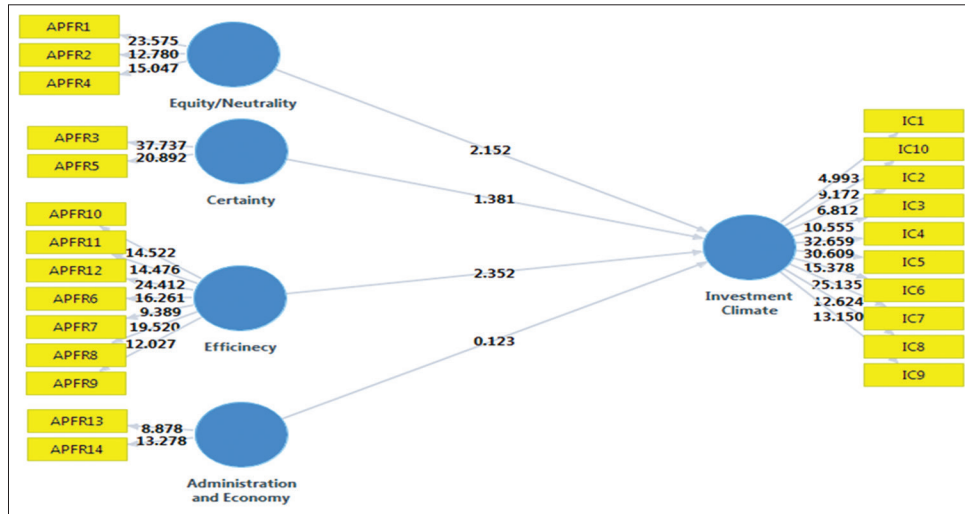


Table 4: Items loadings, composite reliability and average variance extracted

Constructs/Items	Loadings	Com-posite reliability	AVE
Fiscal administration/economy		0.900	0.818
APFR13	0.864		
APFR14	0.944		
Fiscal certainty		0.889	0.800
APFR3	0.915		
APFR5	0.874		
Fiscal efficiency		0.916	0.610
APFR6	0.781		
APFR7	0.708		
APFR8	0.819		
APFR9	0.780		
APFR10	0.781		
APFR11	0.782		
APFR12	0.812		
Fiscal equity/Neutrality		0.876	0.701
APFR1	0.865		
APFR2	0.829		
APFR4	0.818		
MOFs' investment climate		0.925	0.558
IC1	0.562		
IC2	0.610		
IC3	0.708		
IC4	0.856		
IC5	0.862		
IC6	0.804		
IC7	0.852		
IC8	0.728		
IC9	0.764		
IC10	0.654		

Table 5: R-squared

Endogenous construct	R-squared	Adjusted R-squared
MOFs' investment climate	0.231	0.204

Hypothesis 3 projected that efficiency of petroleum fiscal regime will be positively related MOFs' investment climate in Malaysia. Result in Table 3 supports this hypothesis ( $\beta = 0.226$ ,  $t = 2.352$ ,  $P = 0.009$ ). This is consistent with the assertion that Malaysia fiscal regimes are efficient and effective compared to other countries

Table 6: Effect sizes

Exogenous constructs	f <sup>2</sup>	Effect size
Fiscal administration/Economy	0.00	None
Fiscal certainty	0.02	Small
Fiscal efficiency	0.03	Small
Fiscal equity/Neutrality	0.03	Small

Table 7: Predictive relevance

Endogenous construct	SSO	SSE	1-SSE/SSO
MOFs' investment climate	1,200.000	1,063.409	0.114

as it encouraged foreign investor to make efficient utilization of operating cost (Airlangga, 2013).

Hypothesis 4 claimed that equity/neutrality of petroleum fiscal regime will be positively related to MOFs' investment climate in Malaysia. This hypothesis was supported by result in Table 3 ( $\beta = 0.198$ ,  $t = 2.152$ ,  $P = 0.016$ ). This is consistent with the current situation of MOFs' fiscal regime in Malaysia, where RSC are not required to pay royalty. In this, Nakhle (2008) posited that abolition of royalty is the first step of ensuring neutrality of petroleum fiscal regime.

