Available online at
www.icas.my

INTERNATIONAL CONFERENCE ON ACCOUNTING STUDIES
ICAS 2015
AUG. 17-20 JOHOR BAHRU, MALAYSIA

International Conference on Accounting Studies (ICAS) 2015
17-20August 2015, Johor Bahru, Johor, Malaysia

Simulating of the influence of fiscal regime adjustment on marginal oil field's investment climate in Malaysia

Abdulsalam Mas'ud*[ab], Nor Aziah Abdul Manaf[a], Natrah Saad[a]

[a]*School of Accountancy, Universiti Utara Malaysia, Malaysia*
[b]*Department of Accountancy, Hussaini Adamu Federal Polytechnic, Nigeria*

Abstract

The need for improved governance of oil and gas sector and sustainability of production coupled with increasing number of stranded marginal oil fields mandated Malaysian authorities to adjust the fields' fiscal regime. The new regime came with special incentives, and changed the fiscal arrangement from production sharing contract to risk service contract. The influence of the new regime in comparison to the old one on marginal oil fields' investment climate was simulated under nine different scenarios relating to oil prices and reserves levels. Using internal rate of return, it was found that the fiscal regime under risk service contract has more favorable investment climate in majority of the scenarios- with exception to those relating to high oil prices, which fiscal regime under production sharing contract is more favorable. As implication for policy, to make the new fiscal regime more attractive under the risk service contract, contractors' remuneration fee should be attached not only to performance but also to high oil price. In essence, incentives given to contractors should be higher during soared oil prices. Concern should be made for the assumptions employed while applying the results for a decision.

Keywords: Fiscal regime, incentives, production sharing contract, risk service contract

1. INTRODUCTION

The need for improved governance of oil and gas sector and sustainability of production coupled with growing numbers of stranded marginal oil fields influenced Malaysian government's decision to introduce new fiscal regime for marginal oil fields in the year 2010 (Economic Transformation Program, 2010; Lacouture, 2013; Malaysia Petroleum Resources Corporation, 2014). The new fiscal regime changed the fiscal arrangement of marginal fields from production sharing contract (PSC) to risk service contract (RSC) and introduced special tax incentives. The new tax incentives include (i) reduced tax rate from 38 to 25 percent of chargeable profit; (ii) accelerated capital allowance from 10 to 5 years; (iii) waiver of export duty on oil produced and exported by marginal oil fields operators; (iv) investment tax allowance of 60-100 percent on qualifying capital expenditure (QCE) and; (v) qualified capital expenditure transferable between non-contiguous petroleum agreement within the same partnership or sole proprietorship. Petroleum Development Act was also amended in 2011 in line with the new development.

Despite the fiscal regime adjustment, between November 2010 - July 2014 there were only six RSCs (Mas'ud, Manaf, & Saad, 2014) compared to 17 PSCs between 2010-2012 (Ley, 2012). Thus, this study intends to provide empirical answer to the following research question: *Does the new fiscal regime improve the investment*

*Corresponding author. Tel.: +60166839225; +2347036824625
E-mail: masudabdussalam@yahoo.com

climate of marginal oil fields in Malaysia? Analyses were conducted which compared internal rate of return (IRR) of marginal oil field development project under two fiscal regime scenarios: scenario one used revenue over cost (r/c factor) PSC fiscal terms, while RSC fiscal terms were used for scenario two. The essence is to evaluate which of the two fiscal regimes render investment climate more attractive. Scenario analysis is not a real world analysis, but a simulation using different fiscal impositions at different oil prices and reserves levels to evaluate their differential investment attractiveness (Manaf, Saad, Ishak, & Mas'ud, 2014). Many studies have used similar approach (see (Johnston, 1994, 2002; Kaiser, 2007; Nakhle, 2007; Saidu & Mohammed, 2014)).

Two issues motivated the present study. First, there is global inconsistency in the literature relating to the effect of fiscal regime changes on investment climate. In some instances change of fiscal regime creates favorable investment climate, in others it render the investment climate less attractive. The second motivation is, to the best of our knowledge we did not come across a study which evaluate whether or not the new marginal oil fields' fiscal regime under RSC arrangement improved fields' investment climate beyond the old fiscal regime under PSC arrangement, hence, the need to provide empirical evidence.

