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# Effects of fiscal regime changes on investment climate of Malaysia's marginal oil fields: Proposed model

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**Abstract**

The paper proposes a model to examine the effect of the 2010 fiscal regime changes on investment climate of Malaysia's marginal oil fields. It proposes the use of investment appraisal tools, such as Net Present Value, Internal Rate of Return, Profitability Index, Saving Index and Access to Gross Revenue, for the study. Two scenarios would be considered using the fiscal terms of Production Sharing Contract (PSC) and Risk Service Contract (RSC), respectively. Each scenario would be of a fifteen-year simulation. Sensitivity analysis will also be conducted for both the scenarios under different prices and reserves levels. The study, when undertaken, will be beneficial to both industry and the government.


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*Keywords:* Fiscal regime; marginal oil field; oil and gas; investment

## 1. Introduction

Malaysia has been experiencing decline in oil production after its historical peak in 2004. A similar challenge is also being faced by the gas subsector, with its levels waning since 2010 (Economic Transformation Program, 2010). This is due to maturity of the basin and stranded marginal oil fields (Malaysia Petroleum Resources

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Corporation, 2014). The reserves in the marginal oil fields are quite small, standing at an average of 30 million barrels, and developing this reserve in an economically attractive manner is often challenging (Na, Zawawi, Liew & Razak, 2012). Nonetheless, Oil Majors do not consider investment in marginal fields; their interest lies in bigger fields considered more commercially attractive (Faizli, 2012).

Thus, to overcome the decline in production, new fiscal incentives have been introduced; the operating agreement of the marginal oil field was shifted from Production Sharing Contract (PSC) to Risk Service Contract (RSC) in 2010, leading to the amendment of the Petroleum Income Tax Act. However, despite this fiscal framework adjustments, up to July 2013, there were only three RSCs compared to 17 PSCs in almost the same period (Lee, 2013; Ley, 2012). Thus, this study intends to answer the research question: *Does the new fiscal framework improve the investment climate in the Malaysian marginal oil fields?*

Scenario analysis will be conducted in order to understand whether or not the new fiscal framework is more attractive to investors and can simulate the investment climate under the new fiscal framework compared to the old. Scenario analysis is not a real world analysis, but a simulation using different fiscal impositions to evaluate their differential investment attractiveness. Many studies have used this approach, such as Johnston (2002), Kaiser (2007) and Nakhle (2007).

The study will be significant in two ways. First, literature on the effect of fiscal regime changes on investment climate show mixed findings; hence, the need for more evidence. Second, evidence on the impact of the new Malaysian marginal oil fields' fiscal framework is limited.

The second part of the paper reviews the global literature on the effects of fiscal regime changes on investment climate. The third part proposes the methodology and scenario model assumptions. The fourth part is the conclusion.

## 2. Overview of the petroleum fiscal regime in Malaysia

### *2.1 Concessionary system*

Like in other oil producing countries, the concessionary system is the oldest form of petroleum fiscal regime in the Malaysian oil and gas industry. Shell was the first company to be awarded with concessionary contracts in the 1960s. In the late 1960s, more oil companies turned to Malaysia to explore oil and gas resources, including Conoco and Esso (Mehden & Troner, 2007). The fiscal regime components, known as royalty/tax, were charged by the State governments on whose land oil and gas was discovered (Lee, 2013). The concessionary arrangements were governed by mining enactments of individual States that possessed oil and gas resources.

### *2.2 Production sharing contract (PSC)*

The PSC emerged in the Malaysian oil and gas industry in the mid-1970s after the legislation of the Petroleum Development Act (1974). Another reason for PSC's introduction was the success of its arrangement in neighboring Indonesia (Pongsiri, 2004). The features of the PSC 1976, as outlined by the Coordinating Committee on Geosciences Program-CCOP (2004), consist of: 10% royalty, 20% cost oil ceiling, profit split of 70:30 in favor of Petronas and Petroleum Revenue Tax of 38 % paid by both Petronas and the contractor to the Government. Lee (2013) asserted that the fiscal regime of 1976 under the PSC arrangement was considered very stringent in terms of cost oil ceiling and profit splits; thus, some oil companies, such as Aquitaine, pulled out of Malaysia.

