

*Investigating the effectiveness of different forms of mineral resources governance
in meeting the objectives of the UK petroleum fiscal regime*

Dr Hafez Abdo
Nottingham Business School
Burton Street
Nottingham NG1 4BU
UK
Email: hafez.abdo@ntu.ac.uk
Telephone: ++44 (0)115 8486098

Abstract

After 40 years of oil investments, the UK is now a mature oil province. During these 40 years or so, the UK Government has changed the type of governance it uses to manage its petroleum resources. This paper introduces the theoretical background to two models of mineral resource governance: the so-called proprietorial and non-proprietorial regimes. It investigates the adoption of these two models by the UK Government and their effect on the overall tax take from the UK's petroleum resources. The analysis tracks the changes in the UK petroleum taxation system since establishment up until 2010. It assesses how these tax changes have affected the overall petroleum average tax rate (ATR). The study concludes that the UK Government adopted a proprietorial type of mineral governance during the period 1975-1982, before changing to a non-proprietorial regime in the period 1983-2000. Since 2000 it has begun to move back towards a proprietorial style of governance. This change is still in its early stages, however; the evidence shows that although there has been an increase in fiscal revenues, this increase has been small.

Keywords: minerals governance, petroleum, UK

1. Introduction

Governance of natural resources is a prevalent concern in the energy sector, whose nature and extent could depend significantly on the tax regime in place (Boadway and Keen, 2010: 13-14). The adopted form of mineral resources governance dictates how access to, control of and distribution of these resources are managed. In developing partnerships with international extractive companies, mineral rich countries seek agreements that will secure reasonable returns to them (Mommer, 1999). This debate is not new; Hotelling (1931: 139) asks: "How much of the proceeds of a mine should be reckoned as income, and how much as return on capital".

Over the last 40 years or so, the UK has developed into one of the world's major oil production countries.ⁱ In the late 70s and early 80s of the last century, Oil and gas resources played a significant role in the British economy, in this regard Garnaut and Clunies Ross (1983: 278) state "British oil and gas production tends to stabilize the economy, even in the absence of corrective action". Successive administrations have developed a fiscal regime using the concession model.ⁱⁱ The main objective of the Government's fiscal regime has been to provide tax incentives to oil and gas companies to explore and develop the UK oil and gas reserves while at the same time securing an appropriate share of these resources for the nation. Nonetheless, although adopting a concession system, the UK Government exercised control over mineral resource extraction and disposal using a range of tools such as the fiscal regime and licencing systems.

Previous studies of the UK petroleum fiscal regime have discussed different aspects and effects of the detailed changes of this regime since establishment. Zhang (1995,

1997) studied the neutrality and efficiency of the PRT in relation to both making development decisions and in recouping economic rent. Garnaut and Clinies Ross (1983: 276-293) studied the economic and political effects of the pre-1983 tax changes on investment decisions. Devereux and Griffith (1999, 2003) investigated the effect of average tax rate on both marginal investment decisions and decisions of investment locations and choice of technology. Abdo (2006) explored rationales for the UK petroleum tax relaxations between 1980 and 2000. He studied the effects of these relaxations on investment decisions, government and companies' revenues and the policy implications of these relaxations towards the governance of mineral resources. Boadway and Keen (2010) researched features of resource tax design in terms of their key instruments, problems and challenges. Boadway and Keen investigation extended to touch on issues of neutrality, time consistency and investment decisions. Professor Alex Kemp of Aberdeen University has studied political, investment and economic effects of the changes to the UK petroleum fiscal regime since establishment, for example see Kemp (1975; 1976), Kemp and Cohen (1980), Kemp and MacDonald (1992), Kemp and Stephen (2011). However, apart from a number of few studies, such as Cameron (1983), Mommer (1999, 2002) and Abdo (2006), no other research has been conducted on the issue of governance of the UK mineral resources. Whilst other studies focused on how does taxation affect the quality of governance, this study focuses on how governance affect taxation.

The objective of this paper is to examine to what extent the introduction of the SC rate and its subsequent increases – and indeed any other changes to the UK petroleum fiscal regime – may have changed the way the UK's petroleum resources are governed. It also aims to identify whether these changes have allowed the UK

Government to collect higher tax revenues of these resources compared with the pre-2000 period. In other words, this paper will try to answer the question of how effective the post 2000 changes to the UK petroleum taxation system have been in increasing the Government's tax take from its petroleum resources? Do changes to the petroleum fiscal regime mirror changes in the type of governance being employed to manage the UK's petroleum resources? In answering these questions and meeting the above specified objectives, this study will follow changes of the average tax rate (ATR) resulted from changes to the structure and taxes rates of the petroleum fiscal regime and how the former changes have affected both of UK tax take and oil and gas investments. Answering these questions will help us arrive at an overall evaluation of the UK's petroleum taxation policy and how useful changing the type of governance has been over the life of the UK's commercial oil and gas investments. The following section discusses the various types of mineral governance.

2. Governance of Mineral Resources

The word 'taxation' appears in the literature mainly in the context of economic policy discussion; most of the generated research about taxation, whilst focuses on policy and revenue, seems to ignore governance issues (Moor, 2007). The term 'governance of mineral resources' refers to the effective provision of collecting outcomes and to the political process that generate these outcomes. In other words, it means the manner in which state elites acquire and use their power and authority in managing and controlling fiscal policy.

Historically, mineral rich countries have used different tools and approaches to govern the extraction of their mineral resources. One of these tools was contracts, which have taken different forms and structures. The starting point was a 'concession' system

where international operators exercised complete freedom in terms of investments and production. Then, in the 1950s, a new form of contract came into existence: the production sharing agreement (PSA). In this arrangement, the home government joined forces with a national oil company (NOC). NOCs were used to place tight direct control on national mineral resources. These companies were established with a number of objectives in mind, but primarily to reduce dependency on international companies for energy supply, and to help home governments to build up the knowledge and experience to develop their own mineral resources. NOCs therefore played a key role in negotiating new and existing contracts with international companies (Grayson, 1981; Garnaut and Clunies Ross, 1983; Mommer, 1994; Daniel and Sunley, 2010; Rossiard, 2012).

Debate on government-investor relations goes back to the late 1950s when governments started using new form of contacts: PSA. Penrose (1959) seems to be the pioneer in opening this debate up, followed by Faber and Potter (1971), Herfindahl (1974), Hughes (1975), Mikesell (1975, 1979), Faber (1977), and Granaut and Clunies Ross (1979). The debate at the time focused on characteristics of different types of oil and gas agreements, and queries were raised about the reasons for why and how different governments would establish different types of relations with their investors using different policy, political and fiscal tools. Two main classifications to the government-investor relationship were identified at that time, these are 'resources rent' approach and this was a reflection to the description and characteristics of the PSA; and 'Bargaining' approach and this was associated with concessions (Garnaut and Clunies Ross, 1983). This debate on government-investor relations, in the early

days of the 1960s, formed a ground for what is known today as governance of mineral resources.

Cameron (1983) argues that there are two forms of state governance when it comes to mineral resources: socialist and nationalist. Mommer (1999, 2002) later used different terms to express the same meaning: proprietary and non-proprietary. Mommer (2002) differentiated between private and public ownership and the governance of mineral resources. Whilst historically the British coal industry provides a good example of private mineral governance when the mineral rights remain in individual ownership, oil industries, apart from some exceptions in the US, are usually examples of public mineral governance (Mommer, 1999: 1; Rossiaud, 2012: 2). Yet Mommer (2002: 230) argues that “the controversy that may surround public mineral governance is not about *public vs. private* but *non-proprietary vs. proprietary* governance and fiscal regimes”. For the purpose of this paper the author build on Mommer’s more sophisticated differentiation in analysing the case of UK governance of petroleum resources. The characteristics of these two regimes are described below.

2.1. Proprietary Regime

Public ownership of mineral resources may conceive as national ownership, and as such be subject to every kind of ‘nationalist’ policies: national companies are an essential tool in this regime. Under this type of governance, access to land or sea is only granted if the expected profits and fiscal revenues are considered satisfactory by both investors and the owners of the mineral resources. The main concern of the proprietor is not to allow free access to his land/sea.

Royalties are an essential tool within this regime; this is to prevent a unit of production being lifted without rent being paid (Rossiaud, 2012). Both sides understand that these royalties add to the producers' operating costs, putting additional pressure on the producing companies. Thus, under this type of mineral governance the mineral resource owner shares with the producer the risk associated with the price, but not that associated with the profit.