The paper is divided into five parts. This part is the introduction, which is followed by the second part; the literature review. The third part is methodology and assumptions. The fourth part is analysis and result. The last part is conclusion which highlights the limitation and implication for future studies.

2. LITERATURE REVIEW

2.1 Petroleum Fiscal Regimes in Malaysia and Investment Climate

Some studies investigated the effect of fiscal regime changes on investment viability and their sensitivities to changes in oil price whilst, other studies investigated the influence of tax relaxation and offering new allowances on investment climate. Findings from the former showed that changes in oil and gas prices improve the investment climate by making non-commercial viable fields economically attractive (Kemp & Stephen, 2011). On same issue, Njeru (2010) found 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 under low oil price scenarios.

Evidence also showed that changes in fiscal regime may have positive influence on oil and gas project investment climate. In his UK study, Abdo (2010) found that relaxation of petroleum tax had different effects on investments in the United Kingdom Continental Shelves (UKCS), with each relaxation leading to increase in oil companies cash flow. Likewise, Kemp and Stephen (2011) found that when a supplementary charge (SC) was removed under the 2011 tax system, many fields had more better NPV than before SC removal. Kemp & Stephen (2012) also established that complementing 2011 tax increase with new allowances in 2012 had substantial positive impact on the UKCS oil and gas investments. Allowance may be a possible way to improve investment attractiveness of small and marginal oil fields in UKCS based on the 2011 budgetary tax provisions (Kazikhanova, 2012).

However, other studies documented negative influence on fiscal regime changes on investment climate. In Nigeria, Onaiwu (2009) found investors' profitability increased under the PSC of 1993, while the reverse was the case under the PSC of 2005. This mean that fiscal package of 2005 PSC has negative effect on project profitability compared to 1993 PSC. Nakhle and Hawdon (2004) found that the scenario of fiscal packages of 1978-1983 generated significant reduction in profitability of small fields; this indicated that the fiscal package had negative impacts on investment climate of smaller fields. Moreover, 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 (Nakhle, 2007). Evidence showed that 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 (Kemp & Stephen, 2012). Increase in SC under the 2011 budget had a negative impact on small profitable fields and marginal fields (Kazikhanova, 2012).

Nonetheless, some studies recorded insignificant influence of fiscal regime changes on investment climate. It was found 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 (Mead, Muraoka, & Sorensen, 1982). Similarly, Emeka, David, Yun and Li-Fei (2012) discovered that the mean and standard

deviation obtained from the scenario analysis for proxies used in assessing the effect of fiscal regime on investment climate showed little difference to the base-case values of projects' NPV, IRR and PI.

Literature documented missed results. In some instances change of fiscal regime impacted positivity on investment climate, in others, no effect, on the extreme is negative. Fiscal regime has different effect in different countries due to differential tax policies and reserve prospectively, hence, reserve outcome of one country cannot be applied for the others. Consequently, the present study will evaluate the investment climate of marginal oil fields' in Malaysia under PSC and RSC fiscal regime scenarios.

2.2 Petroleum Fiscal Regimes in Malaysia

Historically, concessionary system which was repelled by PSC in 1974 had been the oldest form of fiscal arrangement in Malaysian oil and gas industry. This arrangement was first entered into with Shell in early 1960s. Late 1960S also saw more companies such as Conoco and Esso who joined the race of concessionary arrangement in Malaysian oil and gas industry (Mehden & Troner, 2007). It fiscal components include royalty and tax which are levied by governments of oil and gas producing states (Lee, 2013). Emergence of PSC in 1970s led to the abolishing of concessionary arrangement.