It is evident from Table 5 that both the r-squared (23.1%) and adjusted r-squared (20.4%) are above the recommended minimum value of 10% (Falk and Miller, 1992). Therefore, the coefficient of determination – r-squared of this study can be considered adequate. In essence, it means that dimensions of attractive petroleum fiscal regime explain 23.1% of the changes in MOFs' investment climate in Malaysia.

Table 6 revealed that f<sup>2</sup> of fiscal administration/economy is 0.00; this implied that the construct has low effect on MOFs' investment climate in Malaysia. However, fiscal certainty, fiscal efficiency and fiscal equity/neutrality have f<sup>2</sup> of 0.02, 0.03 and 0.03 respectively; explaining that all the constructs have small effects respectively (Chin, 1998; Cohen, 1988).

Table 7 showed that the model examined in this study has a predictive relevance, because the Q<sup>2</sup> is 0.114 which is >0. Geisser

(1974) and Stone (1974) posited that a model with  $Q^2 > 0$  has a predictive relevance.

## 5. CONCLUSION, PRACTICAL AND THEORETICAL CONTRIBUTION, AND DIRECTION FOR FUTURE RESEARCH

The paper modeled the influence of attractive petroleum fiscal regime dimensions on MOFs' investment climate in Malaysia. The result showed that fiscal administration/economy has insignificant relationship with MOFs' investment climate in Malaysia. Contrarily, Positive relationships were found between fiscal certainty, fiscal efficiency, fiscal equity/neutrality and MOFs' investment climate in Malaysia. In line with this findings the study provide insights for multiple attributes decision making by OGC for the investment location decision within oil and gas industry.

### 5.1. Practical and Theoretical Contributions

The result has established weaker link between petroleum fiscal regime administration and MOFs' investment climate in Malaysia, thus highlighting the scope for improvement on this dimension. Therefore, it is recommended that concerned authorities should consider strengthening of the administrative framework of MOFs' fiscal regime, thereby enhancing its investment climate. Though significant link has been established on the relationships between fiscal certainty, fiscal efficiency, fiscal equity/neutrality and MOFs' investment climate in Malaysia, concerned authorities should ensure the sustainability and enhancement of such relationship which in essence will add more investor-confidence as well as continued interest in Malaysian MOFs. The study highlights that apart from other factors not considered here, the attribute of attractive petroleum fiscal regime that encompasses economy/administration, certainty, efficiency and economy of the fiscal system play important role in predicting investment climate, and eventually, competitiveness of Malaysia MOF sector. It highlights that fiscal efficiency ( $\beta = 0.226$ ) is the most important predictor to MOF investment climate, followed by fiscal equity/neutrality ( $\beta = 0.198$ ), then fiscal certainty ( $\beta = 0.155$ ) and lastly fiscal administration ( $\beta = 0.012$ ) which is less important in influencing investment climate and location decisions compared to the other three variables.

Theoretically, while evidence exists in developed and developing nations on the influence of attractive petroleum fiscal regime on upstream oil and gas investment, analyses are mainly scenario-based conducted using investment appraisal techniques such as net present value, internal rate of return and profitability index. The shortcoming of scenario-based analysis is that it cannot be performed without lots of assumptions. To the best of our knowledge this is the first study that employed the use of experts' perception in modeling the influence of attractive fiscal regime dimensions on oil and gas fields' investment climate, eventually investment location decisions. Moreover, the study has provide empirical evidence on the application of Adam Smith's canons of efficient tax system in oil and gas fiscal setting, through modeling its implication to investment climate.

### 5.2. Limitations and Direction of Future Research

The major limitation of this study is small sample. Owing to the small sample size of only 120 cases, the outcome of this study should be applied with caution. Though many oil and gas related studies that used perception-based methodologies have sample sizes smaller than the one utilized in this study, future studies should consider the enlargement of the sample to enhance robustness of the analysis. The study has some suggestions for future research. First, the perception-based methodology employed in this study for modeling the influence of attractive petroleum fiscal regime dimensions on MOFs' investment climate called for its wider application in other settings so as to provide more evidence and explore areas for improvement. Second, future studies should consider further examinations of the dimensions of attractive petroleum fiscal regime so as to confirm its' internal consistency reliability, convergent validity and discriminant validity.

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