The Taxation of UK Oil and Gas Production: Why the Windfalls Got Away

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ABSTRACT

Starting with evidence that United Kingdom Continental Shelf oil and gas companies have benefitted very disproportionately from the recent period of very high oil prices, this paper traces the history of this weakness in the UK's petroleum fiscal regime. Evidence is provided that the progressive relaxations in the UK's petroleum fiscal regime in 1983, 1987-88 and 1993 were: largely unnecessary to stimulate the development of new, smaller, 'marginal' fields; misguided in their assumption that such fields were more costly to develop than earlier counterparts or larger contemporary fields; and impotent compared with the effects of oil price movements. The paper concludes with a conceptualisation which illuminates why these failures of policy were not just random: they emerged from the UK's 'non-proprietorial' stance with respect to the country's oil and gas resources, a stance which assumes responsibility for oil company profitability and vainly tries to counter market forces at the expense of government revenues.

Keywords: taxation, oil, gas, policy, UKCS

1. Introduction

A little noticed fact of UK fiscal policy was that as the (Brent) oil price rose from $55/barrel to $72 between 2005 and 2007, the UK's tax revenues from its still substantial oil and gas production actually went down from £9.4 billion to £7.8 billion (Table 1). It is probably safe to assume that no other oil and gas-producing nation had such an experience. Why did the UK - particularly given that at $55 per barrel oil prices were already way above costs, and that any increase from this level would therefore imply pure windfall profit for companies? A superficial response would be that such a decline in the UK's fiscal revenues at such high and rising oil prices must reflect the decline in UK oil and gas production. But did it? It is certainly true (see Table 1) that since the turn of the century UK oil and gas production has been declining sharply: oil by 44% from its 1999 peak and gas by 35% from its 2000 peak. It is also true that between 2005 and 2007 in particular, the UK's total oil plus gas equivalent production fell by as much as 18%. However, the corresponding inference that it was to be expected that revenues should decline pro-rata with production is entirely misplaced. Production may have been declining, but rising prices resulted in rising profits: the Net (after depreciation) Operating Surplus from the UK Continental Shelf (UKCS) rose by £4.2 billion between 2005 and 2006 (as tax revenues fell) and in 2007 this surplus was still above its 2005 level, but tax revenues were £1.5 billion less (Table 1).

Table 1: UKCS Production, Prices, Profits and Taxation 1980-2007

Making this particular point though, is just to pick up on a striking symptomatic anomaly – for there are three more general indications that something is amiss with the UK's petroleum fiscal regime. Firstly, despite the introduction of a Supplementary Corporation Tax ('Supplementary Charge') of 10% in January 2001, and its subsequent increase to 20% in January 2006 (see Appendix 1), the surplus which UKCS companies accumulated between 2002 and 2007 was an astronomical £63.9 billion (Table 2). This is what UKCS companies were left with after meeting all their costs in the UK, *including taxes and investment*. This was well in excess of the UKCS tax revenue accruing to the government during this period. It was also, notably, more than three times the fiscal stimulus which the government has applied to the whole economy in the wake of the financial crisis (HM Treasury 2008).

Table 2: UKCS Company Post Tax and Investment Surpluses Since the Introduction of the Supplementary Corporation Tax Charge

Secondly, comparing the profitability of the UKCS company sector with the non-UKCS company sector, their average pre-Corporation Tax rates of return between 2002 and 2007 were 26.1% and 12.2% respectively (Table 1). In other words, after meeting all their special tax obligations including the Supplementary Charge of 20%, UKCS companies enjoyed an enormous margin of profitability over non-UKCS companies.

Thirdly, and looking now to Figure 1, while it is the case that the UK government's tax take per barrel of production has been increasing both absolutely and as a percentage of the oil price, it is still low in a historical perspective and in relation to the oil price: claiming only $15 out of a 2007 unit sales value of $60 per barrel of oil and gas equivalent seems rather generous.[1] Moreover, as a share of unit sales value, the government's take fell from 34% in 2005 to just 25% in 2007. Already we seem to have *prima facie* evidence that something is wrong with the UK's petroleum fiscal regime.

Figure 1: Tax Take per Barrel Equivalent of UKCS Oil and Gas Production

On the other hand, perhaps this relatively light fiscal burden on the UK's oil and gas production can be justified? Here two arguments are commonplace. Firstly, and as will be demonstrated in detail in the sections below, it is argued that low taxation is to stimulate investment. Just focusing for the moment on the recent past, Table 3 shows that this argument is without foundation: the most that has been reinvested in the UKCS by companies in the last eight years has been 25% of Gross (including depreciation) Operating Surplus. Three quarters was not. Secondly, it is argued that companies could not withstand further increases in tax because of dramatically increasing operating costs (e.g. Oil & Gas UK, 2008, p.8; p.28). While this argument has already been seen to be without foundation given the increasing profits we have identified, it is still worth consideration with other data. Table 3 reveals that UKCS operating costs have indeed increased about threefold to over $11/barrel since 2000. However, as a proportion of unit sales value the increase has been much less dramatic and in 2007 only represented 19% of the UK's unit sales value per barrel of oil and gas equivalent. To bring these points home in another way, in 2007 the unit sales value of a UK barrel of oil and gas equivalent was $60, operating costs were $11 per barrel and tax was $15 per barrel. This still left the company take for re-investment and dividends at $34 per barrel of oil and gas equivalent – more than half of unit sales value .

Table 3: Investment in and Operating Costs of the UKCS 1980-2007

These introductory points indicate that there are weaknesses in the UK petroleum fiscal regime which have prevented the UK government and its citizens from benefiting from the recent dramatic increases in oil prices in the same way that other oil and gas producing countries have. They also indicate that there are two lines of enquiry which need to be pursued in order to establish why this has been the case. Firstly, there are conjunctural questions about why the current fiscal regime has not been delivering despite the introduction of, and subsequent increase in, the Supplementary Charge. Secondly, there is clearly a longer-term historical problem with its roots in the nineteen eighties. Table 1 shows that the government claim on company surpluses was much higher in the nineteen eighties. Why and how was it reduced?

Answering these latter questions is the main task in this paper and, as we shall see, they also provide the historical keys to answer the conjunctural questions. We shall approach them by exploring what changes have been made to the UK's petroleum fiscal regime since 1980, why they were made and what were their consequences. Reflecting the relative dearth of academic work on the performance of government policy with respect to the UKCS, there are few previous pieces of research which engage directly with this territory and none which does so consistently over the almost three decades since the UK became self-sufficient in oil. Martin (1997) is most directly pertinent with an evaluation of the relative impacts of government tax policy vs. technological change on UKCS hydrocarbon production between 1985 and 1995. The work of Kemp, Cohen, Stephens and Seymour has partially engaged the territory (e.g. Kemp and Cohen, 1980; Kemp, 1992; Kemp and Stephens, 1996; 1997; 2000; Seymour, 1990).[2] Other work has focused on specialised aspects of the UK's petroleum fiscal regime (e.g. Devereux, 1983A, 1983B; Devereux and Morris, 1983A, 1983B; Favero and Pesaran, 1994; Kemp and MacDonald, 1994; Saunders, 1987), taxation principles and future policy (e.g. Bland, 1991; Boyle, 1984; Bond et al., 1987; Rowland and Hann, 1987; Zhang, 1997) or government strategy (e.g. Anderson, 1993; Hann, 1986; Noreng, 1980). Rutledge and Wright (1998) previously established that the UKCS petroleum fiscal regime was weak in the past (between 1986 and 1996) and that this could not be justified by generic criteria such as historical and international comparisons, relatively poor UKCS profitability (both in relation to the rest of the UK company sector and oil industry investment elsewhere in the world) and the particular risk associated with oil and gas industry investments. However, missing from the literature has been an evaluation of the UK's petroleum fiscal regime in terms of the outcomes of changes to it - seen in relation to the original objectives which it was professed these changes were designed to achieve. What were the professed objectives of the many relaxations in the UK's fiscal regime and did the latter succeed or fail in terms of these objectives?

2. A Brief History of the UKCS Petroleum Fiscal Regime

Appendix 1 provides an outline of the changes which have been made to the UK petroleum fiscal regime since its inception. It reveals, first of all, a steady tightening 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 increases in oil prices of 1973, that this was too weak an instrument with which to claim a fair share of 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. Tax avoidance was also curtailed by ring fencing field operations for tax purposes. Subsequently, there were substantial increases in PRT up to a peak of 75% in 1982. A Supplementary Petroleum Duty had been introduced by the first Thatcher government the previous year in response to dramatically high oil prices, but this was dropped in 1982 in favour of a higher basic rate of PRT and the introduction of Advance PRT in order to accelerate its collection.

From this taxation highpoint the next 10 years showed a progressive relaxation in the UK's petroleum fiscal regime. This involved three components: (a) targeted reductions in royalty obligations (b) a set of tax breaks which included breaching the original ring-fencing of PRT and (c) finally, the reduction of the rate of PRT and its partial abolition. To these different relaxations were added, coincidentally, the effects of reductions in standard Corporation Tax from 52% in 1983 down to 33% by 1993.

Figure 2: Indices of UK Production, Taxation and International Oil Prices 1980-2007

Figure 2 illustrates the broad effect of these changes: the index of tax revenues fell very steeply and its relationship to both production and prices was changed quite fundamentally. The changes induced may be broadly characterised as the achievement of 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 may be brought into sharp relief by looking at the UK government's tax take in relation to production in 1986, 1993 and 1999 (Table 1): in 1986 the oil price was $14/barrel, oil and gas production was 165.6 millions of 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 had been in 1986, but revenues were 46% less in money-of-the-day (considerably less in real terms) even though the oil price was higher. Significant windfalls therefore escaped the UK government and UK citizens without, as we shall see, a commensurate response from companies in terms of increasing investment. If the tax take per barrel achieved in 1986 (£3.87) had been replicated in 1999, government revenues would have been £6.6 billion rather than £2.6 billion.