In mid-1970s, PSC emerged in Malaysian oil and gas industry after promulgation of Petroleum Development Act in 1974. PSC as a fiscal arrangement has been experiencing series of adjustment with view of enhancing its competitiveness thereby improving the investment climate of Malaysian oil and gas industry. PSC was adjusted in 1985, deepwater PSCs of 1993, and Revenue over Cost PSC of 1997. Each adjustment is normally accompanied by simplified and attractive fiscal terms that can encourage more participation in Malaysian oil and gas industry. Thus, PSC has been the most dominant form of fiscal arrangement in Malaysian oil and gas industry. It was documented that only 5 PSCs exist prior to 1998, but continuous simplifications of fiscal terms has made 83 PSCs into record as at 2012 (Lee, 2013). Lately, in 2013 PETRONAS celebrated 100 deepwater PSCs (Manaf, et al., 2014).

Due to continuous desire to improve attractiveness of small and marginal oil fields, Malaysian government introduced RSC in 2010 which led to the amendment of Petroleum Development Act IN 2011 (Wei, 2011). RSC is an arrangement between government - represented by PETRONAS as project owner and private oil companies as contractors, whereby the contractors are allowed to recover the development cost incurred and be paid a fixed fee for the services rendered based on production and performance (PETRONAS, 2011). As mentioned in the introduction this new regime that came-up with RSC arrangement contained reduced tax rate and allowances capable of improving marginal oil fields' investment climate.

With recent adjustment in marginal oil fields' fiscal regime from PSC to RSC, the current study did not come across any others study which investigated whether or not the RSC fiscal regime has more improvement in marginal oil fields' investment climate than the former PSC regime. Consequently, the present study will evaluate the investment climate of marginal oil fields' in Malaysia under PSC- specifically R/C factor PSC and RSC fiscal regime scenarios to understand which one has more impact. In line with this development, the study will test the following hypotheses:

H_{1a} RSC's fiscal regime will have higher IRR than PSC's under high oil price-high reserves.
H_{1b} RSC's fiscal regime will have higher IRR than PSC's under high oil price-medium reserve.
H_{1c} RSC's fiscal regime will have higher IRR than PSC's under high oil price-low reserve.
H_{1d} RSC's fiscal regime will have higher IRR than PSC's under medium oil price-high reserve.
H_{1e} RSC's fiscal regime will have higher IRR than PSC's under medium oil price-medium reserve.
H_{1f} RSC's fiscal regime will have higher IRR than PSC's under medium oil price-low reserve.
H_{1g} RSC's fiscal regime will have higher IRR than PSC's under low oil price- high reserve.
H_{1h} RSC's fiscal regime will have higher IRR than PSC's under low oil price-medium reserve.
H_{1i} RSC's fiscal regime will have higher IRR than PSC's under low oil price-low reserve.

2.3 Model Derivation

To achieve the objective of this paper, discount cash flow (DCF) will be used to compute project internal rate of return (IRR). It was 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 climate evaluation techniques 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). It was categorically

clarified that when comparing mutually exclusive project NPV is the best technique, but for evaluation of single project under different scenarios IRR is better (Arshad, 2012). The objective of this study is to evaluate investment climate of marginal fields' development project under two fiscal regime scenarios: PSC and RSC, following Arshad (2012) IRR is best evaluation tool, hence it is used in this study. Before IRR computation, DCF of the project is calculated as:

Investor's DCF under PSC Regime

$$DCF_t = CR_t + PO_t - CAPEX_t - OPEX_t - RCESS_t - ED_t - TAX_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where;

DCF_t = *Investor's Discounted Cash Flow*
CR_t = *Cost recovered in year t*
PO_t = *Share of investor's profit oil in year t*
$CAPEX_t$ = *Capital Expenditure incurred in year t*
$OPEX_t$ = *Operating Expenditure in year t*
$RCESS_t$ = *Research CESS in year t*
ED_t = *Export Duty in year t*
TAX_t = *Tax paid in year t*

Investor's DCF under RSC Regime

$$DCF_t = CR_t + FEEOIL_t - CAPEX_t - OPEX_t - TAX_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where;

CR_t = *Cost recovery in year t*
$FEEOIL_t$ = *Fee Oil received in year t*
$CAPEX_t$ = *Capital Expenditure in yeart*
$OPEX_t$ = *Operating Expenditure incurred in year t*
TAX_t = *Tax paid in year t*

The DCF under the two fiscal regime scenarios are expressed in line with the related studies (Hao & Kaiser, 2010; Nakhle, 2010). Then based on the DCFs above, IRR of the project under the two fiscal regime scenarios was computed using the following formula.

