Nordic Council of Ministers

CLIMATE POLICIES in the Nordics

Nordic Economic Policy Review 2019

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Comment on K. Holtsmark: Supply-Side Climate Policy in Norway

Klaus Mohn[1]

Although the consensus of climate policies remains dominated by a demand-side perspective, supply-side policies have gained increasing interest and attraction among academic researchers over the last years. Nevertheless, a breakthrough for supply-side climate policies among politicians and policy-makers is still pending (Lazarus and van Asselt 2018). A summary of findings and potential applications is therefore highly relevant for policy design of oil-exporting countries, and in particular for countries where the ambitions for climate policies go beyond domestic emissions.

For a reasonable set of supply and demand elasticities, research so far has established that unilateral supply-side policies are likely to contribute to reduced emissions of greenhouse gases on a global scale (e.g., Fæhn et al. 2017), in particular if coalitions of cooperating producers of fossil fuels can be formed (Harstad 2012). Supply-side policies also have the advantage of addressing the issue of fossil fuels directly at the core, thereby reducing the risk of compensating behavior among producing companies and countries, as exemplified by the so-called green paradox (e.g., Sinn 2015). Finally, a supply-side approach to climate policies can also be justified by recent research on readjustment and strategic industrial policy (e.g., Acemoglu et al. 2018).

Holtsmark's paper provides a good review of these branches of economic research, with reflections of the academic discussion of world market elasticities of supply and demand, carbon leakage in space and time, and path dependence in policies and technological development. For a policy journal, however, the question is how such an update could help in actual formation of policies for oil-exporting countries. On the one hand, the justification for supply-side policies is increasingly well established in the economic literature. On the other hand, this is not the case when it comes to implications of theoretical insights for actual design of climate policies in

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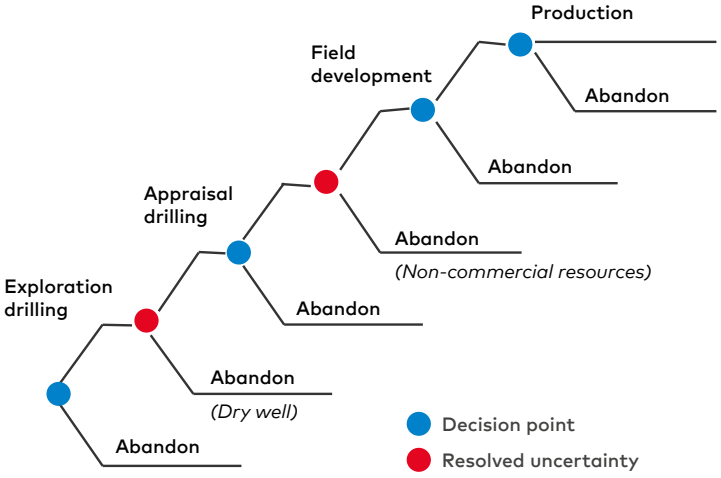
oil-exporting countries. For a policy journal, the time has therefore come for the research question of supply-side climate policies to shift from *why* to *how*. This call is also the main motivation for my comment to Holtsmark's paper, and the exposition below is developed accordingly.

My point of departure is a brief review of the licensing and decision system of Norwegian oil and gas fields, to initiate a discussion on the specific points of interference for supply-side policies. I go on to review the current outlook for Norwegian oil and gas production, and discuss how current and expected production might respond to climate-related policy measures. I then briefly discuss how adjustments to the tax system might potentially serve the purpose of climate policy ambitions, keeping distortions at a minimum. Finally, I present some concluding remarks.

Academic research on supply-side climate policies often leave the impression that policy makers of oil-producing countries have tools at their hand that enable them to fine-tune the volumes of oil and gas extraction on a continuous basis. Obviously, this is not the case, and least of all for Norway, where oil exploration, development and production is subject to long-term profit maximization by competitive oil companies in a stable and market-based regulatory environment (Mohn 2008, Norwegian Petroleum Directorate 2014). Licensing policies form the point of departure not only for oil resource management in Norway, but also for the decision process of oil companies. Once the exploration licenses are awarded in regular licensing rounds, oil companies are basically left on their own, with a sequence of investment decisions to consider (see Figure 1), and without further direct government involvement. Large field developments do require approval by the Norwegian parliament. However, this milestone for field project progress is currently more of a formality, and no project plans have been rejected over the last couple of decades. With substantial uncertainty around exploration results, development lags, cost and prices, this means that the control by government over ultimate extraction rates is very limited.