In Wälde's (2003) view, the proprietorial regime allows mineral owners to dispose of their resources as they see fit, and to secure the maximum possible payment for granting companies access. Furthermore, this model allows mineral owners to make their own decisions regarding the development and exploitation of resources and to deploy tools that will allow the maximum rent. Different devices may be used for collecting ground rent to secure a higher take at each level of the investment process. These might include higher royalty rates, various bonuses that may be scattered over the contract period, higher income taxes and excess-profit taxes; NOC plays key roles under these regimes in securing higher rent and to control the extraction and distribution of national mineral resources (Mommer, 1994). The key aim of the proprietor is to collect a significant rent for every unit lifted, with the usual focus being on levies on gross income (see Mommer, 1999).

2.2. Non-Proprietorial Regime

Governments may see themselves as merely the administrators of their country's natural resources, taking the view that these resources are public goods and a free gift of nature to producers and consumers alike. Overtaxing and restricting the exploitation of mineral resources risks reducing the investment activities which

generate tax benefits for both a mineral rich government and its citizens. Mineral rich countries taking this attitude generally operate a non-proprietary type of governance.

This type of governance allows extraction companies relatively an easy access to mineral resources. It is usually associated with a legal regime that weakens the strength of ownership over subsurface minerals in favour of extractive companies (Rossiaud, 2012: 3). The central concern in this model is the profitability of investment; this type of governance relies on a fiscal regime based on the taxation of excess profit, rather than gross income (as under the proprietary governance regime). In this type of governance, there is usually no requirement for a customary ground rent (Mommer, 1999:8-9). However, it is not unreasonable to expect high excess-profit tax rates to suffer the same fate as high income tax rates and to settle, in the long run, at relatively modest effective levels. Yet, in order to provide investors with incentives to increase productivity they must be left with some of the excess profits.

Non-proprietary (liberal) regimes are found in countries using concession type of agreements in regulating their mining industry; concessions usually grant international companies *carte blanche* when it comes to the amount and timing of investments and extraction. Overall, non-proprietary fiscal regimes are not very efficient in collecting rent; however, bonuses can be used in this regime at a bidding and signature stages of granting licenses (Mommer, 2002: 88-95). In the UK, bonus bidding and signature bonuses have been used, but at a very limited level.

In the non-proprietary model, the landlord – the state – grants his tenant – the oil and gas company – access to his land and/or sea for free (or free in practice) and his target

will be the tenant's economic rent. Of course, access is granted through a licensing agency, which regulates the granting of licences to tenants according to certain criteria fixed by the agency itself (Mommer, 1999; Abdo, 2006, 2008). The landlord's aims in allowing free access to his land might be to attract tenants to invest, benefiting both the private investor and the consumer from lower prices, and at the same time to develop any marginal resources that could exist in his land or sea. The emphasis in this type of governance is on not leaving a unit of production in the ground as long as it is profitable to be extracted, even if the rent a marginal unit attracts falls to zero; therefore in order not to lose what may remain in a reservoirs renewal of licences is as straight forward as an update to the terms and conditions (Mommer, 1999:16). The decision to adopt a non-proprietary regime may sometimes be driven by social and strategic factors such as economic growth, inflation and unemployment.

Based on the above accounts of both types of mineral governance - proprietary and non-proprietary – distinguishing characteristics can be drawn upon as in figure 1.

Figure 1: Non-Proprietary vs Proprietary Governance

Type of Governance	Non-Proprietary	Proprietary
Objectives	Economic Rents Free flow of investments Regulatory Framework	Ground Rent Investment flow and production subject to payment of compensation to natural resource owner Business Relationship
Supply of new lands	Ex-ante reservation profit	ex-ante reservation profit and reservation ground-rent
Bonuses	signature bonus as decision-making device only	Decision-making and ground-rent-collecting device
Relinquishment	Discretionary	Recovering appreciated lands
Development and Production	Ex-post reservation profit	Ex-post reservation profit and reservation ground-rent
Principal form of collection	Excess profit levy	Royalties

Duration of contract	Indefinite, or renewable as a matter of course	shorter, offering opportunity to increase ground-rent taking advantage of reservation of producing facilities
National Oil Company	Not applicable	Expertise to specify and control variables above Joint ventures Production sharing agreements production service contracts Nationalisation
Source: Mommer (1999: 26)		

Increasing uncertainty and reducing investors' revenue expectations from new and existing projects in order to secure higher rent to the government fits the description of a proprietorial regime. While on the other hand, improving stability and certainty of a fiscal regime and increasing investors' revenue expectations outfits the characteristics of a non-proprietorial regime.

It is worth mentioning that there may not exist a clear cut 'non-proprietorial' or a 'proprietorial' regime. The two concepts tend to co-exist, but one of them will dominate the fiscal system (Wälde, 2003). Even though these two types seem to be distinct from each other they may both exist in one country – as in the case of the UK. This is not a new thought as Garnaut and Clunies Ross (1983) share a similar view of the 'resource rent' and the 'bargaining' approaches that regulate state-investor relations.

3. Historical Evolution of the UKCS Petroleum Fiscal Regime

The historical evolution of the UK petroleum taxation system has been well described in a number of studies, for example Garnaut and Clunies Ross (1983), Abdo (2006; 2010b), Nakhleh (2008, 2010), HMRC (2010 a&b) and Usenmez (2010). However, it is our intention here to outline the historical evolution of this regime up to 2010,

focusing on the consequences of the changes in the average tax rate. This should allow us to trace, from the tax changes and other indicators, how governance of the UK petroleum fiscal regime shifted between the proprietorial and non-proprietorial models.

3.1. The Period up to 2000

Following the commercial discoveries of oil and gas in the UK North Sea, the tax regime tightened steadily as the UK got to grips with its newly discovered hydrocarbon riches and the implications which they might have for government revenues. The starting point, in 1964, was to claim a 12.5% royalty. But it soon became apparent, particularly after the dramatic increase in oil prices in 1973, that this was too weak an instrument with which to claim a fair share of the rapidly escalating oil revenues for UK citizens. In 1975, therefore, a new tax, Petroleum Revenue Tax (PRT), a tax on cash flow, was chosen as the preferred instrument for claiming the Government's share of oil rent. It is worth mentioning here that in 1975 the UK Government created the British National Oil Corporation (BNOC) the aim of which was to represent the state in the oil and gas industry, to build a state body of expertise, and to secure national ownership of produced oil and gas (Garnaut and Clunies Ross, 1983; Abdo, 2006). Tax avoidance was also curtailed by ring fencing field operations for tax purposes.

In 1979 the rate of PRT was increased from 45% to 60 % (Great Britain, 1975); by so doing, the Government increased its ATR from its petroleum resources from 76.9% to 83.2% (58% for non-PRT-paying fields).ⁱⁱⁱ UK petroleum taxation escalated further in 1980, when the rate of PRT was increased to 70% (Great Britain, 1980, S.104),

raising the government's ATR from 83.2% to 87.4% (58% for non-PRT-paying fields).

In response to dramatically high oil prices in 1979/80 a Supplementary Petroleum Duty (SPD) had been introduced in 1981 by the first Thatcher government at a rate of 20% (Great Britain, 1981, S. 122: 5). SPD was dropped in 1982 in favour of a higher basic rate of PRT and the introduction of Advanced PRT, in order to accelerate revenue collection. The Thatcher government also disposed of the BNOG to the private sector, having declared their intentions in the Oil and Gas (Enterprise) Bill on 17th December, 1981. Taking into account the 12.5% royalty, PRT at 45 % and RFCT at 52 %, the ATR was 76.9 % for PRT-paying fields, and 58 % for fields non-paying PRT.

With the introduction of SPD, there was thus a combination of taxes on oil and gas production during the period 1980-1981, and UK North Sea oil taxation became extremely complex and unstable. The instability of the petroleum fiscal regime arose from the fact that there were nine major changes over the period 1975-1982.^{iv} It was so complex because of multiple applications and exemptions (see Garnaut and Clunies Ross, 1983: 276-293). In 1982 four separate taxes were being levied simultaneously: royalties at 12.5%, PRT at 70%, SPD at 20%, and RFCT at 52%. This combination of taxes meant that the UK government received an ATR of 89.9% of the final revenues (output) of UK oil and gas resources (66.4% from non-PRT-paying fields).^v On 31st December, 1982, SPD was replaced by another tax called Advanced Petroleum Revenue Tax (APRT). These tax reforms brought the ATR down to 89.5% (58% for non-PRT-paying fields). This ATR did not last long as the

rate of PRT was further increased to 75% (Great Britain, 1982, S.132); and this increase driven the ATR up to 91.6% (66.4% from non-PRT-paying fields).