Looking again at Figure 2 and at Table 2, it might seem that there may have been a reason for the weakening in the UK’s petroleum fiscal regime: production had started to decline from its 1986 peak and investment was also in decline. The measures which weakened the UK’s petroleum fiscal regime might therefore be seen in this light: that they were driven by an apparent decline in UK production and investment, and that they actually succeeded not only in arresting that decline but also in stimulating very substantial increases in the production of both oil and gas. The implication is that the weakening in the UK’s petroleum fiscal regime was not only justified but also necessary in order to secure a future for UKCS production. It is this general hypothesis, which has underpinned government policy, that the rest of this paper is mainly concerned to investigate – for if it is not true then government policy towards the UKCS over the past 25 years would be deemed to have sacrificed government revenue to no avail, an outcome which would amount to a failure of the stewardship which governments should exercise over natural resources on behalf of sovereign citizens.

3. The 1983 Relaxations: PRT reliefs and Selective Abolition of Royalties

The first of the relaxations in the UK's petroleum fiscal regime post-1982 involved PRT reliefs (removal of advanced payments; cross-field offsets of exploration and appraisal costs against PRT; increased tax free oil allowance for new oil fields outside the Southern Basin of the North Sea) and an abolition of Royalties on fields in the northern sector of the North Sea which had received development consent after April 1982.[3] From simply reading these measures there emerges a sense that the government was concerned to use tax breaks to stimulate investment and production in the emerging Central and Northern UKCS area of production. Was this the motivation? From a contemporary statement of the then Chancellor, Mr Nigel Lawson, this is confirmed to have been the case.

> Analysis of the profitability of existing fields led the Government to conclude that there was no economic justification for tax or royalty reduction to improve returns on those fields viewed in isolation. Likewise the prospective rates of return of the future incremental projects to existing fields that were looked at appeared attractive enough not to justify special reliefs. But the Government accepted on the basis of its analysis of the new information on actual projects provided by the operators that future free-standing fields were likely in general to be less profitable, because they would be smaller, geologically more complicated and proportionately more costly to develop than previous fields. (Lawson, 1983, p.4)

In the same evidence to the UK Parliament's Energy Committee Mr Lawson also indicated that concern about the industry's cash flow and the potentially adverse impact which this might have on future investment also motivated the abolition of advanced payments of PRT (Lawson, 1983, p.9):

> ....in the light of current pressure on the oil and gas industry's cash flow the Chancellor has decided to phase out the acceleration of PRT through the APRT system to provide some easement in cash flow over the next few years, to help finance new development.

This perspective was shared completely by the then Energy Minister, Mr Hamish Gray, who told the *Petroleum Review* that the tax relaxation was significant to the extent that it would help develop the most marginal fields in the North Sea, and at the same time encourage the oil and gas companies to keep investing within the UKCS rather than move elsewhere (*Petroleum Review*, May 1983, p.6).

Two questions now present themselves in relation to this policy perspective: was it appropriate and was it effective in practice? The first question can be made more specific by way of another question – was it appropriate for a government to use the tax system to create an investment incentive, rather than to rely on the market (i.e. changes in oil prices) to make investment opportunities viable? An answer to this question will emerge as part of investigating whether the policy was effective in practice.

To gauge whether the policy of using the petroleum fiscal regime to create investment incentives was effective, we use three tests: an ex-post evaluation of the way the changes to the fiscal regime affected field-level economics; an ex-ante evaluation of the same; and data on the behaviour of exploration and development expenditure in the targeted area (the Central & Northern North Sea). To do so we first of all need to identify the fields which could have benefited from the fiscal relaxation. The location of these was given more precisely by the Finance Act of 1983 (Great Britain 1983, S.36, p.200):

> Subject to subsection (3) below, in this section "relevant new field" means an oil field—

(a) no part of which lies in a landward area, within the meaning of the Petroleum (Production) Regulations 1982 or in an area to the East of the United Kingdom and between latitudes 52° and 55° North; and

(b) for no part of which consent for development has been granted to the licensee by the Secretary of State before 1st April 1982; and

(c) for no part of which a programme of development had been served on the licensee or approved by the Secretary of State before that date.

From the above definition it emerges that 14 offshore fields were embraced by the 1983 fiscal relaxation. These are identified in Table 4 where the pre-1983 and post-1983 field economics are also shown. The latter are *ex-post* evaluations of the policy based on running Wood Mackenzie's Global Economic Model (GEM) – in its 2004 version in order to avoid the potentially distorting impact of the very large increases in oil prices which occurred during the last three years, It shows us that for four of the 14 fields, Alwyn, Clyde, Cyrus and Balmoral, the impact of the 1983 fiscal relaxation was insufficient to raise the

Internal Rate of Return (IRR) above the standard industry target rate of 15%. And yet the development of these fields went ahead anyway – indicating that the contribution of the fiscal relaxation was unnecessary.[4] Considering the other 10 fields, eight of them turned out to have IRRs well in excess of 15% before the fiscal relaxation, again indicating that the fiscal relaxation was unnecessary in order for these fields to be developed. This leaves just two small fields, Duncan and Innes, upon which the 1983 fiscal relaxations might conceivably have had an impact. Both were shut down along with the Argyll field in 1992 (OPL, 1998, p.63).

Table 4: The Financial Performance of Offshore Oil Fields Developed between April 1982 and March 1987

This though is an ex-post perspective, and although it might serve as a warning to governments about not taking on board perceived future company risks which may or may not materialise, it does not inform us about the *ex-ante* investment decision: what were the expectations at the time and how might this have reflected on field economics? These are of course very difficult to recreate with such a long period of hindsight, but we can refer to expected oil prices at the time. These projections generally much higher than the actual outcome which gave us the ex-post results and using one (EIA, 1983, p.xiii) only the Cyrus field registers an expected IRR of less than 15%, in turn indicating that the expectations of the time would have made fiscal stimulus appear less rather than more necessary.

Other relevant data which we can observe, and which escapes the trap of ex-post rationalisation, is the behaviour of exploration and development expenditure. From Table 1 it can already be seen that exploration and appraisal expenditure initially rose after 1983 but then fell away. But what happened in the areas of the North Sea which were being targeted (the Central and Northern areas) – was there differential behaviour as a result of the changes in the petroleum fiscal regime? Figure 3 shows that this was not the case with the number of exploration wells drilled: these had been on a rising trend since 1980 in all areas of the UKCS and fell away in all areas after 1984. Development drilling, in contrast, continued on a falling trend in the Central and Northern areas of the UKCS, while Development drilling in the other, older areas of activity actually increased. Exploration and development drilling in all areas then increased up to and including 1988.

Figure 3: Offshore Exploration and Development Wells Drilled between 1980 and 1987

None of this drilling data indicates that the 1983 tax breaks had any differential effect on prospective new areas of exploration and development and, in fact, this is what one might expect - not because of the changes in taxation, but rather because of changing oil prices which fell sharply to a 1986 trough (Table 1). Actual and prospective oil prices must play the main role in the process of oil and gas industry investment decision-making, as the literature confirms

(Pesaran and Favero, 1990; Seymour 1990). Moreover, Seymour (1990, p.9) points out that development activities are more likely to be price sensitive than exploration activities, because development involves larger capital expenditure than exploration. Oil companies might be motivated to explore, whatever the oil price is, in order to build up a portfolio of reserves for eventual development. These observations seem to be borne out by the differential behaviour of exploration and development activity in Figure 3, with exploration drilling seemingly less sensitive to oil price movements.

For two principle reasons therefore: the ex-post and ex-ante profitability of the targeted fields; the relaxations in the UK's petroleum fiscal regime of 1983 were, of themselves, largely ineffective in achieving their objectives. Only two small fields apparently benefited and their lives were cut short in the early nineteen-nineties. Moreover, the policy of using the tax system to incentivise companies towards particular objectives is already emerging as relatively impotent in the context of the oil market: compared to tax breaks, oil price movements are much more powerful drivers of exploration and development decisions.

4. The 1987-1988 Relaxations: Further Erosions of the PRT Ring-Fence and of Royalties

While 1985 and 1986 saw no major changes in oil taxation, the 1987 Finance Act introduced the concept of the 'Cross Field Allowance', which stated:

> Where an election is made by a participator in an oil field (in this section referred to as "the receiving field"), up to 10 percent of certain expenditure incurred on or after 17th March 1987 in connection with another field, being a field which is for the purpose of this section a relevant new field, shall be allowable in accordance with this section in respect of the receiving field… (Great Britain, 1987, S. 65)

The 'certain expenditure' referred to approved categories of development expenditure (see HM Revenue & Customs, OT13040), 10% of which could be offset against PRT obligations by offshore fields outside the Southern Basin of the North Sea and approved for development after the 17th of March 1987.