Project's IRR: Investor's Perspective

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b}(r_b - r_a) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

Where:

r_a = lower discount rate choosen
r_b = higher discount rate choosen
NPV_a = NPV at r_a
NPV_b = NPV at r_b

3. METHODOLOGY AND ASSUMPTIONS

3.1 Data

This study used Kapal, Banang and Meranti (KBM) marginal fields project data located in Offshore Peninsular Malaysia. The data was obtained from the information released by the project contractor (Coastal Energy, 2012) and the offshore technology.com (Offshore Tecnology.com, 2014). Hence, assumptions relating to productions, reserves, costs and duration are based on the information from these sources.

Fig.1. Kapal, Banang and Meranti Fields (KMB) Offshore Peninsular Malaysia

3.2 Provisions for the Two Scenarios: R/C Factor PSC and RSC Fiscal Regimes

The following fiscal provisions for R/C factor PSC and RSC contained in Table 1 and 2 were used in the analysis.

Table 1. Fiscal Provisions for R/C Factor PSC and RSC

R/C Factor PSC Scenario	Royalty of 10 % on gross production, PIT of 38%, Research CESS of 0.5 % Capital allowance for 10 years, Export Duty 10% and Cost recovery and profit split based on R/C ratio in Table 2 below.
RSC Scenario	Royalty paid by PETRONAS on its share, CIT of 25% no Research CESS, Accelerated Capital Allowance for 5years, Zero Export Duty, Remuneration fee 10%, and 100% cost recovery.

Table 2. R/C Ratio for Malaysian 1998 PSC

Contractor' R/C Ratio	**Cost Oil**		**Profit Oil**
	Cost Oil Ceiling	**Unused Cost Oil PETRONAS: Contractor**	**Profit Oil PETRONAS: Contractor**
0.0< R/C < =1.0	70%	N.A	20:80
1.0 < R/C <= 1.4	60%	20:80	30:70
1.4 < R/C <= 2.0	50%	30:70	40:60
2.0 < R/C <=2.5	30%	40:60	50:50
2.5 < R/C <=3.0	30%	50:50	60:40
R/C> 3.0	30%	60:40	70:30

3.3 Reserve, Production and Duration Assumptions

It was estimated that the recoverable reserves of KMB marginal field range from 15 to 35 million barrels (Coastal Energy, 2012). We assumed three reserve levels; small, medium and large with 15, 25 and 35 million barrels of oil equivalents.

It was also estimated that KMB fields lower production is 4,530 barrels per day (bpd) of oil, 4 million metric cubic feet (mmcf) of gas which is equivalent of 5,220 barrels of oil equivalent (boe) based on American Petroleum Institute (API) conversion of 6:1. That is 1 barrel of oil is equivalent to 6 mcf of gas. The annual production at lower range will be 1,905,300 boe. During higher period the production stand at 16,495bpd of oil and 14mmscf of gas which is equivalent to 18,909 boe per day, while the annual production during high production period will be 6,901,785 boe.

The KMB contract will last for 8 years 2012 to 2019, and production was started in December, 2013 (Lacouture, 2013). Therefore, based on this data it was assumed that for small fields (15millions boe), production started at lower range in the second year – December, 2013, it reached its peak in the third years - 2014 and then declined at 45% annually up to 2019. For medium fields (25millions boe), it was assumed that production started at lower range in the second year –December, 2013, it reached its peak in the third years- 2014 and then declined at 21% annually up to 2019. For larger fields (35millions boe), it was assumed that production started at lower range in the second year – December, 2013, it reached its peak in the third year - 2014 and then declined at 6% annually

up to 2019. Similar assumption was made in previous studies based on other reserve levels (see (Ghandi & Lin, 2014; Hao & Kaiser, 2010; Kaiser, 2007; Saidu & Mohammed, 2014)). Table 3 presents reserves, production and depletion rate assumptions used in the analyses.