By the same token, the UK petroleum licencing system during this period allowed the Government a stronger form of control over its petroleum resources. The licencing system at the time had main key features such as: (1) discrimination in favour of British applicants; (2) intensive exploration; and (3) securing the maximum share of rent to the nation (Cameron, 1983: 76). The discretionary mode of licencing allocation along with the other features, Cameron argues, fits the 'nationalist', i.e. proprietorial, regime's aspects and objectives. It is worth mentioning that licences were first granted for a period of 40 + 6 years, this has been changed to 30 + 3 + 4 years between 1976 and 1979 and then to 30 + 6 years between 1980 and 1987. These terms, however, have been changed later on to 18 + 12 + 6 years between 1989 and 2001, and to a more stricter conditions of 18 + 4 + 4 years (and 18 + 6 + 6 years in some cases) beyond 2002 (see DECC, 2013).

Though, when the ATR reached 91.6%, the Government recognised that exploration and development activities were being affected by the tax regime; it concluded that the further development of North Sea oil was being put at risk by the high ATR and the frequency of changes. Further, when the number of new oil and gas projects being proposed by the industry started to show a significant decline, changes were made to the UK petroleum fiscal regime in order to encourage investment activities (Abdo, 2009; 2010b).

In 1983, royalties were abolished under the Petroleum Royalties (Relief) Act 1983 for qualifying fields receiving development approval from the Secretary of State for Energy on or after 1st April, 1982 (Great Britain, 1983). Following this change, new fields (that is those developed between 1st April 1982 and March 1993) were subject to an ATR of 89.5% (58 % for non-PRT-paying fields) against the 88% rate levied upon old fields. The RFCT rate was reduced in this year to 50%, making the ATR 89.062% for old fields and 87.5% for new fields. The removal of royalties for new fields might be considered a sign that the regime had become non-propiertorial, because royalties represent payments towards customary ground rent. However, it should be remembered that fields developed before April 1982 (the old fields) were still subject to this duty; in other words, this non-propiertorial-type measure was not applied to the entire UK petroleum fiscal regime.

The rate of the RFCT was further reduced to 45% in 1984, 40% in 1985 and to 35% in 1986 (Great Britain, 1984, 1985; 1986), and these changes brought the petroleum ATR down to 87.97% (86.25 % in new fields); 86.87% (85 % in new fields); and to 85.78% (83.75% in new fields) respectively. Again, although petroleum ATRs were reduced, it does not follow that the reductions in the RFCT rate signalled a change towards a non-propiertorial governance regime for the UK's petroleum resources, since this tax is not a special petroleum tax but is paid by corporations across the UK.

The Finance Act 1987 introduced the concept of the "Cross Field Allowance". This concept allowed 10% of the development expenditure of offshore fields outside the Southern Basin of the North Sea and approved for development after 17th March 1987, to be deducted from the income of other fields for the purpose of calculating

PRT (Great Britain, 1987, S. 65). The Chancellor of the Exchequer also announced in the 1988 Budget that all Southern Basin and onshore fields granted a development permit after 31st March, 1982 would be exempted from royalties with effect from 1st July, 1988 (Great Britain, 1989; DOE, 1988; Bland, 1991). Both of these fiscal changes in 1987 and 1988 were signs of a non-proprietary philosophy, since they reduced the tax burden on oil companies.

In 1990, the RFCT rate was lowered to 34%, bringing the ATR to 85.56% for old fields and 83.5% for fields developed after March 1982. The RFCT rate was further reduced to 33% in 1991; this lowered the petroleum ATR to 85.34% for old fields and 83.25% for new fields.

Another significant petroleum tax relaxation came about in 1993; PRT was abolished for oil fields where development consent was given on or after 16th March, 1993 (Great Britain, 1993, S. 185). This tax reform made the newest fields, i.e., those with development consents given after 16th March 1993, subject only to RFCT at a rate of 33%. The rate of PRT was reduced for oil fields that had development consent before 16th March from 75% to 50%. This tax reform brought the ATR for old fields to 70.69% and that for fields developed post March 1982 but pre March 1993 to 66.5% (41.4% for non-PRT-paying fields), while fields developed post March 1993 were subject to a ATR of 33%, which was the RFCT rate at the time.

The 1993 tax reductions are the clearest signs that non-proprietary governance was now in place for the UK's petroleum resources, particularly for fields developed post March 1993. Oil companies extracted the UK's non-renewable oil and gas resources

from the post March 1993 fields without paying any petroleum tax – as if these resources were nature's free gift to them. Zhang (1995: 2) noted the weakness of the post-1993 UK petroleum fiscal regime vs the strength of the pre-1983 regime by stating “One key aim of the tax regime in the North Sea is that of recouping some of the resources transferred to the private sector in this way; and this must surely account for the very high effective rates of tax which prevailed up until 1993”. Zhang (1995) found that the pre-1993 petroleum tax regime was very close to neutral despite the high ATR on oil revenues when all allowances are exhausted; hence the pre-1993 tax regime did not affect the incentives to invest in the North Sea. Zhang mistakenly thought that dismantling an efficient fiscal regime in 1993 and abolishing PRT at the time was not permanent and only changes induced by low oil prices, he thought that PRT would be put back to practice when oil prices increases again. However, Zhang was wrong as the dismantling of the pre-1993 was a shift in the regime induced by a change in the governance of petroleum resources and PRT never been back again to service since then.

The RFCT rate was reduced in 1997 to 31%; this pulled the petroleum ATRs for the three different areas of the UKCS down to 69.81% for old fields, 65.5% for fields developed post March 1982 but pre March 1993, and 31% for fields developed post March 1993. In 1999, the RFCT rate was lowered to 30%, reducing the ATRs to 69.38% for old fields, 65% for fields developed post March 1982 but pre March 1993, and 30% for fields developed post March 1993.

As can be seen from the above account, the tax regime which applied to any particular oil and gas field depended on when it received development approval. Depending on

the age of the field and its tax state, the ATR ranged from 69.4% to 30%. If a field was liable for royalties, PRT and RFCT, then the ATR would be 69.4%. If the field was liable for PRT and RFCT alone, then the ATR would be 65%. Finally, the ATR would be 30% for fields that were liable for RFCT only (DTI, 2001, S. 3.28). The changes to the petroleum tax regime were initially intended to simplify the regime, as well as making the UK an attractive investment province for international oil and gas companies and former Prime Minister Tony Blair asserted that the UK oil industry enjoyed an “enormously favourable tax regime” (Corzine, 1998: 16).¹

Since 2000, however, a number of tax changes have occurred; these changes are narrated next with their implications on the petroleum ATR and on the UK governance of petroleum resources.

3.2. The Period 2000-2010

Since 2000, UK petroleum tax regime has again witnessed significant change with the introduction of a new petroleum tax, the rate of which has subsequently been raised twice. There are a number of possible explanations for this change in taxation policy: it may be put down to the dramatic increase in oil prices post 2000 (Rutledge and Wright, 2010); or it could be that the Government had realised that the type of mineral governance applied to oil and gas resources between 1983 and 2002 needed to be reviewed and possibly changed, or it could be a combination of the two.

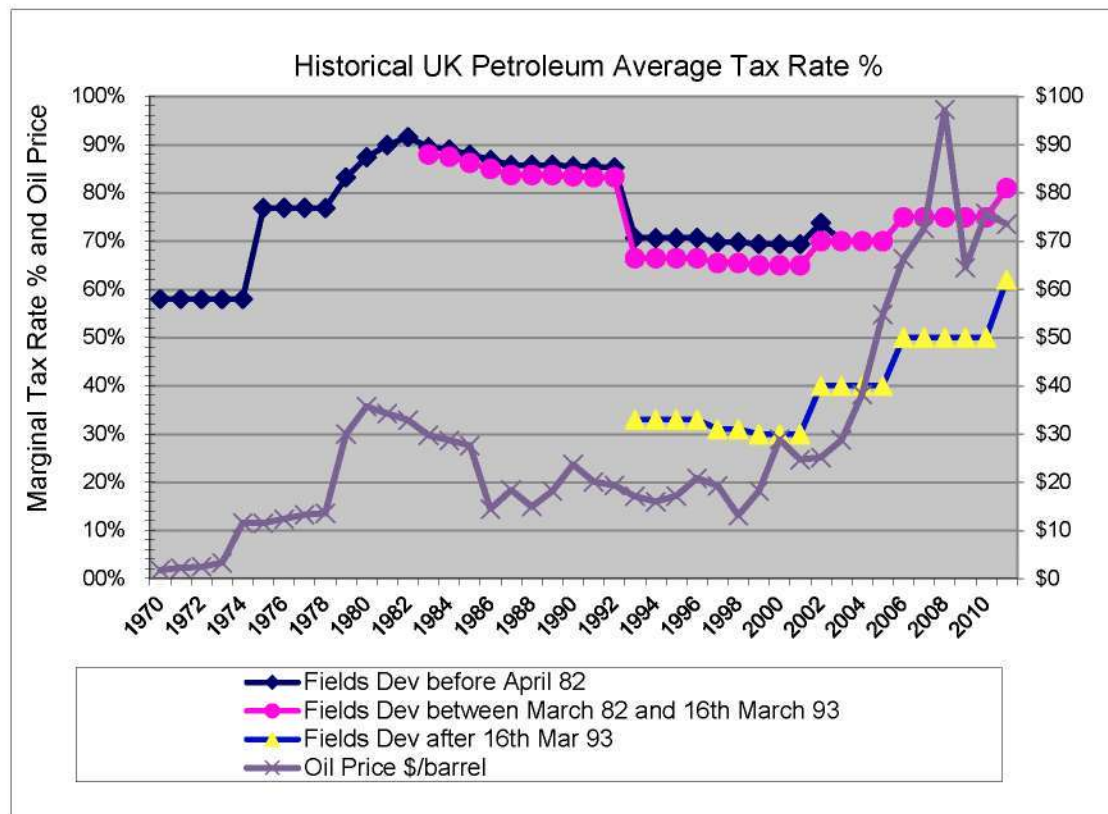
A major tax change to the North Sea regime came about in 2002 when the Chancellor of the Exchequer announced on 17th April that companies producing oil and gas in