The 1988 Budget then further extended exemption from Royalties to all Southern Basin and onshore fields for which a development permit had been given after 31st March 1982, with effect from the beginning of July 1988 (Great Britain, 1989; DOE, 1988, p.72; Bland, 1991, p.26). In this regard, the Petroleum Royalties (Relief) and the Continental Shelf Act 1989 stated:

> (1) Petroleum won and saved from any relevant Southern Basin or onshore field or relevant onshore area shall be disregarded in determining whether any and, if so, what—
>
> (a) payments of royalty; and

(b) deliveries of petroleum, are to be made in relation to chargeable periods ending after 30th June 1988 as consideration for the grant of a licence to which this section applies. (Great Britain, 1989, S. 1)

The 1988 Budget also sought to reduce the PRT-exempt oil allowance down from 250,000 tonnes per chargeable period to 100,000 tonnes, with the cumulative limit reduced from 5 million to 2 million tonnes. However, some haggling with the industry led to the reduction being reduced and the new allowance becoming 125,000 tonnes, with a cumulative limit of 2.5 million tonnes (DOE, 1989, p.85; KPMG, 2000, p.9; Great Britain, 1988, S.138).

The rationale for these changes was that they were required as a response to the way in which the sharp decline in the oil price in 1986 had affected UKCS development activity. At the time the third report from the Energy Committee had noted with alarm that no entirely new oil developments had occurred between May 1986 and March 1987 and that only three developments had taken place earlier in 1986 (HC, 1986, p.xiii). The solution was crystallised in the comments which MP Mr Sproat made to the committee:

> ...we have to improve, bring forward, further developments in the North Sea. We must bring it forward when the price is low. The way is through fiscal adjustments. (HC, 1986, p.130)

Moreover, evidence to the Energy Committee from the industry had given greater specificity to the required adjustments. BRINDEX (the Association of British Independent Oil Exploration Companies) had suggested that permitting PRT relief for development costs on new fields to be claimed against tax liabilities on existing fields would encourage the direct re-investment of profits from mature fields into new development (HC, 1986, p.33). While UKOOA (the UK Offshore Operators Association) had suggested that reducing the royalty burden on Southern Basin fields would be an important step towards making the UK oil taxation system purely profit-related (HC, 1986, p.35).

Later, after the Budget, during a debate in Parliament on June 16th, 1988, Mr Peter Lilley, Economic Secretary to the Treasury, would confirm that government thinking had indeed reflected the view of the company lobby:

> To achieve an improvement in the profit-relatedness of the south North Sea oil regime, we had to abolish royalty entirely.

He continued:

> ....the effect of changing the regime in that way was to make it more likely that marginal fields would be brought forward for development and the cost of reducing the royalty generally was met by increasing the burden tax on more profitable fields.
>
> (SC Deb (A), 16 June 1988, c129)

Notice here the undemonstrated assumptions (a) that there was parity between the impact of reducing the scope of Royalties and reducing the size of the PRT oil allowance and (b) that existing fields were more profitable than as yet undeveloped discoveries would be in the future.

That these tax relaxations bore fruit there was no doubt at the time. For example, from the academic community, Seymour noted that in 1988 development activities returned to pre-1986 levels and linked this turnaround with the new fiscal incentives, also noting (Seymour, 1990, p.24):

> From 1988 onward one can, therefore, identify a relationship between development activity and the fiscal regime that seems to offset the problems created by low and volatile oil prices.

But was this perspective correct, or was it simply that, just like the 1983 relaxations in the petroleum fiscal regime, the claims made for these policies were never put to the test?

Before proceeding to identify the fields targeted by these relaxations, we need to think about how to identify any increases in development activity which they may have stimulated. Development activity could, for example, be examined in terms of the drilling of development wells or in terms of changes in overall development expenditure (Seymour's perspective). This data might then also be linked to the areas specifically targeted by the tax breaks. Such data reveals (a) an increase in development drilling and expenditure consequent upon the fiscal stimulus (Table 3) and (b) some evidence that this activity and expenditure was disproportionately concentrated in the target areas (Figure 3). However, the explicit contention of Mr Lilley above was that the objective was to facilitate the development of *marginal fields*. In other words, development drilling and expenditure may have increased but was the tax break essential to this happening? In order to test whether this was the case, we shall once again look at how the relaxations affected the prospective profitability of targeted fields – using IRRs below 15% to designate marginal fields.

Identifying the target fields, these fall into two groups: those potentially benefiting from the Cross Field (Development) Allowance and those benefiting from the abolition in Royalties.

To identify the fields targeted by the Cross Field Allowance, 'relevant new fields', the 1987 Finance Act stated:

> (1) for the purpose of the principal section "relevant new field" means, subject to sub paragraph (2) below, an oil field—
>
> (a) no part of which lies in a landward area, within the meaning of the Petroleum (Production) Regulations 1982 or in an area to the East of the United Kingdom and between latitudes 52° and 55° North; and

(b) for no part of which consent for development has been granted to the licensee by the Secretary of State before 17th March 1987; and

(c) for no part of which a programme of development had been served on the licensee or approved by the Secretary of State before that date.

(Great Britain, 1987, Sch. 14, Part III)

Table 5 lists the 32 offshore fields which would benefit from the Cross Field Development Allowance: fields which were developed between April 1987 and March 1993 (the cut-off date determined by the subsequent policy changes in 1993 which included the abolition of the Cross Field Development Allowance). However, only 22 of these should be considered as *target fields* because ten of the 32 (Donan, Gryphon, Hudson, Gannet D, Angus, Hamish, Saltire, Nelson, Moira and Linnhe) were discovered after April 1987. The point is that the Cross Field Development Allowance introduced by the 1987 budget was targeting existing *discovered* fields, and these 10 fields were yet to be discovered at that time.

Looking now just at the 22 targeted fields, Table 5 provides data on their ex-post profitability, showing how this would have stood pre-1983 and then how it was affected by both the 1983 fiscal relaxation and the 1987 introduction of the Cross Field Development Allowance. This data first of all serves to eliminate a further nine fields: Arbroath, Dunbar, Osprey, Toni, Leven, Glamis, Gannet C, Alba and Ness, because they already had IRRs above 15% before 1987 (in the cases of Osprey and Alba because of the impact of the 1983 relaxations) and were not therefore 'marginal' at the time of the introduction of the Cross Field Development Allowance. In addition, any fields for which GEM is unable to define an IRR, or for which the post-tax IRR comes out as negative are excluded: development of such fields would have been driven by factors other than the strict application of commercial criteria and a further six of the original 32 fields are eliminated on this basis: Lyell, Don, Tiffany, Emerald, Blair and Crawford.

Table 5: Fields Potentially Benefiting from the 1987-88 Petroleum Tax Relaxation

Following these eliminations, we are left with just seven discovered fields which were discovered and marginal and whose development might therefore have been critically influenced by the introduction of the Cross Field Development Allowance: Chanter, Staffa, Gannet A, Strathspey, Scott, Miller and Kittiwake. These fields absorbed 41% of the £608 million (DCF value) tax break offered by the Cross Field Development Allowance – but the bulk of it went on just three fields: Miller, Scott and Kittiwake. Table 5 then shows us that even after the combined effects of the 1983 and 1987 tax breaks, three of these seven fields, Gannet A, Kittiwake and Chanter, did not break through the 15% IRR threshold and Chanter and Gannet A remained very marginal – such that their development must have been driven by factors other than the strict application of profitability criteria. In addition, the Staffa field was the first development for LASMO, and the company would not therefore have had any accumulated PRT obligations from other operations against which the development costs of Staffa might be set. That the Cross Field Development Allowance might have been a critical factor in the development of this field is therefore ruled out. The final count is therefore that the Cross Field Development Allowance may have been critical in the development of only three fields: Miller, Scott and Strathspey.

Turning briefly to the impact of the abolition of Royalties on all offshore South Basin and onshore fields receiving development consent after March 1982, there is not a great deal to say. This is because no Southern Basin oilfields were given development consent after 1982. Apart from affecting a few very small onshore fields, this extension in exemption from Royalties merely served to provide companies operating in the Southern Basin with a windfall gain.

Certainly the 1987 fiscal relaxation (the Cross Field Development allowance) does appear to have stimulated UKCS development expenditure (non-exploration capital expenditure) because it rose by 166% between 1987 and 1992 (Table 3). However, here we must take account of the impact of the Piper

Alpha disaster which occurred on July 6th, 1988. The subsequent Cullen report into the disaster required companies to invest in major improvements in platform safety, such that development expenditure was affected by this requirement as well as by fiscal stimulus during this period. Fortunately, an approximate separation of the two factors does appear possible – Cullen reported in November 1990 which means that the increase in development expenditure which can be noted between 1987 and 1990 (an increase of 70%) cannot be attributed to the repercussions of Piper Alpha. Secondly, in 1991 and continuing in 1992 and 1993 there was a dramatic increase in non-exploration investment which seems likely to have been attributable to meeting Cullen's recommendations.

Nevertheless, even if it is possible to separate out some impact on development expenditure from the introduction of the Cross Field Development, the retrospective view is that most of the targeted offshore fields would have been developed anyway. The policy may have worked in one sense but it was unnecessary in another. Moreover, the price which the UK government and its citizens paid for the government seeking to act in *loco parentis* for company decisions was high: the government's share of UKCS net operating surplus slumped from 75% in 1986 to only 28% in 1991, when total revenues plumbed an all time low of just over £1 billion – and this at a time when oil prices were actually rising out of their 1986 low.[5]

5. The Abolition or Partial Abolition of PRT

In 1993, and without having conducted any comprehensive review of the preceding relaxations in the UK's petroleum fiscal regime, the UK government decided to continue along the path of fiscal relaxation for the oil and gas industry by introducing a more general tax giveaway:

a. With effect from June 30th, 1993, PRT was abolished for oil fields which had received development consent on or after 16th March 1993;

b. With effect from June 30th, 1993, the rate of PRT was reduced from 75 to 50 per cent for paying oil fields which had obtained development consent before 16th March 1993;

c. All PRT allowances (Oil allowance, Cross-Field Exploration & Appraisal allowance, Cross-Field Development allowance) were removed.[6]

It can be seen from the above reforms that the 1993 petroleum tax relaxation was different from the two previous relaxations (1983 and 1987-88) in terms of defining the areas which would benefit from this tax reform. This petroleum tax relaxation divided oil fields liable to PRT into two groups, according to development consent date. These were: (a) oil fields developed after 16th March 1993 which would not pay any PRT; and (b) oil fields developed before 1993 which would be liable to PRT at 50 per cent, but with no allowances. Now, in one form or another, the whole of the UKCS was to benefit – driven, according to the UK Inland Revenue (2003), by the following rationale:

> In his Budget speech on 16 March 1993 the Chancellor announced a number of significant reforms to the PRT regime. The changes were aimed at encouraging the further development of the UK's oil and gas resources by allowing companies to keep more of their profits, whether from additional investment in existing oil and gas fields, or from the development of new ones.