Table 3.Reserve, Production and Depletion Assumptions

Large Size Marginal Field (≈35mboe)		**Medium Size Marginal Field (≈25mboe)**		**Small Size Marginal Field (≈15mboe)**	
Year	Production	Year	Production	Year	Production
2012		2012		2012	
2013	156600	2013	156600	2013	156600
2014	6901785	2014	6901785	2014	6901785
2015	6487678	2015	5452410	2015	3795982
2016	6098417	2016	4307404	2016	2087790
2017	5732512	2017	3402849	2017	1148284
2018	5388561	2018	2688251	2018	631556.5
2019	5065248	2019	2123718	2019	347356.1
Total	**35,830,802**		**25,033,017**		**15,069,354**
			Decline Rate: effective from 2014		
	6%		21%		45%

3.4 Development and Operation Costs Assumption

It was estimated that the development cost (capital expenditure - CAPEX) of KMB marginal fields is equivalents to USD 320 million to be expended within three (3) years (Coastal Energy, 2012). Therefore, this assumed in this study. There is no specific operating cost data available for KMB fields; however, average operational/lifting cost (operational expenditure - OPEX) within Asia is USD 9.5 per barrel (US Energy Information Administration, 2014b). Therefore, we assumed this rate for KMB fields in this analysis.

3.5 Price Assumption

Three Brent spot crude oil prices were assumed: low, medium and high. The highest average annual Brent spot crude oil prices from 1987-2040 based on nominal dollar value of 2012 is USD 141.46, while the lowest is USD 17.2 (US Energy Information Administration, 2014a). We used these two prices to arrive at medium oil price - i.e. 141.46 plus 17.2 divided by 2 which equaled to 79.33. Thus, USD 79.33 was used as medium oil price. In summary, three Brent oil prices were assumed: high, medium and low with values of USSD 141.46, USD 79.33 and USD 17.2 respectively. It is important to note that the duration of KMB fields development project i.e. 2012 - 2019 is covered by the Brent oil price projection of 1987- 2040, providing sufficient justification for prices assumed in the analysis.

3.6 Service Fee Assumption

Many press releases on Malaysian RSC revealed that contractors are entitled to per barrel remuneration fee attached to performance. However, Lacouture (2013) reported that contractors of Malaysian marginal fields under RSC receive 10% of per barrel revenue as a remuneration fee. Therefore, we assumed 10% remuneration fee for RSC contractors.

3.7 Discount Rate Assumption

In line with other studies, this study assumed 15% discount rate for computation of DCF (Kaiser & Pulsipher, 2004; Saidu & Mohammed, 2014). The DCF was then used in calculating IRR of different oil prices and reserves scenarios.

3.8 Analytic Procedure

The assumptions set out above were used to calculate the DCF and IRR of KMB marginal fields under different scenarios relating to oil prices and reserves level. The computations were performed using Excel spreadsheet that has inbuilt formula for IRR.

4. ANALYSIS AND RESULT

As mentioned earlier, analysis for the computation of IRR based on investor's DCF under R/C factor PSC and RSC fiscal regimes scenarios were performed using excel. The output from such analysis is depicted in Figure 2 below.