¹ For chronological tax changes see Table 1A in Appendix.

the UK or on the UKCS would pay a SC of 10% on their profits from ring-fenced trading on top of the 30% RFCT already payable on these profits. Companies paid the SC on ring-fenced profits at the same time as their general CT, and there were special rules for instalment payments to cover the transitional period (i.e. the accounting period that included Budget day). These special rules ensured that no underpayment of instalments would arise by virtue of the introduction of the SC (HMRC, 2010a). Also in this year the Budget introduced 100% First Year Capital Allowances to be available for virtually all ring-fenced capital expenditure. This allowance was clearly aimed at stimulating oil investment in the UK North Sea. In the same Budget the Chancellor announced his intention to abolish the royalty charge completely (Great Britain, 2002). With the introduction of the SC, the ATR of the three areas of the UKCS changed up to become 73.75% for old fields, 70% for fields developed post March 1982 but pre March 1993, and 40% for post March 1993 fields.

Royalty was abolished with effect from 1st January, 2003. This in turn changed the ATR for fields developed before March 1982 down to 70%, while fields developed after March 1982 were not affected since these fields were not subject to royalty charges (HMRC, 2010a). The interesting point about this reform is that it simplified the UK oil and gas fiscal regime: all those fields developed prior to March 1993 became subject to the same ATR (70%) from January 2003 (see Figure 2).

Figure 2



Source: based on data extracted from HMRC.

The rate of the SC was raised to 20% with effect from 1st January, 2006 (HMRC, 2010b). This increase in the SC rate increased the ATR for the two categories of fields in the UKCS to 75% for any field developed pre March 1993, and to 50% for fields developed post March 1993. A further increase in the rate of the SC – to 32% – came in the Finance Bill of 2011, taking effect from 24th March, 2011 (DECC, 2011). This increase in the SC rate increased the ATR to 81% for fields developed pre March 1993, and to 62% for posts March 1993 fields.

These changes have made the UK petroleum fiscal regime tougher, and the debate about whether they have de-incentivised investment in the UKCS has already started; see, for example, Muslumov (2011) and Pfeifer et al. (2011).

In 2009, the Government introduced a Field Allowance to encourage investment in small or technically challenging fields. This allowance was set at £75 million for small fields and £800 million for ultra-heavy oil fields and ultra-high pressure/high temperature fields. The Government believes that the introduction of this allowance will help unlock two billion barrels of the UK's remaining oil and gas reserves, making a significant contribution to the supply side of UK energy security (HMRC, 2009).

4. Analysis and Discussion

With the steady upward escalation of the ATR from the 12.5% royalty charge in 1964 to the 91.6% total in 1982 (see Figure 2), the establishment of the BNOC in 1975 and the discretionary mode of licencing allocation; the UK petroleum fiscal regime appears to have been following the proprietorial mode of governance. The introduction of new taxes and the repeated raising of existing tax rates during the pre-1983 era are consistent with the character of a proprietorial regime; the aim of these increases in the petroleum tax burden being to capture a larger share of the revenues from petroleum wealth for the UK Government and its citizens (Garnaut and Clunies Ross, 1983:284).

Prior to 2000, the index of petroleum tax revenues fell very steeply and its relationship to both production and prices fundamentally changed. The changes may be broadly characterised as a disassociation between taxation and both production and prices between 1986 and 1991, followed by a disassociation between taxation and production between 1991 and 2000. These changes can be illustrated by looking at the UK Government's tax take in relation to production in the years 1986, 1993 and 1999 (see Table 1). In 1986 the oil price was \$14/barrel, oil and gas production was 165.6

million tonnes of oil equivalent (mtoe) and tax revenues were £4.8 billion. In 1993 the oil price was \$17/barrel, oil and gas production was 160.1 mtoe and tax revenues were just £1.3 billion. In 1999 the oil price was \$18/barrel and production of 227.9 mtoe was associated with revenues of £2.6 billion. In other words, production in 1999 was 38% greater than it was in 1986, but revenues were 46% less in money-of-the-day (considerably less in real terms) even though the oil price was higher. Thus, the UK Government and UK citizens forfeited significant windfalls, without a commensurate response from companies in terms of increased investment, particularly as a result of the adoption of a non-proprietary regime during that period (Abdo, 2010a).

The evolution of the UK petroleum fiscal regime between 1983 and 2000, illustrated in table 1A in appendix and in figure 2, clearly demonstrates that the UK's governance of its mineral resources underwent a significant downward change during this period. The Government loosened the taxation burden on oil and gas companies in order to attract more oil and gas investment and hence, in the long term, collect more revenues. Previous studies have however shown that the Government was not successful in meeting these objectives (Abdo, 2010a; Rutledge and Wright, 2010). By intervening in the oil business, disposing of the BNOCs, and relaxing the UK petroleum fiscal regime over the period 1983-2000, the Government was attempting to implement a non-proprietary regime, but this attempt did not result in the expected win-win situation for the UK Government and the oil and gas industry. The consequences of the application of the non-proprietary regime were increased profits and an enhanced cash flow for oil companies at the expense of the UK Government and its citizens (see Abdo, 2006).

Zhang (1995, 1997) studied how a fiscal regime can be both neutral with respect to development decisions and efficient in recouping economic rent. He concluded that the pre-1993 UK petroleum tax regime while increased the development trigger it allowed getting 73% of the rent at the entry trigger; in post-1993 regime, Zhang found that the development trigger was higher than the pre-1993 but the regime allowed getting only 37% of the rent. Zhang (1997: 1115) states: “While the shift of tax regime may only have a marginal effect on development triggers, it does have a substantial (negative) effect on the fraction of oil revenues accruing to the government on newly developed fields”. This result supports our proposition that the UK petroleum fiscal regime was governed by a non-proprietary philosophy post 1983, and more clearly post 1993, as oil companies had an easy access to the UK petroleum resources at an insignificant cost. In fact, Zhang (1997: 1106) statement makes it clear that the UK petroleum resources were governed by means of a non-proprietary regime: “One key aim of the tax regime in the North Sea is that of recouping some of the resources transferred to the private sector”. By the same token, Boadway and Keen (2010) argue that royalties have significant disadvantages. In addition to their potential distortion to extracting decisions, being levied at extracting stage royalties have negative influence on quasi-rent. Also, royalties may lead to premature closure of operation.

Linking Boadway and Keen view to that of Zhang it can be stated that in order for the UK to serve the objective of extracting every possible drop of oil from the UKCS, to recoup some of the resources transferred to the private sector, and not to cause any premature closure of any oil field in the North Sea, has abolished royalty charges

completely in 2002. However, abolition of royalties did not go without fiscal revenues being forfeited.