Again the concern was developmental – the contention being that the UKCS required sustained tax breaks in order for companies to continue investing. However, the switch to a more general tax break did signal disenchantment with the previous, more targeted regime of special allowances – which had in fact cost the government money in financial year 1991-1992 (see Table 1) as some firms were able to register negative PRT returns (see Rutledge and Wright 1998, p.806)***.*** On the other hand, while the intention may have been to counterbalance the withdrawal of allowances by way of the reductions in PRT, this recalibration of the fiscal regime clearly benefited larger PRT-paying companies compared to smaller independents which had been able to take advantage of the various allowances (Knott, 1993, p.31). Indeed, an editorial in Oil & Gas Journal expressed the following, hard-hitting concern (1993, p.19):

> Companies will produce in the U.K. and use profits to explore for replacement reserves somewhere else. What the government has implemented, therefore, is a policy of protracted liquidation of the U.K. offshore producing industry'. ....Reducing the 75% rate, thereby easing the incentive to shelter incomes against PRT, was a good start. Offsetting the rate cut with elimination of exploration cost deductibility will prove to have been a horrible finish.

What was the actual outcome? Table 3 shows that the anticipated negative impact on exploration activity did occur: exploration expenditure and drilling tailed away after 1993, with expenditure in 2000 barely registering a fifth in money terms of what it had been in 1992. Moreover, while Development drilling did register some increase, Development expenditure was continuously below its 1992 level throughout the rest of the decade. Perhaps more damningly, total investment as a percentage of Gross Operating Surplus declined very substantially from its 1992 peak of 85.7%, down to just 14.7% in 2000 (Table 3). In addition, there is also no clear evidence to suggest that the tax reductions encouraged companies to invest in old fields. Such investment required the submission of a revised Field Development Programme (FDP) for approval to the then Department of Trade & Industry and only nine such FDPs were applied for between 1993 and 2000 (DTI, 2004) – in respect of Brae South, Brent, Claymore, Magnus, Osprey SW, Scapa, Scott, Tern and Wytch Farm (an onshore field). And even with respect to these it is doubtful whether their investment programmes were exclusively linked to fiscal stimulus. Redevelopment of the Brent oil field in 1993, for example, was certainly not due to the 1993 petroleum tax changes because the decision to redevelop was made in 1992 by Shell Oil i.e. before the tax changes were introduced (OPL, 1998, p.308; Kuyper, 2002).

Low oil prices throughout the decade would of course also have played a role in constraining UKCS investment, but this simply poses the policy question more sharply: are tax breaks largely impotent in the face of market forces? While this was the case with respect to the government's stated objectives for the policy, the impact on company finances was substantially positive for the majors. For example, BP in its annual report noted (1993, p.29):

> From 1 July 1993, the Finance Act reduced the rate of Petroleum Revenue Tax (PRT) on existing fields from 75% to 50%, eliminated relief for exploration expenditure, and removed the PRT liability for new fields. The benefit to 1993 after-tax income of the reduced rate on current production was about £60 million.

Table 6: The PRT Burden on Selected Companies 1990-2000

Consolidating this point, Table 6 shows this beneficial effect of the reduction in the rate of PRT on three other majors Exxon, Shell and Chevron-Texaco between 1993 and 2000 and also compares their experience with the impact on two smaller independents, Premier Oil and Viking. It clearly was the case that the various allowances had been of greater significance to this latter category of company - such that they started to face larger rather than lesser tax burdens – Oil & Gas Journal's 'horrible finish' being borne out in practice. However, Table 5 also brings into sharp relief the general complexity of the UKCS petroleum fiscal regime: because each company had a different portfolio of reserves in terms of discovery and development dates, and in terms field size, the attempts by government to micro-manage the development of the UKCS simply created greatly different tax positions (and therefore incentives) at company level.

Finally, before concluding the paper by identifying the generic policy and conceptual issues raised by the history of the UKCS petroleum fiscal regime, Figure 4 facilitates a broad sweep appreciation of how this history was reflected in the performance of the UK's main vehicle for capturing oil and gas rents – Petroleum Revenue Tax.

Figure 4: Production and Petroleum Revenue Tax 1980-2000

The effect of the introduction of the new allowances after 1983 is clear. While PRT revenues did show some recovery after 1993 this was well short of being commensurate with the increase in production.

6. Previous Research and the Small Field Argument

There is only one piece of research, Martin (1997), which occupies the same territory as the preceding sections and it came to more positive conclusions about the impact of the fiscal relaxations of 1983, 1987-88 and 1993. However, this was essentially for the following three reasons. Firstly, Martin did not consider the relaxations in terms of their actual rationales at the time: he did not research the stated purposes of government policy, instead assuming that this policy was simply about increasing production in general. Secondly, Martin divided UKCS fields into two groups: those which had started operations prior to 1985, and those which did so post-1985. In other words, he did not calibrate his breakdown to reveal, separately, the impacts of the 1983, 1987 and 1993 relaxations, actually ignoring the 1987 relaxation altogether. Thirdly, he did not explore when specific fields actually received development consent – thereby incorrectly relating the production of some fields to fiscal relaxations when in fact companies had applied for and received development consent prior to the enactment of the fiscal relaxations. Martin's results were therefore delivered by a flawed methodology which in effect sought to relate all of the changes in production of his post-1985 group of fields to the fiscal stimuli of 1983 and 1993. Moreover, even results obtained under these terms showed that of the cumulative production from 'new' fields (post 1985 fields in Martin's study), 34.3% was attributable to fields with an IRR of less than 15%, and 21.4% to fields which would have been developed anyway because their IRR was above 15% without any requirement for tax breaks.

A second set of reflections with respect to the preceding literature, and indeed with respect to government policy, concerns the 'small', 'marginal' field argument. This, as we have seen, figures prominently in all the decisions about changes to the UK's petroleum fiscal regime and continues to do so to this day – the 2009 Budget introduces a new tax break for marginal fields (HM Treasury 2009, clause A.88, p.164 and see below for further details). The image being kindled and rekindled is that of costly new developments which could not proceed without special tax privileges (e.g. Moose 1982, Anderson 1993, Corzine 1995). But has this argument been empirically correct? There are already doubts in the work of its proponents. Moose (1982), for example, after having indicated that less than 20% of the UK's undiscovered reserves would fall into the small category, uses a minimum discount rate as high as 17% to delineate the viability threshold. Secondly, and also providing evidence from the eighties, Bond et al (1987, p.51) state that "There is only a weak correlation between small fields……and fields with low profitability.".

Consolidating these doubts, we can add our own data, also from the critical period which launched the UK along the road of seeking to promote exploration and development by way of tax breaks. Table 7 shows the comparative cost of production for a selection of fields receiving development consent either before April 1982 or between April 1982 and 1987, and located in the strategic areas which the government was seeking to target. It reveals, first of all, that the costs of production (lifetime operating plus capital costs per barrel, largely based on actual outcomes) of small fields were generally significantly lower post-April 1982 than they had been pre-1982. Table 7 also shows that the same applied to the pre and post 1982 medium and large fields (Tern compared with Murchison; Alwyn North compared with Cormorant North), and that small fields receiving development consent after April 1982 could also be cost competitive with both a medium field (Tern) and a large field (Alwyn North) which received development consent during the same period. These results would perhaps surprise policy makers, but they should not do. The point is that one would expect the costs of certain small fields to decline as an oil basin becomes more mature – simply because the investment in expensive infrastructure was made in a preceding, initial phase. This emerges very clearly from a comparison of the capital costs per barrel of pre-April 1982 fields compared with 1982-1987 fields (Table 7). New small fields are often, as they have been in the UKCS, satellite developments of larger fields or situated conveniently close to existing infrastructure. Our previous contention that it is *a priori* unwise to try and use tax breaks to counter market signals in the oil and gas industry, can therefore now be amplified by an awareness that the target of these tax breaks may turn out to be undeserving for other reasons. ‘Small’, ‘marginal’ fields are not necessarily more costly than larger fields and are not, as we have also seen, automatically incapable of meeting target IRR thresholds unaided.