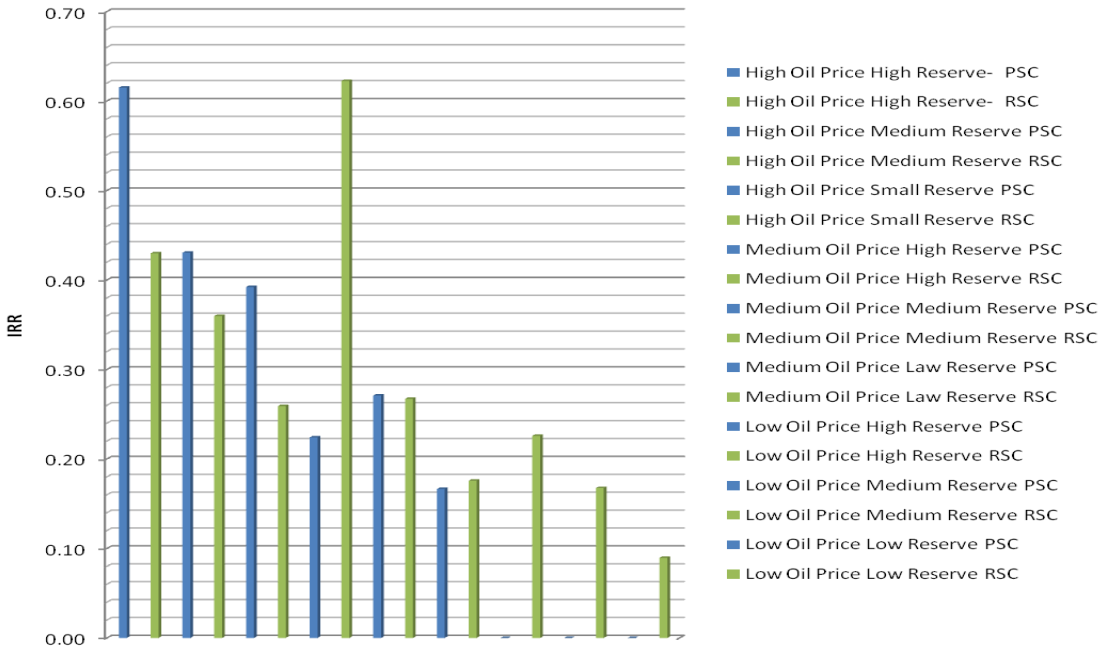

Fig. 2. KMB Fields IRR under Different Price and Reserve Assumptions

In line with the analysis in Figure 2 above, the result of the study is presented in Table 4 below. Based on this result, the hypothesis raised in 2.2 above was tested.

Table 4. Results

Hypotheses	Statements	IRR		Results
		PSC	RSC	
H_{1a}	RSC has higher IRR under High Oil Price-High Reserve	61%	43%	Not supported
H_{1b}	RSC has higher IRR under High Oil Price-Medium Reserve	43%	36%	Not supported
H_{1c}	RSC has higher IRR under High Oil Price-Small Reserve	39%	26%	Not supported
H_{1d}	RSC has higher IRR under Medium Oil Price-High Reserve	22%	62%	Supported
H_{1e}	RSC has higher IRR under Medium Oil Price-Medium Reserve	27%	27%	Not supported
H_{1f}	RSC has higher IRR under Medium Oil Price-Low Reserve	17%	18%	Supported
H_{1g}	RSC has higher IRR under Low Oil Price-High Reserve	0%	23%	Supported
H_{1h}	RSC has higher IRR under Low Oil Price-Medium Reserve	0%	17%	Supported
H_{1i}	RSC has higher IRR under Low Oil Price-Low Reserve	0%	9%	Supported

The results in Table 4 revealed that RSC fiscal regime is not favored by high oil price. During oil price hike of USD 141.46 and above, PSC fiscal regime seems more likely to make investment climate of marginal oil fields favorable than RSC fiscal regime. Specifically, the result revealed that PSC is more likely to make investment climate of Malaysian marginal oil fields favorable under high oil price-high reserve (*PSC-IRR= 61%, RSC-IRR =43%*), high oil price-medium reserve (*PSC-IRR= 43%, RSC-IRR =36%*) and high oil price-low reserve (*PSC-IRR= 39%, RSC-IRR =26%*). This is only the case under three high oil price scenarios.

Conversely, RSC fiscal regime is favored by medium oil prices. During oil prices of approximately USD 79.33, investment climate will likely be more attractive in Malaysia under RSC than PSC fiscal regime. Specifically, the result showed that RSC is more likely to make marginal oil fields investment climate more favorable under medium oil price-high reserve (*PSC-IRR= 22%, RSC-IRR =62%*), medium oil price-low reserve (*PSC-IRR= 17%, RSC-IRR =18%*). However, the two regimes will likely have equal influence on investment climate under medium oil price-medium reserve (*PSC-IRR= 27%, RSC-IRR =27%*).

Moreover, RSC fiscal regime is also favored by low oil prices. When oil price is approximately USD 17.2, RSC fiscal regime seems more likely to improve investment climate of marginal oil fields in Malaysia, than PSC.

