

Petroleum taxation and investment behaviour

Av

Petter Osmundsen*, Magne Emhjellen**, Thore Johnsen*** and Christian Riis****

* *University of Stavanger*

** *Petoro*

*** *Norwegian School of Economics*

**** *Norwegian Business School*

(1) Overview

Petroleum administration can be regarded as a principal-agent problem. The government allocates exploration and production assignments to petroleum companies on behalf of the population. The government is the principal and the companies are agents. With the aim of capturing revenue for the state, the government devises a petroleum tax system which takes account of the investment decisions made by the companies, while accounting for the fact that the companies may report strategically to the government. An important issue is how tax deductions are to be treated in investment analyses. A discrepancy arises here between assumptions made in some areas of tax theory and the actual investment analyses conducted by the companies. Tax theory has given rise to discussion and controversial tax proposals for the petroleum sector in Norway, Denmark and Australia. It led, for example, to reductions in tax depreciation for the Norwegian petroleum industry in May 2013. The article reviews this tax debate and analyses the implications of basing tax design on contra-factual investment behaviour.

(2) Methods

Taxation is placed in a broader framework as part of the application of principal-agent theory to the petroleum sector, see Osmundsen (2005). We study literature in the field of public sector economics which argues in favour of partial discounted cash flows, where tax-related depreciation has a different discount rate than other cash flows. See, for example, Fane (1987). A typical feature of this literature is that it does not build on empirical facts, but merely assumes that companies regard tax-related depreciation as secure. We compare this with empirical work on petroleum taxation, including Johnston (2008). Furthermore, we compare it with studies of the actual investment behaviour by companies, including Summers (1987), Boston Consulting Group (2007) and Brealey et al (2008). We look at the effect of tax systems on various components of company decisions. The question is not only whether to invest, but also how the investment is dimensioned, see Osmundsen (2013). We analyse implications of different types of tax depreciation schemes by using model oil and gas fields.

(3) Results

The government seeks to maximise its tax income over time, but must take account of the fact that companies set specific required rates of return for their activities. This can be formalised as a participation constraint. A key consideration here is the way companies make their investment decisions. They apply the traditional present value method and have relatively substantial rate of return requirements. Tax deductions are treated as other cash flow elements. This must be taken into account if the aim is a neutral tax system – in other words, one which does not reduce value creation by distorting company investment behaviour.

(4) Conclusions

Tax systems designed on the basis that tax deductions have a higher value than they are actually assigned by the companies will provide incentives to underinvestment and cream skimming. The result will be a lower recovery factor and loss of government revenues. That could particularly hit measures for improved recovery from mature fields. The commitment on mature fields is time-critical – these must be upgraded before reservoir pressure falls too far and while their installations can still be used. It is also the case that the opportunity space for potential future measures to promote improved oil recovery is determined by the original development concept. Inadequate investment incentives because rates of tax-related depreciation are too low mean that new development solutions have low level of flexibility, reducing the future recovery factor. The debate concentrates exclusively on how the companies assess tax-related depreciation over time. If theory is the primary consideration, the choice will fall on direct expensing. This is the solution for a neutral cash-flow tax.

References

- Boston Consulting Group (2007), “E&P Investment Criteria and methodologies. Benchmarking results”.
- Brealey, R A, SC Myers, and F Allen (2008), *Principles of Corporate Finance*, New York: McGraw-Hill, 9th edition.
- Fane, G (1987), “Neutral taxation under uncertainty”, *Journal of Public Economics* 33, 95-105.
- Johnston, D (2008), “Changing Fiscal Landscape”, *Journal of World Energy Law & Business* 1, 1, 31-54.
- Osmundsen, P (2005), “Optimal Petroleum Taxation - Subject to Mobility and Information Constraints”, in Glomsrød, S and P Osmundsen, eds, *Petroleum Industry Regulation within Stable States. Recent Economic Analysis of Incentives in Petroleum Production and Wealth Management*, Ashgate Studies in Environmental and Natural Resource Economics, Ashgate Publishers.
- Osmundsen, P (2013), “Choice of Development Concept – Platform or Subsea Solution? Implications for the Recovery Factor”, *Oil & Gas Facilities* (Society of Petroleum Engineers), October 2013, Vol 2, No. 5, 64-70.