Table 1:

UK Petroleum Production, Prices and Tax Revenues							
Year	Production of Liquids (Crude Oil + NGLs) (Mt)	Production of Gas (Mtoe)	Production of Oil and Gas (Mtoe)	Brent Crude Price (\$/bbl)	Total North Sea Tax Revenues (£million)	Total UK Tax Receipts (£billion)	North Sea Tax Revenues / Total Uk Tax Receipts %
1980	80.5	33.1	113.6	36.8	3,963	85	4.7
1981	89.5	32.8	122.3	35.9	6,506	100	6.5
1982	103.2	32.9	136.1	33.0	7,868	110	7.2
1983	114.9	33.3	148.2	29.6	8,817	118	7.5
1984	125.1	32.9	158.0	28.8	12,171	129	9.5
1985	127.6	36.5	164.1	27.6	11,371	138	8.2
1986	127.1	38.5	165.6	14.4	4,804	147	3.3
1987	123.4	40.5	163.9	18.4	4,645	162	2.9
1988	114.5	38.7	153.2	14.9	3,193	177	1.8
1989	91.7	38.3	130.0	18.2	2,401	190	1.3
1990	91.6	42.3	133.9	23.7	2,343	201	1.2
1991	91.3	47.1	138.4	20.0	1,016	205	0.5
1992	94.3	48.1	142.4	19.3	1,338	205	0.7
1993	100.2	60.1	160.3	17.0	1,266	212	0.6
1994	126.9	59.5	186.5	15.82	1,683	232	0.7
1995	130.3	64.8	195.1	17.02	2,338	250	0.9
1996	130.0	77.6	207.6	20.67	3,351	269	1.2
1997	128.2	79.0	207.2	19.09	3,331	296	1.1
1998	132.6	81.9	214.5	12.72	2,514	317	0.8
1999	137.1	90.8	227.9	17.97	2,563	335	0.8
2000	126.2	99.6	225.8	28.50	4,457	359	1.2

Source: DECC, various years, Oil and Gas Information

A simple investigation into the post 2000 petroleum tax changes leads to some interesting observations. The introduction of the SC in 2002 at a rate of 10% increased the ATR for old fields by 3.06 percentage points (6.1 percentage points for non-PRT-paying fields), and for fields developed post March 1982 but pre March 1993 it increased the rate by 3.5 percentage points. The abolition of royalty in 2003 benefited the old fields by 3.75 percentage points (7.5 percentage points for non-PRT-paying fields) but had no effect on post March 1982 fields since these were already exempted from paying this duty. The overall effect of the two tax reforms on the old fields was a benefit of 0.69 percentage points (1.4 percentage points for non-PRT-paying fields); while post 1982 fields experienced a loss of 3.5 percentage points.^{vi} In other words, the two reforms had different effects on these two categories of fields; there is as yet no clear indication of a change in the governance of petroleum resources in the UK, at least as far as old fields are concerned.

The story is different, however, when we look closely at the changes implemented since 2006. The increase in the SC rate from 10% to 20% had the greatest effect on non-PRT-paying fields. Whilst the ATR from fields developed both pre and post March 1982 increased by 5 percentage points (from 70% to 75%), the ATR from non-PRT-paying fields rose by 10 percentage points (from 40% to 50%). And, after the 2011 tax change, while the ATR of PRT-paying fields increased by 6 percentage points (from 75% to 81%), it rose by 12 percentage points from non-PRT-paying fields (from 50% to 62%).

Thus, changes to the UK petroleum fiscal regime since 2000, including the royalty and SC reforms, have had the greatest effect on non-PRT-paying fields. While the

overall effect of the tax changes on old fields has been an increase of the ATR of these fields by 11.63 percentage points, and fields developed post March 1982 have seen their ATR going up by 13 percentage points, non-PRT-paying fields have been subject to a 23.5 percentage point increase. This suggests that the Government has decided to capture more tax revenues from the non-PRT-paying fields – possibly because these fields previously benefited from PRT exemption.

Although the Government removed the royalty charge completely in 2003, the ATR for every field in the UKCS increased as a result of the SC rate increases in 2006 and 2011. This is a clear sign that the Government was attempting to retighten the UK's petroleum fiscal regime in line with a proprietorial type of mineral resource governance.

As can be seen from Figure 2, changes in ATRs mirror changes in oil prices, and the latter (i.e. the changes in oil prices) mirrors changes in total UK tax revenues from the UKCS. But has the Government's introduction of the SC, and the subsequent increases in its rate, succeeded in capturing more tax revenues? Or has the increase in the Government tax take actually been driven by the rise in oil prices since 2000? The answers to these questions should give a clearer idea of whether the introduction, and subsequent increase in the SC, reflects a change in the nature of the UK's governance of its petroleum resources from non-prorietorial towards proprietorial.

4.1. Increase in Tax Rates or in Oil Prices?

Table 2 shows that tax revenues from the UKCS, notwithstanding short term fluctuations, have grown steadily since 2000. A closer look at the figures in the table shows that this increase has not been driven by an increase in oil and gas production.

In fact, oil and gas production declined over the period 2000-10. This note is supported by a correlation coefficient value of -0.769 between total petroleum tax revenues and total UKCS oil and natural gas production over the period 1999-2010.

Table 2

Tax Revenues, Oil and Gas Production and Brent Oil Prices								
Year	Licence Fee £M	Royalty £M	Petroleum Revenue Tax £M	Corporation Tax £M	Supplementary Charge £M	Total Tax Revenues £M	Total UKCS Oil & NG production mtoe	Oil Prices \$/barrel
1999	53	389	853	1268	0	2563	244	17.97
2000	55	552	1521	2329	0	4457	241	28.5
2001	59	548	1307	3515	0	5429	227	24.44
2002	63	434	958	3392	270	5117	224	25.02
2003	58	-13	1179	2317	740	4281	213	28.83
2004	57	0	1284	2841	990	5172	194	38.04
2005	57	0	2016	5427	1880	9380	175	54.52
2006	57	0	2155	3959	2750	8921	158	65.14
2007	55	0	1680	3378	2350	7463	150	72.39
2008	65	0	2567	6108	4250	12990	143	97.26
2009	66	0	923	3288	2280	6557	129	61.67
2010	66	0	1450	4530	3150	9196	121	79.61

Source: Tax revenues and production data from the DECC 2011, oil prices from BP Statistical Review 2010

The increase in tax revenues can be related directly to either the increase in oil prices, oil production, tax rates or a combination of these three variables. It is observed from table 1 that while the percentage of total UK petroleum tax revenues to total UK tax revenues was 7.17, 7.47 and 9.46 in 1982, 1983 and 1984 respectively, it declined to 0.49, 0.65 and 0.59 in 1991, 1992 and 1993 respectively. This decline was mainly attributable to both low oil prices and low petroleum ATRs, see table 1 and figure 2. After 2000 the above percentage witnessed an increase to be 1.2, 2.05 and 1.8 in 2004, 2005 and 2006 respectively then up to 2.55 in 2008. Oil production did not increase after 2000, but oil prices and ATRs did both increase. With the observed increase of the percentage 'tax to oil price' it can be stated that the tax tool, although

having a limited effect, has been a successful tool in increasing the total UK tax take from its petroleum resources post 2000. But how significant the effects of increasing the ATR and oil production on the overall petroleum tax revenues have been? This is illustrated next here.

In 2004 oil and gas production decreased to 194 million tonnes of oil equivalent (mtoe) from 213 mtoe in 2003, but tax revenues from the UKCS increased to £5,172 million (£m) in 2004 from £4,281m in 2003 (see table 2). This increase in tax revenues can be linked to the increase in oil prices from \$28.83/barrel in 2003 to \$38.04/barrel in 2004. The increase in tax revenues is not directly related to the introduction of SC in 2002 because, as demonstrated above, old fields were better off by 0.69 percentage points and the effect on non-PRT-paying fields was insignificant. In this regard, we calculated the correlation coefficient between total petroleum tax revenues and oil prices during the period 1999-2010; the result is 0.914 which indicate a strong association between the two variables. This conclusion supports our statement above re the direct effect of changes in oil prices, rather than increases in ATR and production, on the total tax take from the UK petroleum resources during the above period.

Going back to 2003, it can be seen that tax revenues declined to £4,281m from £5,117m in 2002. This reduction is the result of abolition of the royalty in that year, the effect of implementing the 100% capital allowance in 2002 and a reduction in oil and gas production; oil prices did not rise significantly in this period. It can also be seen from table 2 that the tax revenues from the UKCS materially increased after

2006. This is attributable to two main factors: the 2006 increase in the SC rate to 20% and the dramatic increase in oil prices, particularly in 2008.

It is clear enough now that the growth in tax revenues from the UKCS is mainly attributable to increasing oil prices rather than the increase in the petroleum ATR. Fields developed before March 1993 saw their ATR rise by 5 percentage points, while new fields faced an increase of 10 percentage points. However, as new fields tend to be smaller than old ones, the net effect of this change was minimal. Thus, the increase in tax take can be affirmed to have been driven primarily by the rise in oil prices. Had oil prices remained constant, we could have expected to see tax revenues go down as oil and gas production declined from year to year. Even if production remained constant, tax revenues would not have increased without an increase in the tax rate. In the UK, such increases happened in 2002, 2006 and 2011. The effect of the 2011 tax rate increase is yet to be felt, but the effects of the 2002 and 2006 increases were evident in the higher tax revenues generated in 2003 and 2007.

