Lars Lindholt
OPTIMAL PRODUCER TAXATION IN A MATURE OIL PROVINCE

Lars Lindholt: lli@ssb.no

The Norwegian Continental Shelf (NCS) is often described as a mature oil province. The term mature implies various characteristics as: a) falling average size of discovery and development, b) declining production, c) failure to replace depletion by new additions to reserves and d) declining exploration interest. Some of these characteristics apply to the NCS.

Oil prices have increased significantly over the last 6 years, from around $25 in 2000 to $28 in 2003, reaching around $65 per barrel of Brent Blend in 2006. The Norwegian petroleum net tax rate of 78 percent was much criticized by the oil industry as late as 2003. The oil industry argued for a reduction of the Special Petroleum Tax from 50 percent to 25 percent, which is added to the general corporate tax of 28 percent. The oil industry argued that the after-tax return on investment was not sufficient to generate interest in the maturing NCS.

Along with the steep increase in oil prices since 2004, the criticism of the high Norwegian taxation has calmed. Many analysts believe that it is highly unlikely that the global price of oil in the medium-term will revert to the mean of around $15 to $20 for Brent Blend, which characterized most of the 1990s. The reason for this is firstly that there appears to have been a marked and unanticipated structural shift upward in global demand for oil primarily in Asia, led by China and India, and partly in the US. Secondly, the expansion of the supply outside OPEC is unlikely to be sufficiently rapid so as to satisfy anywhere near all the projected growth in oil demand. During the last years many international oil companies have not been able to replace the already produced oil with new reserves, due to fewer and smaller new discoveries of conventional oil. Hence, the governments in the resource rich countries outside OPEC seem to have strengthened their negotiating position vis-à-vis the international oil companies. This may lead to higher producer taxes, as has already been introduced in Great Britain and Russia.

However, the future is uncertain. New large oil discoveries, a weaker OPEC or a reduction in demand in important oil consuming countries might lead to lower oil prices. For this reason we implement constant oil prices of $20, $40 and $60.

In this study we employ the FRISBEE model, which is recursively dynamic, i.e. the model is solved in sequential periods and equilibrium within each period depends only on past and contemporaneous variables. The model incorporates both short and long run effects of changing oil prices in various regions on both the demand and supply side. An important contribution of our paper is the detailed modelling of the supply side. We separate between oil producers' investment and production decisions in 4 field categories in 15 different regions, based on profit maximization and detailed information about the access to fields worldwide. The basic incentive for oil companies is to invest in provinces and field types with the highest expected return. To sort out the most profitable among projects, net present value (NPV) is calculated for investments in each of the 52 Non-OPEC provinces/field types over the entire project lifetime. There are three ways to increase the scale of production. First, the oil companies have the opportunity to raise production above the foreseen production profile at additional costs in all phases with ongoing production.

Second, they may invest in *new fields* with specific production profiles over several years time horizon. Finally, there is the option to invest in increased oil recovery, which mobilizes new reserves and lifts the production profile in the decline phase accordingly.

In the model we examine how different tax rates influence the cash-flow of the oil companies and, hence, future investment and production on the NCS the next 25 years. From these scenarios we derive the tax-take of the Norwegian government, in search for the optimal producer tax. i.e. the tax rate that maximizes the net present value of the tax income.

As we apply a global model with updated taxes in the different regions, we are able to take account of possible tax competition between the different provinces. Our preliminary results show that under a wide range of assumptions that the optimal net tax rate is in the range of 75 to 85 per cent. Hence, even if many regard Norway as a high tax province, reducing the tax rate will in most cases not boost investment to such a degree that the net present value of tax income increases.