Table 7: Comparative Costs of Production for Small and Large Fields

1982-87 and Pre-1982

8. Why the Windfalls Got Away: The Consequences of a 'Non-Proprietorial' Fiscal Regime

The conclusion from the preceding analysis could reasonably be that the fiscal stimuli afforded to companies operating on the UKCS in 1983, 1987 and 1993 were both misconceived and failed to fulfil their original objectives, even after allowing for a measure of hindsight. However, these were not just simple errors of judgment at particular conjunctures – they reflected a more general perspective on a government's role with respect to its oil and gas sector, a perspective which Mommer (2002) conceptualises as 'Non-Proprietorial Governance'. The presence of Non-Proprietorial governance in oil and gas is signalled by a fiscal regime which in effect assumes a certain responsibility for the profitability of oil and gas companies operating on its territory by basing taxation increasingly just on the profitability of the sector, a perspective which draws succour from an academic literature concerned to promote the virtues of 'efficient', 'neutral', Ricardian rent-seeking resource taxation.[7] This contrasts with 'Proprietorial Governance' under which a government is more simply a landlord seeking to maximise rent from sovereign ownership of its resources – the profitability of oil and gas companies is a function of international oil prices, and not a legitimate concern of government seeking to represent the interests of its citizens. The presence of revenue raising via Royalties is the symbol of Proprietorial Governance – Royalties express the principle that access to sovereign resources requires a payment whatever the economic circumstances faced by companies. Royalties are more properly seen as a cost of production rather than a tax.

While this distinction between Non-Proprietorial and Proprietorial governance, may not be so sharp in reality – as Wälde (2003) suggests, most petroleum fiscal regimes combine proprietorial and non-proprietorial elements – associated with the Non-Proprietorial perspective is the controversial contention that revenue maximisation from a government's oil and gas resources is not at all incompatible with fiscal stimuli for companies. This argument, expressed most cogently in support of a ‘Resource Rent Tax’ (a tax which does not generate revenue until the original investment has been recouped plus a rate of return - see Garnaut and Clunies-Ross, 1975; Smith, 1999) is that there can be a ‘win-win’ situation for both companies and governments if fiscal relaxations stimulate increased production. In this way, with a lower rate of tax which attracts companies governments can actually extract more tax revenue than they otherwise might have done because production, stimulated by the tax break, is higher than it otherwise would have been. However, as well as finding that the relaxations in the UK’s petroleum fiscal regime did not perform in terms of their stated objectives, we have also found that this apparently comfortable fallback position lacks substance.

Looking back now to Table 1, it can be seen that between 1993 and 1999, UKCS oil production increased by 37% and gas production by 50%. These were dramatic increases which occurred against the backdrop of low international oil prices. However, to the extent that the reduction in PRT contributed to this increase by making it more profitable to maximise production in the short-term, the increase in government revenues was not the commensurate one indicated by the proponents of 'win-win', Non-Proprietorial governance. Indeed, the generosity of the UK's petroleum fiscal regime in the 1990s caused the leading industry authority on international petroleum fiscal regimes, Petroconsultants (1996), to comment:

> Of the 20 largest producing regimes only the UK, Argentina and the US generate a State Take of less than 70%. The UK stands out as particularly lenient with a State Take of only 33%. Indeed, of the 110 regimes reviewed only Ireland generates a lower State Take than the UK.

The main beneficiaries of the UK government adopting an increasingly Non-Proprietorial stance were therefore the companies, and in this context it is worth repeating the cynical view of one of them as previously cited in Rutledge & Wright (1998, p.811);

> The UK North Sea provides a strong stream of earnings and cash flow with relatively modest reinvestment needs. This is important for the funding of the Company's plans in other strategic areas' (Oryx Energy, 1996, p.4). "

For Mommer such an outcome is an entirely predictable consequence of non-proprietorial governance as he observes (2002, p.235):

> A few years will probably be enough to show the heavy losses in fiscal revenues that non-proprietorial governance will entail for exporting countries. Lessons may be learned in the future, but at what price?

The price for the UK can be calculated in various ways, but let's just assume that the relatively modest tax take per barrel of 1988 (i.e. well after the 1986 slump in oil prices and also after the 1983 and 1987 fiscal relaxations) had applied throughout the decade of the 1990s. The UK's fiscal revenues from its oil and gas production would have been some £16 billion higher in money of the day.

Finally, we have already demonstrated that the UK government's introduction of a Supplementary Charge of Corporation Tax, while it might initially have seemed to indicate a change towards more Proprietorial governance, in fact did not prevent companies from enjoying a very substantial windfall between 2002 and 2007. This happened because the additional taxation measures were introduced both within a Non-Proprietorial context, and in a Non-Proprietorial way. Firstly, the UK's main rent targeting device has been allowed to wither away: even among those fields potentially liable to pay PRT (93 fields in 2007) only a minority actually did so (32 fields, see Earp, 2008). Secondly, remaining Royalty obligations were abolished as the Supplementary Charge was introduced. Thirdly, a 100% investment allowance against both standard Corporation Tax and the Supplementary Charge was introduced at the same time as the Supplementary Charge. Given the size of the windfalls which UKCS companies have been enjoying and the small portion of them which they have been reinvesting in the UKCS, the latter measure particularly exposes the UK's Non-Proprietorial regime. There is scarcely a lack of investible funds for the government to be concerned about.

Another windfall has got away and the root cause has been the gradual development of the UK's petroleum fiscal regime into a fully-fledged Non-Proprietorial regime, a process which commenced in the early nineteen-eighties and which continues to be entrenched in the present. With respect to the latter, the UK's 2008 Pre-Budget Report reveals that, even in the context of recent oil price highs, the company lobby has yet again been successful in persuading government that a special tax relief is necessary for them to develop 'marginal' fields,

> Following further discussions with stakeholders, the Government is today publishing its proposals for further reforms to the North Sea fiscal regime.

> These will encourage investment through incentivising production from marginal fields, supporting asset trades and simplifying the regime.
>
> HM Treasury (2008, paragraph 4.28, p.73)

The 2009 Budget itself then delivered a new ‘Field Allowance’ which “will act to reduce the initial tax paid by qualifying new developments” (HM Treasury 2009, clause A.88, p.164).

Footnotes

[1] The unit sales value of UK oil and gas sales is used as the appropriate pricing benchmark because the UK's hydrocarbon production includes both oil and gas, and gas generally sells for a lower equivalent price than oil. Using the crude oil price as a reference price would therefore imply a greater company advantage than has actually been the case. Moreover, using unit value, which is calculated by dividing UKCS oil and gas sales revenue by UK oil-equivalent hydrocarbon production, is also more appropriate because it is a measure related to actually realised rather than imputed revenues.

[2] Kemp and his colleagues have written extensively about UKCS taxation, but their focus has generally been on evaluating the effect of tax changes on different fields, not on testing government policy in terms of its stated objectives.

[3] The PRT 'safeguard' and 'tapering' provisions were still retained – that PRT is reduced to zero if 'adjusted' profits were less than 30% of accumulated investment and that PRT should not exceed 80% of the excess of these profits above the 30% of investment mark (see Kemp and Cohen, 1979, p.42, for a discussion of these provisions).

[4] This same point is made differently by Rutledge and Wright (1998, p.806) on the basis of the data in Martin's 1997 paper – 10.9% of the increase in output between 1991 and 1995 came from fields which were developed with IRRs lower than 15%.

[5] It should be noted that Piper Alpha also contributed to this outcome and in two different ways. First of all, Piper Alpha entailed a major and direct loss of production – the field accounted for 7% of UK oil production according to Martin (1997, p.2). Secondly, as Rutledge & Wright noted (1998, p.806), tax relief on Piper Alpha-related safety improvements may have exceeded expenditure in some cases.

[6] The Cross-Field allowances were abolished for the future but remained (and theoretically still remain) available for the fields to which they originally applied (see HM Revenue & Customs 2008). Moreover, transitional arrangements were made to cover commitments prior to the cut-off point (see HM Revenue & Customs, OT14040).

[7] This perspective is, for example, implicit or explicit in the work of Kemp and Devereux. Attempting to use the concepts of tax efficiency and tax neutrality (to avoid 'distorting' investment decisions) means relying on assumptions about the behaviour of markets which are far from being present in any market, and are particularly not to be found in oil or gas markets.

Table 1: UKCS Production, Prices, Profits and Taxation 1980-2007

Year	Production of Liquids (Crude Oil + NGLs) (Mt)	Production of Gas (Mtoe)	Production of oil and gas (Mtoe)	Brent crude price ($/bbl)	Net Operating Surplus (£million)	Total North Sea Tax Revenues (£million)	*of which **Petroleum Revenue Tax***	Tax Revenues as a % of Net Operating Surplus	Pre-CorporationTax (Post-Special Taxes) Rate of Return UKCS Companies (net)	Pre-Corporation Tax Rate of Return non-UKCS Companies (net)
1980	80.5	33.1	113.6	36.8	7,135	3,963	2,410	55.5	21.2	na
1981	89.5	32.8	122.3	35.9	9,836	6,506	2,390	66.1	20.4	na
1982	103.2	32.9	136.1	33.0	11,777	7,868	3,274	66.8	19.6	na
1983	114.9	33.3	148.2	29.6	14,536	8,817	6,017	60.7	26.3	na
1984	125.1	32.9	158.0	28.8	17,948	12,171	7,177	67.8	30.1	na
1985	127.6	36.5	164.1	27.6	17,178	11,371	6,375	66.2	29.2	na
1986	127.1	38.5	165.6	14.4	6,431	4,804	1,188	74.7	13.1	na
1987	123.4	40.5	163.9	18.4	6,928	4,645	2,296	67.0	10.2	na
1988	114.5	38.7	153.2	14.9	4,422	3,193	1,371	72.2	6.6	na
1989	91.7	38.3	130.0	18.2	3,736	2,401	1,050	64.3	5.3	11.8
1990	91.6	42.3	133.9	23.7	4,135	2,343	860	56.7	6.5	10.0
1991	91.3	47.1	138.4	20.0	3,556	1,016	-216	28.6	7.6	8.7
1992	94.3	48.1	142.4	19.3	3,217	1,338	69	41.6	6.0	8.5
1993	100.2	60.1	160.3	17.0	3,865	1,266	359	32.8	6.4	9.8
1994	126.9	59.5	186.5	15.82	5,111	1,683	712	32.9	8.2	11.5
1995	130.3	64.8	195.1	17.02	6,171	2,338	968	37.9	9.5	11.8
1996	130.0	77.6	207.6	20.67	9,643	3,351	1,729	34.8	14.5	12.3
1997	128.2	79.0	207.2	19.09	7,996	3,331	963	41.7	13.0	13.3
1998	132.6	81.9	214.5	12.72	5,586	2,514	504	45.0	9.2	13.4
1999	137.1	90.8	227.9	17.97	7,005	2,563	853	36.6	11.0	12.7
2000	126.2	99.6	225.8	28.50	14,627	4,457	1,521	30.5	24.7	11.5
2001	116.7	96.1	212.8	24.44	13,391	5,429	1,307	40.5	23.5	11.0
2002	115.9	94.0	209.9	25.02	12,635	4,968	958	39.3	22.4	11.2
2003	106.1	93.7	199.8	28.83	12,173	4,281	1,179	35.2	20.8	12.0
2004	95.4	87.0	182.4	38.27	12,799	5,172	1,284	40.4	21.1	12.4
2005	84.7	79.5	164.2	54.52	17,629	9,380	2,016	53.2	27.5	12.1
2006	76.6	71.6	148.2	65.14	21,801	9,072	2,155	41.6	34.4	12.1
2007	76.8	64.8	141.6	72.39	19,209	7,835	1,680	40.8	30.7	13.2