Specifically, the result highlighted that investment climate under RSC fiscal regime is likely to be more favorable than PSC under low oil price-high reserve (*PSC-IRR= 0%, RSC-IRR =23%*), low oil price-medium reserve (*PSC-IRR= 0%, RSC-IRR =17%*), and low oil price-low reserve (*PSC-IRR= 0%, RSC-IRR =9%*).

5. CONCLUSION AND POLICY IMPLICATION

Scenario analysis conducted revealed that out of the nine scenarios analyzed in this study using PSC and RSC fiscal terms for the evaluation of marginal oil fields' investment climate, RSC is favored by five compared to only three for PSC. For the remaining one, investment climate under PSC and RSC fiscal regimes is likely to be the same.

The findings should be applied with caution due to assumptions employed. Not in this study alone, any other study on the influence of fiscal regime on investment climate using scenario analysis owned peculiar assumptions relating to oil prices, reserve levels, depletion rates, costs, fiscal terms and discount rate. Such assumptions should be borne in mind while applying the result for a decision.

The implication to policy is, even though the fiscal regime under RSC arrangement was favored by majority of the scenarios- with exception of those relating to high oil prices, to make the new regime more attractive, contractors' remuneration fee should be attached not only to performance but also to high oil price. In essence, incentives given to contractors should be higher as oil price soared.

ACKNOWLEDGEMENTS

One of the authors wishes to acknowledge his PhD scholarship to Universiti Utara Malaysia by the Nigerian Tertiary Education Trust Fund (TETFUND).

REFERENCES

Abdo, H. (2010). The taxation of UK oil and gas production: Why the windfalls got away. *Energy Policy, 38*(10), 5625-5635.

Arshad, A. (2012). Net Present Value is better than Internal Rate of Return. *Interdisciplinary Journal Of Contemporary Research in Business, 4*, 211-219.

Coastal Energy. (2012). Malaysian Risks Service Contract *Corporate Presentation 2012*: Coastal Energy.

Economic Transformation Program. (2010). *Chapter 6: Powering the Malaysian Economy with Oil, Gas and Energy*. Kuala Lumpur. : Government of Malaysia

Emeka, E. E., David, O. O., Yun, P., & Li-Fei, X. (2012). Investment Decision and Profitability Analysis in an Upstream Petroleum Sector. *Journal of Economics & Engineering, 3*(1), 28-34.

Ghandi, A., & Lin, C.-Y. C. (2014). On the rate of return and risk factors to international oil companies in Iran's buy-back service contracts.

Hao, H., & Kaiser, M. J. (2010). Modeling China's offshore production sharing contracts using meta analysis. *Petroleum Science, 7*(2), 283-288.

Johnston, D. (1994). *International petroleum fiscal systems and production sharing contracts*. Tulsa: PennWell Books.

Johnston, D. (2002). Current developments in production sharing contracts and international concerns: Retrospective government take – not a perfect statistic *Petroleum Accounting and Financial Management Journal, 21*(2), 101-108.

Kaiser, M. J. (2007). Fiscal system analysis—concessionary systems. *Energy*, 32(11), 2135-2147. doi: http://dx.doi.org/10.1016/j.energy.2007.04.013

Kaiser, M. J., & Pulsipher, A. G. (2004). Fiscal system analysis: Concessionary and contractual systems used in offshore petroleum arrangements. *US Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, La. OCS Study MMS, 16*, 78.

Kazikhanova, A. (2012). *Investmlient Climate in the UKCS after the Budget 2011 Changes.* Msc, University of Aberdeen, Aberdeen.

Kemp, A. G., & Stephen, L. (2011). The effects of Budget 2011 on Activity in the UK Continental Shelf. *Aberdeen Centre for Research in Energy Economics and Finance, North Sea Study Occasional Paper No. 123*.

Kemp, A. G., & Stephen, L. (2012). Prospects for Activity in the UK Continental Shelf after Recent Tax Changes: the 2012 Perspective. *Aberdeen Centre for Research in Energy Economics and Finance, North Sea Study Occasional Paper No. 125*.