Having faced criticism on the stringent nature of PSC, 1976, especially on cost oil ceiling and profit splits, the Malaysian government adjusted its PSC regime nine years later in 1985. Adjustments were made in relation to cost oil ceiling and profit splits (CCOP, 2004).

With continued desire to improve fiscal terms and encourage investment into deepwater oil fields, in 1993, Malaysia designed a fiscal regime for deepwater oil fields (Layungasri, 2010). The reason for this fiscal change was due to the fact that Malaysia's oil and gas reserves were turning to deepwater oil fields. This fiscal regime has attracted some oil companies, like Total and Murphy (Lee, 2013).

With a view to further improve its investment climate under the PSC, in 1997, Malaysia introduced the Revenue over Cost (R/C) PSC (Putrohari, Kasyanto, Suryanto & Rashid, 2007). The main aspect of the R/C PSC is that it enables the contractors to recover the capital invested during the early stages of the project's productivity by granting the investor high cost recovery ceilings (Putrohari et al., 2007). Another issue in Malaysia's R/C PSC is the participating interest by Petronas in development and production activities at the rate of 20% which was absent previously (Putrohari et al., 2007).

PSC has remained the dominant operating arrangement in Malaysia's oil and gas industry. It was estimated that there were only five PSCs prior to 1998; however, with improvement of fiscal terms, especially with the introduction of different fiscal regimes, the number of PSCs has increased to 83 as of 2012 (Lee, 2013), and recently, Petronas celebrated 100 deepwater PSCs (Petronas, 2013).

### *2.3 Recent changes in petroleum fiscal regime in Malaysia: the risk service contract*

The RSC emerged in Malaysia's oil and gas industry in November, 2010, which led to the amendment of the Petroleum Development Act in 2011 (Wei, 2011). In its Malaysian form, the RSC is defined as "A contract between the host authority and contractors, where the host authority is the project owner and the contractors recover the development cost and are paid a fixed fee for services rendered, based on their performance, relevant to the development execution and subsequent production" (Petronas, 2011). The aim of this newest regime is to attract investment into a growing number of Malaysian Marginal Oil Fields. The new fiscal regime has introduced the following fiscal incentives as outlined by Wei (2011).

- Reduction of tax rate from 38% to 25%.
- Capital Allowance has been accelerated from 10 to five years.
- 10% export duty paid under PSC is waived on oil produced and exported from marginal oil development.
- Investment tax allowance of 60 - 100% on Capital Expenditure (CAPEX)
- Qualifying Exploration Expenditure is transferable between non-contiguous petroleum agreements.

Few years after its introduction, the regime managed to attract a few oil and gas investors, locally and from abroad. Three RSCs have already been signed in two licensing rounds.

## 3. Petroleum fiscal regime and investment climate literature

Studies on the influence of fiscal regime on investment climate have been conducted in developed, emerging and developing countries. The main proxy used to measure the effect of fiscal regime on investment climate through scenario analysis is usually Discounted Cash Flow (DCF) approach. In fact, it is disclosed in Nakhle (2007), that a survey conducted in 2001 showed that 99% of oil companies used DCF to evaluate the effect of fiscal regimes. The DCF is then used to compute many investment appraisal indicators, such as Pay-Back Period, Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Saving Index (SI) and Access to Gross Revenue (AGR). Therefore, studies in both developed, emerging and developing countries are discussed in the subsections below.

### *3.1 Developed countries*

In developed countries, some studies have investigated the effect of fiscal regime changes on investment viability and their sensitivities to changes in oil price. The findings show that changes in oil and gas prices improve the investment climate by making non-commercial viable fields to be economically attractive (Kemp & Stephen, 2011). Other studies have investigated the effect of tax relaxation and introduction of new allowances on investment climate. Abdo (2010), in his United Kingdom (UK) study, examined the effect of the 1983, 1987, 1988 and 1993 fiscal regimes on companies' revenue. His result showed that relaxation of petroleum tax had different effects on investments in the United Kingdom Continental Shelves (UKCS), with each relaxation leading to Oil

Company cash flow increase. In their analysis of 2011 tax changes, Kemp and Stephen (2011) found that when Supplementary Charge (SC)was removed under the 2011 tax system, many fields would pass the hurdle of NPV /I > 0.3 and NPV/I > 0.5. This implies that the removal might have improved the fields' investment climate. In a similar manner, Kemp & Stephen (2012) discovered that new investment incentives introduced in 2012 to complement the 2011 tax increase, substantially impacted the UKCS. They further pointed out that the 2012 allowances had a substantial increase in investment levels above those which would have been in the absence of such allowances. A similar view is also documented by Kazikhanova (2012), who posited that increase in the value of allowances may be a possible way to improve investment attractiveness of small and marginal oil fields in UKCS based on the 2011 budgetary tax provisions.