Likewise, a closer examination of the figures for 2008 and 2009 in Table 2 would support this view. ATR did not change between these two years, production declined by almost 10%, tax revenues declined by about 49%, and oil prices declined by about 36%. Since the year 2000, changes in oil prices have had the greatest impact on UK petroleum tax revenues compared to other factors such as increased tax rates. In other words, the tax tool associated with the UK Government's interventionist approach has not been entirely successful in changing the governance of the UK's petroleum resources from the non-proprietary to the proprietary model.

But the key question here is how far the Government's petroleum tax take has been increased as a result of the post 2000 tax changes. The analysis begins with the calculation of the tax paid per tonne of oil equivalent and the tax per tonne of oil equivalent as a percentage of the oil price. These calculations are presented in Table 3 below.

Table 3

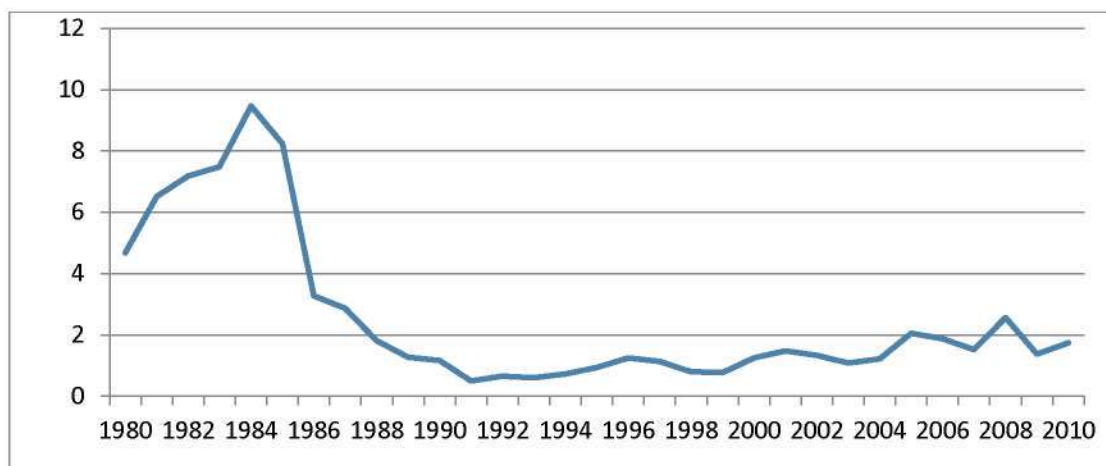
UKCS Totals of Tax Revenues, Oil and Gas Production, Tax Per Tonne of Oil Equivalent, Oil Price per Tonne and Tax to Oil Price Ratio					
Year	Total Tax Revenues from UKCS £M	Oil and Gas Production from UKCS mtoe	Tax per toe £	Oil Price £/tonne	Tax to Oil Price %
2000	4457	241	18.49	138.1	13.39
2001	5429	227	23.92	125.7	19.03
2002	5117	224	22.84	123	18.57
2003	4281	213	20.10	130	15.46
2004	5172	194	26.66	154	17.31
2005	9380	175	53.60	214.4	25.00
2006	8921	158	56.46	257.5	21.93
2007	7463	150	49.75	269.8	18.44
2008	12990	143	90.84	379.8	23.92
2009	6557	129	50.83	240.5	21.14
2010	9196	121	76.00	310.47	24.48

Source: DECC 2011

This table shows that the tax per tonne of oil climbed steadily over the period 2000-2010. In 2008 the tax per tonne of oil was more than four times higher than in 2000 and 2002. The tax paid per tonne of oil in 2009, although lower than the 2008 level, was still about double the 2004 level. This suggests that the Government has managed to increase its tax take from its petroleum resources since 2000. Examination of the tax to oil price ratio column reveals that the Government has increased its tax take per tonne of oil as a percentage of oil price, though not by much. For example, in 2001 the tax to price ratio was 19.03%, while the highest rate, 24.48%, was achieved in

2010; it must be remembered, however, that in 2001 the SC had not yet been introduced, and that oil prices in 2010 were more than double what they were in 2001. From this analysis we can state that the UK Government has managed to increase its tax take from its oil and gas resources, but not by a significant amount. This conclusion suggests that, as part of a proprietorial regime, the tax tool has been effective *to some extent* in increasing the total UK tax take from its petroleum resources since 2000. This is evident from the changes in the percentage of total UK petroleum tax revenues to total UK tax revenues beyond 2000 as can be seen from figure 3.

Figure 3: Percentage of Total UK Oil Tax Revenues to Total UK Tax Revenues



Source: Based on data in table 3 above.

5. Conclusion

The UK petroleum fiscal regime has been subject to many changes since its establishment in 1975, both in its structure and tax rates. While pre 1983 fiscal changes saw consistent increase in ATRs, this trend was reversed between 1983 and 2002, and then reversed again from 2002 onward. These shifts reflect the UK Government's movement back and forth between two different types of mineral

resource governance – what Mommer (2002) called proprietorial and non-proprietorial regimes.

The steady upward escalation of the ATR up to 1983, the establishment of the BNOG in 1975 and the discretionary mode of licencing allocation; while increasing the government tax take it increased the uncertainty of the UK petroleum fiscal regime. The aim of these increases in the petroleum tax burden was to capture a larger share of the revenues from petroleum wealth for the UK Government and its citizens (Garnaut and Clunies Ross, 1983:284). The introduction of new taxes and the repeated raising of existing tax rates during the pre-1983 era are consistent with the character of a proprietorial regime. These changes lead us to conclude that prior to 1983 the UK petroleum fiscal regime appears to have followed the proprietorial mode of governance.

In the early 1980s, the UK Government decided to take an interventionist approach in the oil and gas business in the UKCS, relaxing the petroleum fiscal regime a number of times. The Government's rationale at the time was that relaxing the oil and gas taxation system would bring more investment into the UK North Sea and this would drive more oil and gas production and hence more tax revenues; in other words, adopting the non-proprietorial type of governance would result in a win-win scenario.

But the evidence for the period from 1993 to 2002 appears to indicate that this did not happen, and that what had actually happened was that while oil and gas companies enjoyed windfall profits and enhanced their cash flow as a result of the three tax relaxations, the UK Government lost tax revenues (Abdo, 2006; 2009; 2010a). These

three petroleum tax relaxations have collectively eased the uncertainty of the UK petroleum fiscal regime significantly and lead to an increase in companies' profits and cash flow at the expense of the UK Government and its citizens. These changes, in our view, fit the description of a non-propiertorial philosophy.

Since 2000 the Government has harmonised the tax treatment of fields developed pre March 1993 while at the same time increasing the tax burden on oil and gas investments in the UKCS. The introduction of SC and the subsequent increases in its rate may have signalled that the uncertainty in the UK petroleum fiscal system is back. This suggests that the current and future governance of petroleum resources is shifting back from a non-propiertorial to a propriertorial regime. The Government may have realised that since the previous interventionist approach in the oil and gas business between 1983 and 2000 was imperfect, it brought in no increased investment and did not create the anticipated win-win scenario. Having realised that production from existing resources had peaked and that output was showing a downward trend, the Government appears to have decided that a change in governance was necessary if more tax revenues were to be secured from British petroleum resources.

Under the non-propiertorial regime of the early 1980s, the Government seems to have encouraged the rapid depletion of the UK North Sea oil and gas resources, albeit for some understandable reasons. Self-sufficiency in oil and gas was a key driver, as was the increasing involvement of downstream UK companies in supplying offshore capital equipment. The UK achieved self-sufficiency in oil in 1980 and in gas in 1995, but this did not last long; self-sufficiency in gas was lost in 2004 and in oil in 2006. With the maturing of the UK North Sea oil and gas business, the policy objective

seems to have changed to favour collecting higher revenues from the remaining UK petroleum resources. These revenues, if not used to reduce income tax for British citizens, were to be used for extra public spending, or to cut the current financial deficit. If this is still the Government's intention, a proprietorial type of governance model for UK petroleum resources needs to be in place over the next few years.

The rationale behind the UK petroleum tax relaxations in the period 1980-2000 has already been investigated, and the results show that in most cases the policy objectives were not met; success was very limited. The adoption of the non-proprietorial regime between 1983 and 2002 cost the UK Government significant fiscal revenues. Mommer (2002: 235) has warned that "There remains a possibility that non-proprietorial governance will not prosper beyond the early advances it has already made in some exporting countries. A few years will probably be enough to show the heavy losses in fiscal revenues that non-proprietorial governance will entail for the exporting countries. Lessons may be learned in the future, but at what price?" In the UK's case, the lesson seems to have been revenue costly for both the Government and its citizens.