Lacouture, J. (2013). Tax incentives to boost Malaysian oil production, *Energy Global*. Retrieved from http://www.energyglobal.com/upstream/exploration/18112013/Tax_incentives_boost_Malaysia_oil_production/

Lee, E. T. H. (2013). Scope For Improvement: Malaysia's Oil And Gas Sector. Retrieved from http://refsa.org/wp/wp-content/uploads/2013/07/OG-Scoping-Report-Malaysia-final-20130701.pdf

Ley, L. N. (2012). Member Country Report of Malaysia *48th CCOP Annual Session (Part 1) 5-8 November 2012*. Langkawi, Malaysia: Coordinating Committee for Geoscience Programmes in East and Southeast Asia.

Malaysia Petroleum Resources Corporation. (2014). History of Oil and Gas Industry in Malaysia-Petroleum Income Tax act 2010 Retrieved 05/05/2014, 2014, from http://www.mprc.gov.my/industry/history-of-oil-gas-in-malaysia

Manaf, N. A. A., Saad, N., Ishak, Z., & Mas'ud, A. (2014). Effects of Fiscal Regime Changes on Investment Climate of Malaysia's Marginal Oil Fields: Proposed Model. *Procedia - Social and Behavioral Sciences, 164*(0), 55-61. doi: http://dx.doi.org/10.1016/j.sbspro.2014.11.050

Mas'ud, A., Manaf, N. A. A., & Saad, N. (2014). Comparison of Petroleum Fiscal Regime within Malaysia. *Petroleum Accounting and Financial Management Journal 33*(2).

Mead, W. J., Muraoka, D. D., & Sorensen, P. E. (1982). The Effect of Taxes on the Profitability of US Oil and Gas Production: A Case Study of the OCS Record. *National Tax Journal*, 21-29.

Mehden, F., & Troner, A. (2007). Petronas: A National Oil Company With An International Vision. Rice University: James A Baker III Institute of Public Policy and Japan Petroleum Energy Centre.

Nakhle, C. (2007). Do high oil prices justify an increase in taxation in a mature oil province? The case of the UK continental shelf. *Energy Policy, 35*(8), 4305-4318.

Nakhle, C. (2010). Petroleum fiscal regimes: evolution and challenges. In P. Daniel, M. Keen & C. McPherson (Eds.), The Taxation of Petroleum and Minerals Principles, problems and practice.pp. 75-86. New York: Routledge.

Nakhle, C., & Hawdon, D. (2004). Evaluating Government Fiscal Policy in Maintaining the Attractiveness of the UK North Sea Province- A Time Line Analysis. *24th Annual IAEE North American Conference*.

Offshore Tecnology.com. (2014). KBM Cluster Fields Development, Malaysia Retrieved November, 20, 2014, from http://www.offshore-technology.com/projects/kbm-cluster-fields-development/

Onaiwu, E. (2009). How Do Fluctuating Oil Prices Affect Government Take Under Nigeria's PSCs? *CEPMLP Annual Review, 13*, 1-19.

PETRONAS. (2011). Annual Report and Financial Statements (pp. 91). Kuala Lumpur: PETRONAS.

Saidu, S., & Mohammed, A. R. (2014). The Nigerian Petroleum Industry Bill: An Evaluation of the Effect of the Proposed Fiscal Terms on Investment in the Upstream Sector. *Journal of Business and Management Sciences, 2*(2), 45-57. doi: 10.12691/jbms-2-2-3

US Energy Information Administration. (2014a). Annual Energy Outlook 2014 Early Release Overview Retrieved 18th Feb, 2015, from http://www.eia.gov/foreercasts/aeo//pdf/0383er%282014%29.pdf

US Energy Information Administration. (2014b). How much does it cost to produce crude oil and natural gas? Retrieved 18th January, 2015, from http://www.eia.gov/tools/faqs/faq.cfm?id=367&t=5

Wei, Q. H. (2011). Industry Focus: Oil & Gas Companies. In W. M. Tek (Ed.), *Malaysia Equity Research PP 11272/04/2012*. Kuala Lumpur HWANGDBS Vickers Research Sdn Bhd.