Conversely, other studies have found negative effect of tax increase on investment climate. In their presentations, Nakhle and Hawdon (2004) reviewed different fiscal regime changes in UKCS and evaluated their impacts on investors' perspectives. They found that the scenario of fiscal packages of 1978-1983 generated significant reduction in profitability of small fields; this meant that the fiscal package of 1975-1983 had negative impacts on investment climate of smaller fields. Similarly, Nakhle (2007) concluded that higher tax rate even during higher oil price may discourage investment and render the fields' investment climate unfavorable to investors, hence, negatively impacting government revenue. Furthermore, evidences show that the introduction of SC of 32 % in UKCS in 2011 without field allowances would have had a tragic long-term negative impact on investment in UKCS (Kazikhanova, 2012; Kemp & Stephen, 2012). In fact, Kazikhanova (2012) clearly posited that increase in SC under the 2011 budget had a negative impact on small profitable fields and marginal fields.

### *3.2 Developing and emerging countries*

Like developed countries, studies in developing and emerging countries show that fiscal regime changes are sensitive to oil price. Njeru (2010) utilized several key investment performance indicators to determine the impact of Kenya's fiscal regime on oil and gas fields' investment attractiveness. Evidence from the scenario analysis showed that NPV and IRR decreased in low oil price periods, although the Government Take (GT) comparatively remained unchanged and vice versa. Thus, Njeru (2010) concluded that Kenya's fiscal regime is not flexible enough to accommodate fluctuation in oil prices; hence, the investment climate may not be conducive to investors. Similar findings were also recorded in Nigeria, where Onaiwu (2009) found investors' profitability increased while GT reduced under the PSC of 1993, while the reverse was the case under the PSC of 2005. Other studies have compared fiscal regimes, either from domestic perspectives, i.e., by comparing many regimes in a particular country, or internationally among countries. Putrohari, Kasyanto, Suryanto and Rashid (2007) compared the effect of the fiscal regimes of Malaysia, Thailand, Indonesia, Vietnam and Brunei on investment climate. The finding showed that Thailand's R/T Concession of 1972 had the highest value in terms of investment, followed by Indonesia's FTP 1988 based on NPV, IRR and PI. Similarly, Coker (2012) compared Ghana's and Sierra Leone's fiscal regime and its effects on GT. The result from such comparison showed that Sierra Leone's fiscal instruments were operating more effectively. This especially happens due to combination of petroleum tax and income tax in the regime, which complement each other in opposing directions. Another international comparison was made by Blake and Roberts (2006) on the effect of the fiscal regime of Alberta, Papua New Guinea, Sao Tome and Principe, Nigerian, Tanzanian and Trinidad and Tobago, on investment attractiveness. The study, on the basis of NPV comparison, concluded that there is a higher relationship between fiscal terms and geological attractiveness on a regional basis than on a global basis; or, to put it in another way, the competition among governments for petroleum investment is taking place regionally, not globally.

However, other studies have shown little or no effect of fiscal regime changes on investment climate. Mead, Muraoka and Sorensen (1982) examined the effect of Mexico's fiscal regime on profitability of its oil and gas fields. The finding showed that despite the tax allowances and drastic increase in oil price, the after-tax earnings of oil leases of 1954-1969 were not greater than that of other industries on the basis of NPV, IRR and PI. Similarly, Emeka, David, Yun & Li-Fei (2012) found that the mean and standard deviation obtained from the scenario analysis for the proxies used in assessing the effect of fiscal regime on investment climate showed little difference to the base case values based on NPV, IRR and PV indicators.

It is evident from the foregoing that the fiscal regime has an impact on the investment climate of oil and gas fields. Some studies have recorded positive impacts while others show negative impact; some even show little or no impact. However, despite global evidences, though with conflicting findings, few evidences (if any) have examined the impact of Malaysia's marginal oil fields' fiscal regime changes on investment climate. Hence, this study aims to fill this research gap by simulating the investment climate of marginal oil fields under PSC and RSC terms.