In order to evaluate the success of UK petroleum taxation policy post 2000, further investigation now needs to be conducted into the rationales for the post 2000 petroleum tax changes; this will be our next research.

Acknowledgments

I would like to express my great gratitude to Peter Murphy and Professor Rob Ackrill from the Nottingham Business School, Mike Earp from the Department of Energy and Climate Change, and Professor Alex Kemp from Aberdeen University for reviewing this article and providing rich comments which helped me to make significant improvements on this paper.

References

- Abdo, H. (2006). *Exploring the rationales for relaxations in the UK petroleum fiscal regime, 1980-2000*. Ph.D. thesis, The University of Sheffield.
- Abdo, H. (2008). Readings in the international oil and gas agreements: the governance of petroleum resources. *International Energy Journal*, September, Vol. 9, Issue 3, pp. 163-173.
- Abdo, H. (2009). Evaluating the usefulness of the interventionist approach as a policy tool to influence oil and gas investment activities: the case of the UK. *International Energy Journal*, June, Vol. 10, Issue 2, pp. 1-9.
- Abdo, H. (2010a). The taxation of UK oil and gas production: why the windfalls got away. *The Energy Policy Journal*, October, Vol. 38, Issue 10, pp. 5625-5635.
- Abdo, H. (2010b). The story of the UK oil and gas taxation policy: history and trends. *Journal of Oil, Gas & Energy Law (OGEL)*, No. 4, November. Available at: <http://www.ogel.org/journal-browse-issues-toc.asp?key=39>
- Bland, D. (1991). *UK Oil Taxation*. Third Edition. UK: Longman.
- Boadway, R and Keen, M. (2010). *Theoretical perspectives on resource taxation design*, in The Taxation of Petroleum and Minerals: Principles, Problems and Practice. pp.13-74. Oxon, United Kingdom: Routledge.
- Cameron, P. D. (1983). *Property Rights and Sovereign Rights: The Case of the North Sea*. London: Academic Press Inc.
- Corzine, R. (1998). National news: offshore oil sector keen to know what's in the pipeline: uncertainty over taxation may hit investment. *Financial Times*, London, 19th May 1998, p. 16.
- Daniel, P and Sunley, E. M. (2010). *Contractual Assurance of Fiscal Stability*, in The Taxation of Petroleum and Minerals: Principles, Problems and Practice. pp.406-424. Oxon, United Kingdom: Routledge.
- DECC (Department of Energy and Climate Change) (2011). *The UK upstream oil and gas tax regime*. Available at: <https://www.og.decc.gov.uk/upstream/taxation/TaxRegime.pdf>. [Accessed on 2nd June 2011].
- DECC (Department of Energy and Climate Change) (2013). *Licensing Rounds – Past Licensing Rounds*. Available at: http://og.decc.gov.uk/en/olgs/cms/licences/lic_rounds/past_licensing/past_licensing.aspx. [Accessed on 25th January 2013].
- Devereux, M. P and Griffith, R. (1999). *The Taxation of Discrete Investment Choices*. Revision 2, the Institute for Fiscal Studies, Working Paper Series No. W98/16.
- Devereux, M. P and Griffith, R. (2003). Evaluating Tax Policy for Location Decisions. *International Tax and Public Finance*, Vol. 10, Issue 2, pp. 107-126.
- DOE (Department of Energy) (1981). *Development of the Oil and Gas Resources of the United Kingdom*. London: HMSO.
- DOE (Department of Energy) (1982). *Development of the Oil and Gas Resources of the United Kingdom*. London: HMSO.
- DOE (Department of Energy) (1988). *Development of the Oil and Gas Resources of the United Kingdom*. London: HMSO.
- DTI (Department of Trade and Industry) (2001). *Development of the Oil and Gas Resources of the United Kingdom*. London: HMSO.
- DTI (Department of Trade and Industry) (2006). *The Energy Challenge: Energy Review Report 2006*, presented to Parliament by the Secretary of State for Trade and Industry by Command of her Majesty – July 2006. Cm6887.
- Faber, M. O and Potter, J. G. (1971). *Towards Economic Independence: Papers on the Nationalisation of the Copper Industry in Zambia*. Occasional Paper, No 23. Cambridge University Press.
- Faber, M. O. (1977). The Fiscal Regime. In Brown, R and Feber, M. *Some Policy and Legal Issues Affecting Mining Legislation and Agreements in African Commonwealth Countries*. London and Brighton. Commonwealth Secretariat and Institute of Development Studies.
- Garnaut, R and Clunies Ross, A. (1975). Uncertainty Risk Aversion and the Taxing of Natural Resources Projects. *The Economic Journal*, Vol 85, No. 38, pp. 272-287.
- Garnaut, R and Clunies Ross, A. (1983). *Taxation of Mineral Resources*. Oxford. Clarendon Press.
- Grayson, L. E. (1981). *National Oil Companies*. Great Britain: John Wiley and Sons Ltd.
- Great Britain (1975). *Oil Taxation Act 1975*, Chapter 22. In The Taxes Acts, 1997 Edition. Norwich: The Stationery Office.
- Great Britain (1980). *Finance Act 1980*, Chapter 48. In The Taxes Acts, 1997 Edition. Norwich: The Stationery Office.

- Great Britain (1981). *Finance Act 1981*. Chapter 35. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1982). *Finance Act 1982: Advance Petroleum Revenue Tax*. Chapter 39, Part VI. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1983). *Finance Act 1983*. Chapter 28. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1985). *Finance Act 1985*. Chapter 54. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1986). *Advanced Petroleum Revenue Tax Act*. Chapter 68. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1987). *Finance Act 1987*. Chapter 16. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1988). *Income and Corporation Taxes Act 1988: Petroleum Extraction Activities (Ch. V)*. Chapter 1. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1989). *Petroleum Royalties (Relief) and Continental Shelf Act 1989*. Chapter 1. London: HMSO.
- Great Britain (1990). *Capital Allowances Act 1990*, Chapter 1, In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (1993). *Finance Act 1993*. Chapter 34. In *The Taxes Acts, 1997 Edition*. Norwich: The Stationery Office.
- Great Britain (2002). *Finance Act 1981*. Chapter 23. Available at: http://www.Englandlegislation.hmso.gov.uk/acts/acts2002/ukpga_20020023_en_1. [Accessed on 28th March 2010].
- Herfindahl, O. C. (1974). The value of mineral surveys to economic development. IN Brooks, *Resource Economics: selected works of Orvis Herfindahl*, Baltimore, Johns Hopkins University Press.
- HMRC (2009). North Sea Fiscal Regime: Incentivising Production. Available at <http://www.hmrc.gov.uk/budget2009/bn10.pdf>. [Accessed on 2 April 2010].
- HMRC (2010a). *The taxation of the UK oil industry: an overview: other developments to the fiscal regime 1975 to 2010*. Available at: <http://www.hmrc.gov.uk/manuals/otmanual/ot00190.htm>. [Accessed on 10th December 2010].
- HMRC. (2010b) A Guide to UK and UK Continental Shelf. Viewed on 4th April 2010. <http://www.hmrc.gov.uk/international/ns-fiscal3.htm>
- Hotelling, H. (1931). The economics of exhaustible resources. *The Journal of Political Economy*, Vol. 39, No. 2, pp. 137- 175.
- Hughes, H. (1975). Economic Rents: The Distribution of Gains from Mineral Exploitation, and Mineral Development Policy. *World Development*, Vol 3, Issue 11-12, pp. 811-825.
- Kemp, A. G. (1975). Fiscal Policy and the Profitability of North Sea Oil Exploitation. *Scottish Journal of Political Economy*, Vol 22, No 3, pp. 237-260.
- Kemp, A. G. (1976). The Taxation of North Sea Oil, *North Sea Study Occasional Paper*, No 11, August.
- Kemp, A. G and Cohen, D. (1980). The Impact of the System of Petroleum Taxation in the UK on Oil Operations and Government Revenue. *Fraser of Allander Institute Research Monograph*, No 8, Glasgow, University of Strathclyde Press.
- Kemp, A. G and MacDonald, B. (1992). The UK and Norwegian Fiscal systems: a comparative study of their impact on new field investments. *North Sea Study Occasional Paper*, No. 38, University of Aberdeen, April.
- Kemp, A. G, and Stephen, L. in Glomsrød, S. and Osmundsen, P. (2005). *Petroleum Industry Regulation within Stable States*. England: Ashgate Publishing Limited. pp. 131-156.
- Kemp, A. G, and Stephen, L. (2011). The Short and Long Term Prospects for Activity in the UK Continental Shelf: the 2011 Perspective. *North Sea Study Occasional Paper*, No 121, University of Aberdeen, August.
- Mikesell, R. F. (1975). *Foreign Investment in Copper Mining: case studies of mines in Peru and Papua New Guinea*. Baltimor. Johns Hopkins University Press (for Resources for the Future).
- Mikesell, R. F. (1979). *The World Copper Industry: Structure and Economic Analysis*. Baltimor. Johns Hopkins University Press.
- Mommer, B. (2002). *Global Oil and the Nation State*. Oxford: Oxford University Press.
- Mommer, B. (1999). *Oil Prices and Fiscal Regimes*. Working Paper: WPM 24, Oxford Institute for Energy Studies, May.
- Moor, M. (2007). How Does Taxation Affect the Quality of Governance? Working paper No 280, *Institute of Development Studies*, University of Sussex, April.

