EXECUTIVE SUMMARY

Climate policies in a fossil fuel producing country – demand versus supply side policies

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Why supply side measures?

The conventional way of implementing policies to reduce CO_2 emissions is through the demand side, that is, introducing measures or instruments to reduce the consumption of fossil fuels. Many jurisdictions show willingness to reduce CO_2-emissions by restricting domestic demand for fossil fuels. However, supply side measures, that is, cutting domestic production of fossil fuels as a climate policy measure is less frequently discussed, let alone pursued. In the context of a global climate agreement, a cap on fossil fuel consumption would have the same effects on global emissions as a cap on fossil fuel extraction, as demand must equal supply of fossil fuels at the global level. However, in the present situation where countries or a group of countries act unilaterally, demand side versus supply side policies matters.

The purpose of this paper is to deduce the cost-effective combination of the two types of policies, given a target for a country's (or coalition's) contribution to global CO_2 abatement. We explore how the optimal domestic climate policies depend on the emissions from extraction, the costs of downscaling domestic fossil fuel demand and supply, and last but not least, the market behaviour in the fossil fuel markets. This is crucial, as domestic policy that reduces fossil fuel demand leads to

lower international energy prices and renders global abatement lower than domestic through so-called carbon leakage. Leakages occur also through reduced fossil fuel extraction.

Our numerical analysis looks at Norway, which has an ambitious target for domestic demand side measures for 2020, but has so far not considered using supply side measures. The Norwegian lack of focus on supply side policies has been questioned by media, analysts and NGOs at home, and has also attracted international attention. The global combustion of fossil fuels extracted in Norway leads to CO_2 emissions that are about ten times higher than total emissions of CO_2 within Norway.

Results and policy implications

Even though leakages are likely to be larger with supply side measures than demand side measures, the main conclusion of this analysis is that it is cost-effective for Norway to let most of the contribution to global emission reductions be achieved through supply side measures. In our benchmark scenario, only one third of a given global reduction should be realised through demand side measures; the remaining two thirds should come through supply side measures, that is, by reducing oil extraction. In contrast, the Norwegian Government suggests using demand side measures, only. We find that such a strategy more than doubles the costs.

This optimal composition is fairly robust to assumptions we do. In particular, lower emission intensity in the Norwegian extraction process than globally is of little significance as almost all emissions in oil are released when combusted. Further, the optimal composition is more or less the same irrespective of the size of the global abatement target.

The optimal policy combination is, at least in principle, a tax per tonne domestic CO_2 emissions and a tax per barrel of domestic oil extraction. The tax levels we derive in our benchmark case are high. The CO_2 tax on sources not already trading allowances (in the European quota market) exceeds 200 USD/t. The derived marginal costs of emission reductions translate into a shadow price on oil production equal to 50 USD per barrel. However, implementing such a large tax on oil production is risky and politically unfeasible. Norwegian authorities are, for good reasons, cautious about changing the rules of the game. An alternative supply side policy could be to have a more restrictive practise when it comes to opening new areas for oil exploration. At least it seems reasonable to take a global perspective similar to the one in this paper when undertaking impact assessments of opening new areas for exploration.