Sources: BERR (various years); UK Department for Business, Enterprise & Regulatory Reform (BERR) Oil & Gas Information; former UK Department of Trade & Industry 'Brown Book'; UK Office for National Statistics (ONS); BP Statistical Review of World Energy.

Notes: (a) Tax revenue data is provided on a UK tax year basis (to end March) and this was reconciled with calendar year data by maximising the overlap i.e. calendar year 2007 is matched with tax year 2007/08 **(b)** the Pre-Corporation Tax rate of return for UKCS companies was arrived at by deducting all special taxes (PRT, Royalties, SPD, Licence Fees, Supplementary Charge) from their Net Operating Surplus (ONS series LRWY) and then recalculating the rate of return on Net Capital Employed (ONS series LRXC) **(c)** the category of non-UKCS companies used in the final column includes only non-financial companies.

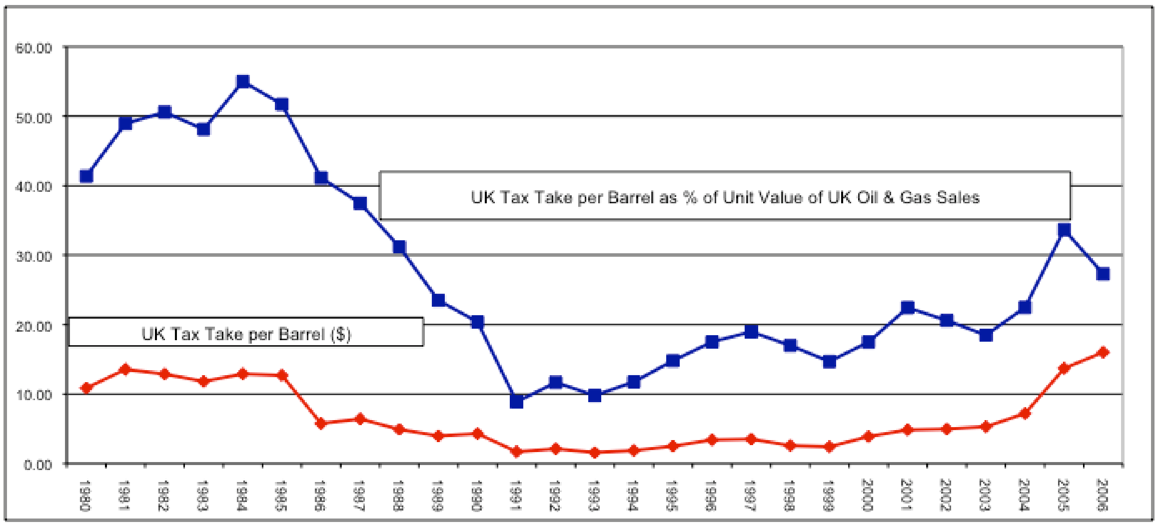
Table 2: UKCS Company Post Tax and Investment Surpluses Since the Introduction of the Supplementary Corporation Tax Charge

£million	UKCS GROSS OPERATING SURPLUS	TOTAL UKCS INVESTMENT	TOTAL UKCS TAX REVENUES	COMPANY SURPLUS AFTER UKCS INVESTMENT & TAX
2002	19,475	3,987	5,117	10,371
2003	19,058	3,746	4,281	11,031
2004	18,646	3,698	5,172	9,776
2005	23,568	4,831	9,380	9,357
2006	27,394	6,429	9,072	11,893
2007	25,683	6,393	7,835	11,455
TOTAL 2002-2007	**133,824**	**29,084**	**40,857**	**63,883**

Source: BERR Oil & Gas Information

Note: Gross Operating Surplus = Total Income minus Operating Expenses (except Depreciation). Gross rather than Net Operating Surplus is the appropriate definition of surplus for the purpose of this calculation because it includes Depreciation – which is not a cash cost and which is therefore available as a source of investible funds.

Figure 1: Tax Take per Barrel Equivalent of UKCS Oil and Gas Production



Sources: derived from BERR Oil & Gas Information; DTI (former UK Department of Trade & Industry) (1980-1992)

Note: the unit value of the UK's hydrocarbon production is used as the appropriate price in these calculations – derived by dividing total UKCS Sales Revenue from oil and gas by oil + gas production in barrels of oil equivalent.

Table 3: UKCS Investment and Operating Costs 1980-2007

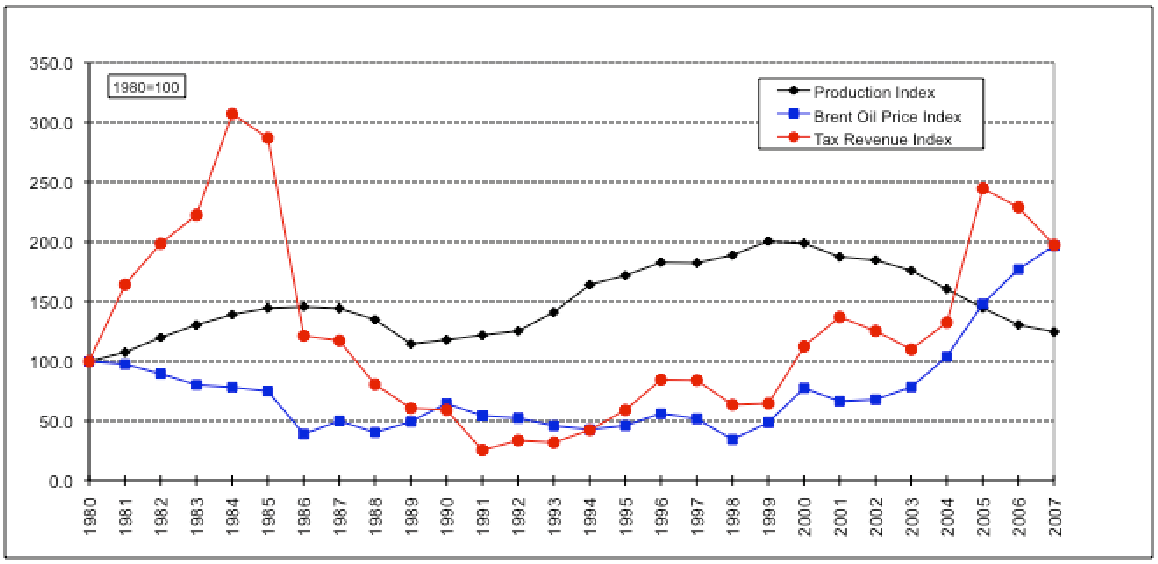
Year	Total Capital Investment	*of which* ***Exploration & Appraisal Expenditure***	***Exploration & Appraisal Wells Drilled***	***Other Capital Expenditure (Oil & Gas Development Expenditure)***	***Development Wells Drilled***	Gross Operating Surplus	Total Investment as % of Gross Operating Surplus	Exploration & Appraisal Expenditure as % of Gross Operating Surplus	Operating Cost per Barrel of Oil & Gas Equivalent ($)	Operating Cost as % of Oil Price
1980	2,767	379	57	2,388	141	8,854	31.3	4.3	1.9	7.2
1981	3,397	550	75	2,847	146	12,236	27.8	4.5	2.1	7.6
1982	3,934	875	116	3,059	134	14,175	27.8	6.2	2.1	8.4
1983	3,846	993	135	2,853	102	16,767	22.9	5.9	2.0	8.2
1984	4,584	1,395	191	3,189	123	20,337	22.5	6.9	1.8	7.8
1985	4,239	1,445	155	2,794	151	19,665	21.6	7.3	2.5	10.2
1986	3,458	1,039	118	2,419	99	9,476	36.5	11.0	2.6	18.4
1987	2,853	809	144	2,044	140	10,232	27.9	7.9	2.9	17.0
1988	3,255	1,129	172	2,126	174	8,120	40.1	13.9	3.2	20.1
1989	3,817	1,182	178	2,635	157	7,844	48.7	15.1	3.9	22.8
1990	5,115	1,637	226	3,478	124	8,541	59.9	19.2	5.3	25.2
1991	7,056	1,955	184	5,101	149	8,078	87.3	24.2	5.5	28.8
1992	6,936	1,508	133	5,428	170	8,093	85.7	18.6	5.3	28.9
1993	5,874	1,213	112	4,661	169	9,199	63.9	13.2	4.6	28.4
1994	4,610	939	99	3,671	207	10,402	44.3	9.0	4.3	27.0
1995	5,440	1,085	97	4,355	265	11,852	45.9	9.2	4.2	24.8
1996	5,461	1,097	112	4,364	282	15,128	36.1	7.3	4.1	20.8
1997	5,457	1,194	96	4,263	259	13,376	40.8	8.9	4.4	23.6
1998	5,758	762	77	4,996	289	10,503	54.8	7.3	4.3	28.3
1999	3,520	457	35	3,063	239	12,920	27.2	3.5	4.0	24.3
2000	3,098	348	61	2,750	224	21,020	14.7	1.7	3.8	17.1
2001	3,990	420	59	3,570	286	19,788	20.2	2.1	3.9	18.0
2002	3,987	389	45	3,598	263	19,475	20.5	2.0	4.6	19.1
2003	3,746	334	45	3,412	207	19,058	19.7	1.8	5.5	19.1
2004	3,698	396	63	3,302	167	18,613	19.9	2.1	6.4	20.0
2005	4,831	460	78	4,371	230	23,568	20.5	2.0	7.2	17.7
2006	6,429	773	70	5,656	201	27,394	23.5	2.8	9.9	16.8
2007	6,393	1,090	111	5,303	165	25,683	24.9	4.2	11.4	18.8