- Muslumove, Z. (2011). Further complication for UK upstream tax regime. *Petroleum Economist*, 12th April. Available at: <http://www.petroleum-economist.com/Article/2806185/Further-complication-for-UK-upstream-tax-regime.html>. [Accessed on 19th June 2011].
- Nakhleh, C. (2008). *Petroleum Taxation: Sharing the Oil Wealth*. London: Routledge.
- Nakhleh, C. (2010). *Petroleum Fiscal Regimes: Evolution and Challenges*. In *The Taxation of Petroleum and Minerals: Principles, Problems and Practice*. pp, 89-121. Oxon, United Kingdom: Routledge.
- Oil and Gas UK. (2010a). Economics, Energy Policy and Gas. Available at: <http://www.oilandgasuk.co.uk/economics.cfm>. [Accessed on 25th July, 2011].
- Oil and Gas UK. (2010b). Economic Report.
- Penrose, E. T. (1959). *The Theory of the Growth of the Firm*. Oxford, Blackwell.
- Pfeifer, S., McNamara, W., Smith, P., Simon, S., Simon, B. (2011). Resources industry angry at tax increases. *Financial Times – Global Economy*, 2nd May. Available at: <http://www.ft.com/cms/s/0/b1c38614-745d-11e0-b788-00144feabdc0.html#axzz1Pj7wu1Rl>. [Accessed on 19th June, 2011].
- Rossiaud, S. (2012). Characteristics of Alternative Oil Governance Structure. *Polinares working paper*, No 63, December.
- Rutledge, I. D. and Wright, P. W. (1998). Profitability and taxation in the UKCS oil and gas industry: analysing the distribution of rewards between company and country. *Energy Policy*, Vol. 26, No. 10, pp. 795-812.
- Rutledge, I. D. and Wright, P. W. (2010). *UK Energy Policy and the End of Market Fundamentalism*. Oxford: Oxford University Press.
- Usenmez, E. (2010). The stability of the UK tax regime for offshore oil and gas: positive developments and potential threats. *International Company and Commercial Law Review*, Vol. 21, Issue 1, pp. 16-25.
- Wälde, T. (2003). *Book Reviews of Global Oil and Nation State*. *CEOMLP Internet Journal*. Available at: <http://www.dundee.ac.uk/cepmlp/journal/html/review80.html>. [Accessed on 12th December 2010].
- Zhang, L. (1995) Taxing Economic Rents in Oil Production: an assessment of UK PRT. *Warwick Economic Research Papers*, No 445, University of Warwick, October.
- Zhang, L. (1997). Neutrality and Efficiency of Petroleum Revenue Tax: A Theoretical Assessment. *The Economic Journal*, Vol 107, July, pp. 1106-1120.

Appendix

Table 1A:

THE EVOLUTION OF THE UK OIL & GAS FISCAL REGIME	
1964	12.5% Royalty + Corporation Tax but major loopholes for the avoidance of the latter, including the deductibility of losses made on non-UK operations.
1975	Additional to the 12.5% royalty, Petroleum Revenue Tax (PRT) introduced, initially at 40%, rising to 60% (1979-80) and then 70% (1980-82). PRT was 'ring-fenced' by field (losses from one field could not be set against the profits of another), but a series
1981	Supplementary Petroleum Duty introduced at a rate of 20% on Gross Revenue, but with a duty free allowance of 20,000 barrels per day.
1982	Supplementary Petroleum Duty replaced by Advance Petroleum Revenue Tax to accelerate PRT payment, plus PRT itself was increased to 75% (from January 1983).
1983	Advanced Petroleum Revenue Tax phased out. Royalties abolished on fields in Northern North Sea receiving development consent after April 1982. PRT Oil Production Allowance doubled for new oil fields outside Southern Basin of North Sea. Cross-Field Explorer
1984-86	Corporation Tax was progressively reduced from 52% to 50% in 1984, 45% in 1985 and 40% in 1986. As a compensating measure 100% first year capital allowances were abolished and replaced with a 25% depreciation allowance calculated on the declining balance
1987	Corporation Tax was reduced further to 35%. A Cross-Field Development Allowance was introduced: in a further breach of the ring-fence principle. companies were allowed to offset 10% of their capital expenditure on certain new fields (fields with no PRT-li
1989	1983 Royalties exclusion extended: Royalties abolished for remaining offshore and onshore fields receiving development consent after April 1982.
1991	Corporation Tax reduced to 34%.
1992	Corporation Tax reduced to 33%.
1993	PRT reduced to 50% for existing fields and abolished altogether for new fields given development consent after April 1993. Cross-Field Exploration and Development Allowances abolished for future exploration and development (under transitional arrangements
1997	New Labour government announces a review of the North Sea Fiscal regime, involving two alternatives: a Supplementary Corporation Tax or a Broader Petroleum Revenue Tax. Either of these alternatives would be accompanied by the abolition of Royalties.
1999	Corporation Tax reduced to 30%
2002	Remaining Royalty obligations abolished from January 2003 for the 30 fields which still paid them. An additional 'Supplementary Charge' of 10% of 'ring-fenced' profits introduced, without any deduction for financing costs. The SC is a Brown tax as it is in effect a cash flow based tax.
2006	January 2006: Supplementary Charge raised from 10% to 20%
2008	March 2008: changes to the treatment of CT losses created by decommissioning, extraction of 100 per cent capital allowance to long-life assets and mid-life decommissioning, and reforms to Petroleum Revenue Tax; Main rate of Corporation Tax reduced to 28% but not applied to UKCS which remained at 30%
2009	March 2009 (effective April 22nd): New Field Allowance reducing the tax payable on qualifying new development; Gains from asset swaps and disposals not to be charged if reinvested in UKCS; Petroleum Revenue Tax decommissioning relife to continue after licences have expired
2011	March 2011: Supplementary Charge raised from 20% to 32% with effect from 24th March 2011

End Notes

ⁱ From an international perspective, the UK is the second largest European oil and gas producer, after Norway. Worldwide, the UK is the 15th largest gas producer and the 19th largest oil producer (Oil and Gas UK, 2010b: 9).

ⁱⁱ Although the UK petroleum fiscal regime is bounded by a concession system, which is described as a 'tax/royalty regime', royalty was completely abolished in 2003; the post 2003 petroleum fiscal regime stood as a concession without royalty.

ⁱⁱⁱ These fields are protected from paying PRT by the "safeguard concept". This concept states that PRT payable by a participator in an oil and gas field for any chargeable period should not exceed 80% of the gross profit of that field, and that it should be levied only if his adjusted profit for that period exceeds 15% of his accumulated capital expenditure at the end of that period (Great Britain 1975, S. 9). Another category of non-PRT-paying fields were those exempted from paying PRT by the 1993 Finance Act, i.e. fields developed post March 1993; the Government calls these "non-taxable fields" (Great Britain, 1993, S. 185). Any PRT-exempted field is referred to in this paper as a "non-PRT-paying field".

^{iv} Major changes to the petroleum fiscal regime over the period 1975-1983 were: the Oil Taxation Act 1975, provisions contained in seven Finance Acts and the Petroleum Revenue Tax Act 1980.

^v The average tax rate of 89.9% is calculated as follows: royalty = $100 \times 12.5\% = 12.5$; PRT = $(100 - 12.5) \times 70\% = 61.25$; SPD = $(100 - 12.5 - 61.25) \times 20\% = 5.25$; CT = $(100 - 12.5 - 61.25 - 5.25) \times 52\% = 10.92$. Marginal tax rate = $12.5 + 61.25 + 5.25 + 10.92 = 89.92\%$.

^{vi} These have been calculated as follows: Old fields were subject to an increase of 3.06 percentage points because of the SC and these fields benefited by 3.75 percentage points from the abolition of royalties; the overall result was a benefit of $3.75 - 3.06 = 0.69$ percentage points less on the marginal tax rate of these fields. Non-PRT paying fields $(7.5 - 6.10) = 1.4$ percentage points benefit. Post March 1993 fields were subject to an increase in their marginal tax rate by 3.5 percentage points.