### *3.3 Research conceptual framework*

The study is underpinned by the economic regulation theory. The central themes of the theory are to provide explanation on issues, such as who will benefit or bear the burden of the regulation, what form of regulation is required, as well as the effect of the regulation on allocation of resources (Stigler, 1971). Stigler further asserted that regulations are made for industries and are designed and implemented for their benefit. However, some regulations may have negative effects on industries, particularly those associated with heavy taxation (Stigler, 1971). Four types of regulation exist in accounting: command and control; self-regulation; disclosure regulation; and incentive-based regulation (Gaffikin, 2005). This study is concerned with incentive-based regulation. Gaffikin (2005) further asserted that although taxes have been used to discourage certain activities in a particular industry, equally, it can be used as positive incentive to encourage activities. As regulation can be negative when it prevents certain behavior, equally, it can be positive if it encourages certain behavior (Gaffikin, 2005). Thus, drawing from this theory we propose that marginal oil fields' fiscal regulation of 2010 improves oil fields' investment climate.

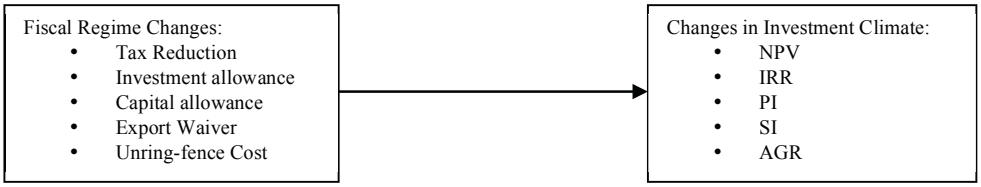


Figure 1. Research Conceptual Framework

## 4. Proposed methodology and model assumptions

The study intends to examine the effect of the 2010 fiscal regime changes on investment climate of marginal oil fields in Malaysia. Consequently, a 15-year scenario analysis using both PSC and RSC terms to simulate the investment climate under each of the two regimes will be conducted. Similar studies, such as Johnston (2002), Kaiser (2007) and Nakhle (2007) used the same approach. The scenario analysis is just a simulation of what would the investment climate be under different fiscal regimes; it is not a real world situation. The reason for selecting 15 years is that, one of the recent RSCs for marginal oil fields entered into by ROC, Dialog and Petronas Carigali, covers 15 years, and on average, RSC for marginal oil fields covers 10-15 years (Wei, 2011). The study will employ quantitative research design. Data will be analyzed using investment appraisal indicators, including NPV, IRR, PI, SI, and AGR. Additionally, sensitivity analysis will be conducted to measure how sensitive the two scenarios under PSC and RSC terms are to different oil price and reserve levels.

The study will assume a contract period of 15 years under both PSC and RSC frameworks for marginal oil fields. This is because exploration and development are expected to cover three years, with production commencing in the fourth year, just as in ROC, Dialog and Petronas Carigali RSC (Wei, 2011). The model assumes that production will reach its peak at 10% of the total reserves in the five years after the commencement of the production, i.e., in the eighth year which will then decline up to the fifteenth year. Reserves will be assumed at 30 million barrels which is the normal number for Malaysian marginal oil fields (Faizli, 2012; Na et al., 2012). However, sensitivities would be tested at different reserve levels of 15, 30 and 35, based on estimates by Coastal

Energy that Malaysia's marginal oil field reserves range from 15-35 million barrels (Coastal Energy, 2012). Costs will be assumed based on the offshore total cost per barrel as disclosed in Van Meurs' Report (Van Meurs, 2008). This would be split into Operating Expenditure (OPEX) and CAPEX of 46% and 54%, respectively, as used in Njeru's study (Njeru, 2010). Oil price will be assumed using high, average and low oil prices, based on the United States Energy Information Administration estimate. Service fee for RSC will be assumed to be fixed at USD12 per barrel based on estimates under the service contract by Moyes & Co. (Moore & Patterson, 2011).

## 5. Conclusion

The study, when undertaken, will provide explanation on the effect of the 2010 fiscal regime changes on investment climate of marginal oil fields, thus answering the research question. The study will be important as it will enable the understanding of whether the 2010 fiscal regime changes have achieved its objectives. It will also be beneficial to investors in understanding the effect of such changes on commercial viability of marginal oil fields.

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