Source: BERR Oil & Gas Information

Note: see Note (c) to Figure 3

Figure 2: Indices of UK Production, Taxation and International Oil Prices

1980-2007



Source: Table 1

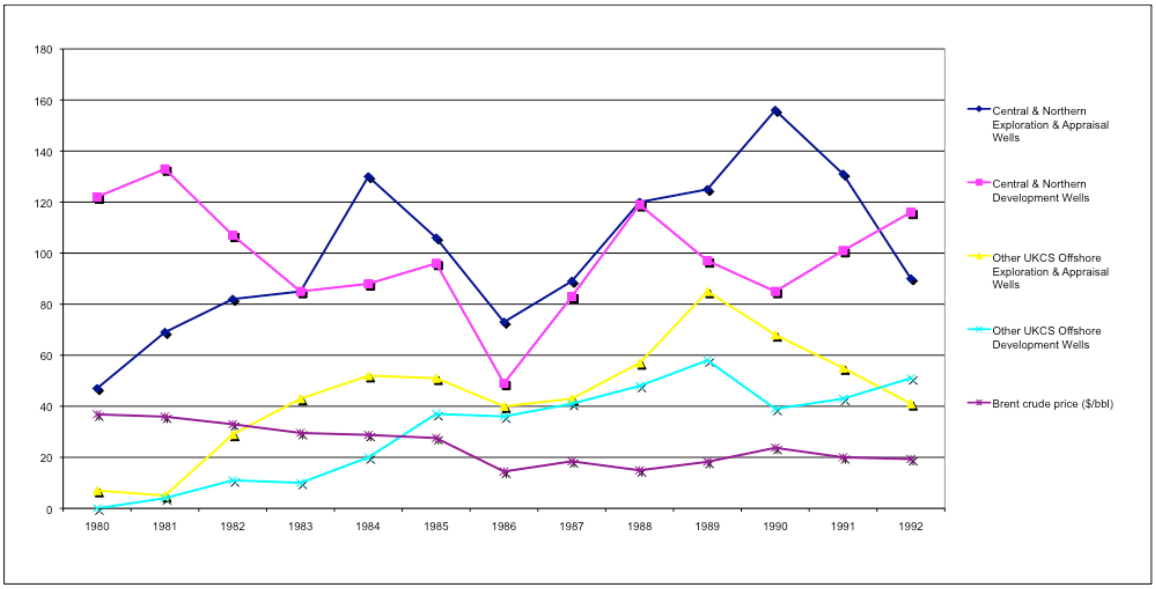
Table 4: The Financial Performance of Offshore Oil Fields Developed between April 1982 and March 1987

Category	Field Name	Development Consent Date	IRR %				Proven Reserves (*million barrels of oil equivalent*)
			Post-1983 Budget		Pre-1983 Budget		
			Post-Tax	Pre-Tax	Post-Tax	Pre-Tax	
IRR less than 15 %	Alwyn North	Oct-82	10.3	13.4	10.0	13.4	678
	Clyde	Dec-82	6.3	8.2	6.1	8.2	154
	Cyrus	Nov-84	#	1.4	#	1.4	27
	Balmoral	Dec-83	8.7	10.8	8.5	10.8	114
IRR improved to more than 15 %	Innes	Nov-84	20.6	25.4	13.7	25.4	6
	Duncan	Sep-83	16.0	27.0	2.6	27.0	18
IRR more than 15 %	Petronella	Apr-86	108.2	120.3	86.4	120.3	48
	Rob Roy	Jan-86	23.4	30.6	20.1	30.6	123
	Ivanhoe	Jan-86	29.1	34.9	22.8	34.9	80
	Eider	Oct-85	16.8	21.5	15.9	21.6	111
	Scapa	Sep-85	46.0	52.0	36.8	52.0	127
	Tern	Feb-85	16.1	21.6	15.2	21.6	288
	Deveron	Sep-84	171.5	190.1	146.3	190.1	17
	Highlander	Nov-83	162.5	184.0	118.6	184.0	80

Source: former DTI (2004) for development consent dates; OPL (2004) for reserve volumes

Notes: **(a)** the equivalent reserve volumes were calculated by using former DTI conversion (DTI 1994, p.vi) **(b)** IRR figures were obtained by applying Wood Mackenzie's GEM (2004, v. 3.01) to the above fields (the 2004 version of GEM was used to make the calculations conservative by not including the effect of more recent very high oil prices) **(c)** '#' indicates fields for which GEM was unable to define an IRR

Figure 3: Offshore Exploration and Development Wells Drilled between 1980 and 1987



Source: DTI (1980-1992, Appendix 2)

Notes: **(a)** as is customary, Appraisal Wells are included together with drilling purely for exploration purposes **(b)** the original data has been converted to match the areas covered by the legislation by designating 'East of Scotland' + 'East of Shetland' as 'Central & Northern North Sea' **(c)** there are major discrepancies between this data and a more recent historical series compiled by BERR (formerly the Department of Trade & Industry), the reason for which BERR notes as, "the numbers now published may differ from earlier years. Sidetracks in earlier years (pre-1988?) cannot be verified as to whether they are geological sidetracks" (BERR, UKCS Drilling Activity since 1964). For the purposes of Figure 3 we have preferred to use the data which was available at the time and which would have been the dataset referred to at the time for the purposes of policy-making. However, for comparative purposes, Table 2 contains the more recent BERR historical dataset.

Table 5: Fields Potentially Benefiting from the 1987-88 Petroleum Tax Relaxation

Field Name	Discovery Date	Annex B Development Approval	IRR %			Total Benefit £million
			Pre-1983	Post-1983	Post-1987	
Arbroath	Dec-69	Dec-87	25.0	30.4	36.3	25.4
Dunbar	Nov-73	Nov-92	17.2	19.7	20.1	7.9
Osprey	Jan-74	Nov-88	12.9	16.2	20.4	26.3
Strathspey	Feb-75	Sep-91	10.1	13.3	15.2	3.3
Lyell	Jul-75	Jan-91	#	-3.9	-2.7	9.1
Don	Jul-76	Mar-88	#	#	#	15.4
Gannet A	Apr-78	Sep-89	7.2	8.7	10.1	31.9
Tiffany	Jul-79	Jul-90	#	#	#	65.0
Toni	Jul-79	Nov-90	19.6	22.6	24.9	10.8
Leven	Jun-81	Sep-92	138.5	217.2	362.0	1.6
Kittiwake	Sep-81	Sep-87	7.7	10.5	14.5	32.0
Emerald	Oct-81	Jan-89	#	#	#	6.5
Glamis	Sep-82	Dec-87	82.5	104.1	131.5	4.1
Gannet C	Sep-82	Sep-89	23.4	27.2	30.5	20.0
Miller	Mar-83	Oct-88	12.9	14.4	16.7	133.3
Scott	Jan-84	Aug-90	11.6	14.0	15.6	47.3
Alba	Aug-84	Apr-91	13.4	15.1	16.2	37.1
Staffa	Jul-85	Oct-90	2.5	10.9	19.0	3.3
Chanter	Sep-85	Dec-87	1.0	4.5	6.9	2.4
Ness	May-86	Apr-87	1,087.8	1,806.3	#	8.9
Donan	May-87	Nov-91	58.0	71.6	83.8	2.2
Gryphon	Jul-87	Dec-92	16.0	19.2	19.2	0.0
Hudson	Jul-87	Dec-92	128.5	239.7	239.7	0.0
Gannet D	Aug-87	Sep-89	19.9	22.1	24.4	8.2
Angus	Dec-87	Nov-91	177.0	237.8	312.8	2.2
Hamish	Jan-88	Feb-90	105.6	133.5	166.3	0.9
Saltire	Jan-88	Jan-91	3.6	5.6	7.7	39.0
Nelson	Mar-88	Jul-91	24.3	27.2	29.4	49.0
Moira	Apr-88	Aug-89	12.5	20.9	30.6	2.7
Linnhe	Aug-88	Sep-89	#	#	#	4.1
Blair	Jun-83	Mar-90	#	#	#	1.1
Crawford	Apr-75	Sep-88	#	#	#	7.4
Total Cash Benefit for Fields Benefiting from the Cross Field Development Allowance						608.3