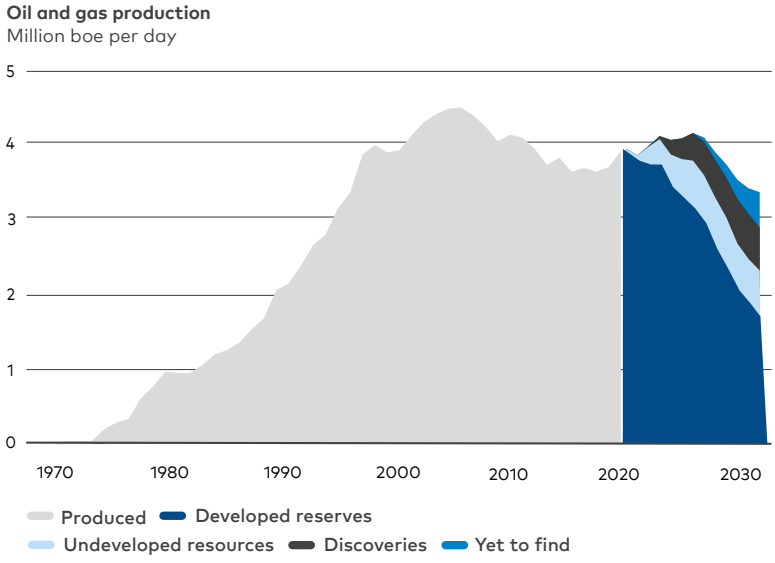
Figure 1 Decisions in oil field development



Once oil companies have engaged in exploration and development activities, their interest is to recover their capital expenditures as fast as possible, and to maximise cash flows to enhance investment returns. Cost of exploration and development play an important part in the optimization process among the companies. However, project design in terms of scale, and not least the pace of development and production is as important. The reason is that capital recovery is closely connected to the ramp-up and pace of production. Once the production capacity is determined, front-loading of production will enhance the net present value of the field project. This also means that any interference to delay development or production will imply a reduction in net present values and investment returns. Any attempts by politicians to intervene in oil company decisions, through direct intervention or adjustments to the taxation system, will leave shareholder value at risk and potentially also put the stability of the regulatory environment in jeopardy.

At any point in time, it should also be noted that oil and gas production is the output from a portfolio of field projects, involving fields at all stages of development. As illustrated in Figure 2, this means that a significant part of the outlook for oil and gas production is

Figure 2 Oil and gas production in Norway



Source: Norwegian Petroleum Directorate.

based on investments that already are sunk. This begs the question which of these categories is the most relevant for supply-side climate policies? Policies to reduce oil production from oil fields in the early phase of production, where the initial investment is yet to be recovered, is particularly costly – and controversial. The same goes for oil fields that are currently under development. That leaves us with oil discoveries where the final investment decision is still pending, as well as exploration activities. Policies directed at these oil fields are less costly, as the bulk of capital expenditures are yet to be sunk, and less controversial, because their revenues are more distant. The implication is that supply-side climate policies will be costly and controversial for a large majority of current production volumes, and therefore more viable for production in the more distant future, i.e., exploration activities and field projects with marginal profitability.

A tax on extraction could potentially have an effect even on fields that are currently producing, as some of these would possibly have

to close down earlier if their revenues were subject to an extra volume tax. Some marginal late-life projects to increase oil recovery could potentially also be stopped by an extraction tax. However, unless the tax was substantial, the total impact on production rates would be very modest. An additional tax on extraction would also interfere with an already complex system of petroleum taxation. Specifically, an extraction tax motivated by climate policy ambitions would threaten attractive qualities of symmetry and neutrality of the Norwegian system of petroleum taxation. Still, as the Norwegian petroleum sector is ageing rapidly and climate concerns are looming, there could be reasons for a review of the Norwegian system of petroleum taxation in light of contemporary challenges of resource scarcity and climate change.[2]

The current consensus for a concentration of climate policies on the demand side of the market for fossil fuels is challenged by recent economic research, calling for a closer consideration also of supply-side measures to reduce global carbon dioxide emissions. Textbook theory clearly suggests that withdrawal of production will have an effect on the oil price. The ultimate impact on demand and emissions is an empirical question. Supply-side climate policies also have the advantage that compensating behavior among oil producers might be avoided, thereby arresting the so-called green paradox. Finally, the transition to a low-carbon society will involve readjustment and restructuring in oil-producing countries, which can be supported by a supply-side perspective on climate policies.

At the end of the day, the combination of demand- and supply-side approaches should be determined by comparisons of their marginal costs, taking the full spectrum of side effects into consideration. In the meantime, resistance prevails against measures to limit oil and gas production, in particular from countries and companies who already invested heavily in this industry. These controversies imply that any interference with the timing and pace of extraction in a market-based industry environment will have to be evaluated carefully before implementation. Restraining production from field projects where capital has just been sunk has a high cost, both to

[2] See Osmundsen et al. (2015), Berg et al. (2018), and Davis and Lund (2018) for recent discussions of the Norwegian system of petroleum taxation.

companies and society. Minor adaptations of the taxation system and adjustments to restrain exploration activities therefore stand out as the most interesting candidates for further examination if a supply-side approach to climate policies were to gain additional ground.

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