Source: DTI (2004) for fields and development approval dates; OPL (1998) for discovery dates

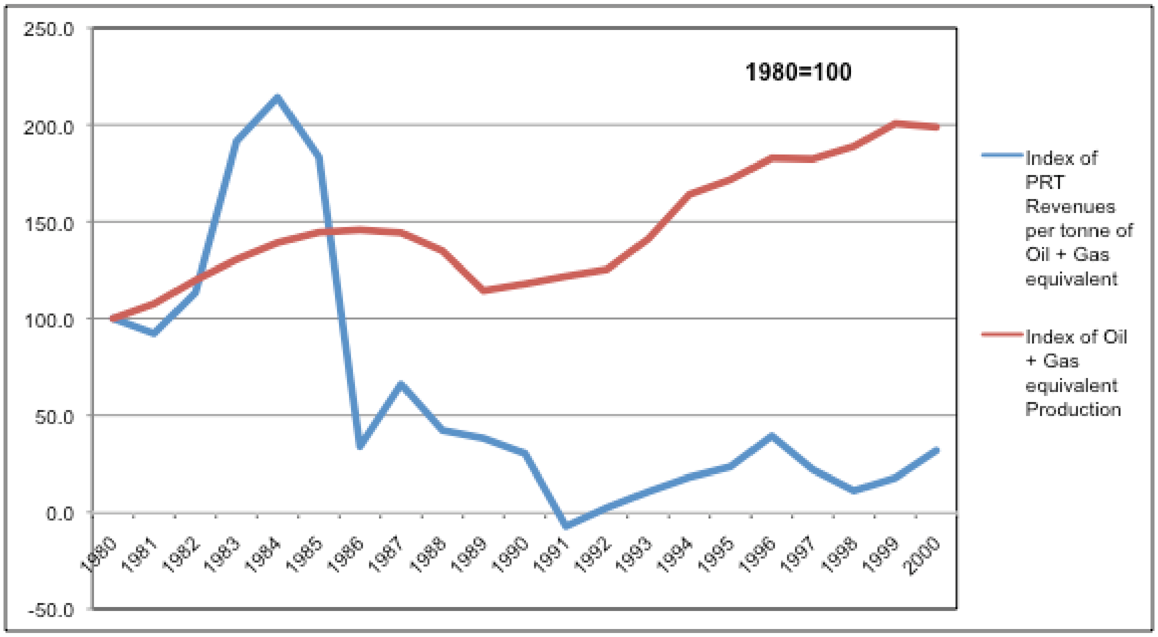
Notes: (a) IRR figures were calculated by using Wood Mackenzie GEM (2004,v.3.01) to generate the three scenarios **(b)** total benefits to oilfields from the Cross Field Development Allowance were calculated based on each field's annual summary cash flow statement generated Wood MacKenzie's GEM (2004,v.3.01).

Table 6: The PRT Burden on Selected Companies 1990-2000

Year	PRT Payments £/tonne of Oil + Gas equivalent produced					
	BP	Chevron-Texaco	Shell	ExxonMobil	Premier	Viking
1990	33.6	38.3	37.1	37.4	0.9	3.7
1991	36.5	39	15.1	15.2	-0.8	18.2
1992	27.1	30.4	15.1	15.4	0	1.3
1993	25.3	32.3	17.0	17.2	0	-3.6
1994	17.5	16.5	4.5	4.6	0	24.7
1995	17.8	20.7	5.3	5.4	21.8	4.2
1996	24.0	20.1	9.1	9.1	19.3	3.2
1997	20.8	21.8	13.4	13.5	20.4	2.3
1998	10.9	10.3	5.6	5.9	13.8	-2.6
1999	6.3	2.9	2.6	2.9	14.2	-3.7
2000	15.4	8.5	10.9	11.4	27.8	0

Source: calculations based on data extracted from Wood MacKenzie's GEM (2004, v. 3.01)

Figure 4: Production and Petroleum Revenue Tax 1980-2000



Source: BERR Oil & Gas Information

Table 7: Comparative Costs of Production for Small, Medium and Large Fields

1982-1987 and Pre-1982

CENTRAL NORTH SEA SMALL FIELDS (Reserves in the Range 51-200 mboe)						
DEVELOPMENT CONSENT BETWEEN APRIL 1982 AND MARCH 1987						
Field Name	RESERVE SIZE (millions of barrels of oil equivalent)	OPERATING COST PER BARREL OF OIL EQUIVALENT ($)	CAPITAL COST PER BARREL OF OIL EQUIVALENT ($)	TOTAL COST PER BARREL OF OIL EQUIVALENT ($)	OIL PRODUCTION ENDING:	GAS PRODUCTION ENDING:
CLYDE	153.8	10.7	11.7	22.4	2012	1999
ROBROY	123.2	5.8	6.0	11.8	2008	2004
IVANHOE	80.0	7.2	4.9	12.2	2008	2002
SCAPA	127.8	7.4	4.8	12.1	2024	none
BALMORAL	113.6	9.0	11.1	20.2	2008	none
HIGHLANDER	79.7	8.7	5.6	14.3	2016	none
DEVELOPMENT CONSENT BEFORE APRIL 1982						
ARGYLL	73.4	18.0	14.0	32.0	1992	none
AUK	142.8	13.0	11.4	24.4	2007	none
BUCHAN	139.9	14.4	13.2	27.6	2016	none
BEATRICE	167.3	12.9	23.7	36.6	2007	none
TARTAN	146.7	12.8	19.9	32.7	2016	1998
CENTRAL NORTH SEA MEDIUM FIELDS (Reserves in the Range 51-200 mboe)						
DEVELOPMENT CONSENT BETWEEN APRIL 1982 AND MARCH 1987						
TERN	288.0	4.94	6.96	11.9	2013	none
DEVELOPMENT CONSENT BEFORE APRIL 1982						
MURCHISON	323.0	7.4	11.09	18.49	2007	2000
NORTHERN NORTH SEA SMALL FIELDS (Reserves in the Range 51-200 mboe)						
DEVELOPMENT CONSENT BETWEEN APRIL 1982 AND MARCH 1987						
EIDER	111.0	5.7	10.3	16.1	2009	none
DEVELOPMENT CONSENT BEFORE APRIL 1982						
HUTTON	193.1	8.7	23.7	32.4	2001	none
NORTHERN NORTH SEA LARGE FIELDS (Reserves in the Range 401-1000 mboe)						
DEVELOPMENT CONSENT BETWEEN APRIL 1982 AND MARCH 1987						
ALWYN NORTH	677.7	3.5	8.2	11.7	2024	2024
DEVELOPMENT CONSENT BEFORE APRIL 1982						
CORMORANT NORTH	608.7	7.6	15.3	22.9	2012	2008

Source and Notes on next page

Source: derived from Wood Mackenzie GEM (2004)

Notes: (a) the selection of fields was arrived at (1) by omitting some very small fields which were developed between 1982 and 1987 (Cyrus, Innes, Duncan, Deveron and Petronella) because these developments were not triggered mainly by commercial considerations (2) Alwyn North is selected as the only large field developed between 1982 and 1987 (3) Eider was the only small field to be developed in the Northern North Sea (4) Clyde, RobRoy, Ivanhoe, Scapa, Balmoral and Highlander are the small fields developed in the Central North Sea between 1982 and 1987 (5) the selection of the Pre-1982 fields sought to achieve comparability with the 1982-1987 group in terms of size and location (6) Tern and Murchison provide the available comparison for medium-sized fields **(b)** Reserves are proven + probable oil (+ proven + probable oil-equivalent gas where a field has associated gas) as estimated in 2004 **(c)** Reserve size categorisation as large or small reflects convention in the literature e.g. see Martin (1997) and Kemp and Rose (1983) **(d)** the basis of the costing is an undiscounted lifetime average per barrel expressed in real terms: the pre-2004 annual data are actual outcomes converted to 2004 constant prices (Jan 2004 £ converted to $); the post-2004 to anticipated end-of-life cost data are projected and incorporate Wood Mackenzie's inflation assumption (2.5% pa). GEM 2004 rather than the latest version was preferred to avoid the effect of the post-2004 increase in oil prices on reserve estimates (upward revaluations which could distort cost comparisons) **(e)** the production life information indicates the extent to which the costings are based on actual outcomes

APPENDIX 1

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 of deductions were allowed (Royalties, a tax-free Oil Production Allowance, 'Uplift' (an enhancement of actual capital expenditure) and smaller and less profitable fields were protected by a 'Safeguard' and 'Tapering'. **Corporation Tax was charged at 52% between 1972 and 1983** and 'ring-fenced' against non-UK losses, but not within the UK for individual fields.
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 Exploration Allowance introduced** with respect to PRT, allowing a partial breach of the PRT 'rig-fence': exploration and appraisal expenditure incurred for one field could be offset against PRT liability on another. New Oil Taxation Act brought income and capital sums received for use or sale of North Sea infrastructure (e.g. pipeline) assets within scope of PRT and made PRT relief immediate for costs of most assets.
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 method.
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-liable profits against which such expenditure could be set) against the PRT liable profits of other fields.
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 to cover committed expenditures).**
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. However neither alternative was implemented, with the 1998 drop in oil prices being used as the pretext. Moreover, oil companies benefited from a **further reduction in Corporation Tax to 31%.**
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 decuction for financing costs. At the same time expenditure which qualified for a 25% writing-down allowance under the plant and machinery and mineral extraction capital allowance codes now allowed a 100% first year allowance. Long life assets which currently receive a 6% writing down allowance now eligible for a 24% first year allowance.
2006	**Jannuary 2006: Supplementary Charge raised from 10% to 20%**

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