Taran Fæhn (Statistics Norway):

# Supply side policies under the Paris regime
## - (still) a good idea?*

*Based on an article in Norwegian coauthered with: G. Asheim, M. Greaker, C. Hagem, B.Harstad, M. Hoel, D. Lund, K. Nyborg, K.E. Rosendahl and H. Storrøsten

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# Norway's dilemma

- Norway is a significant oil and gas producer - contributes to global emissions when extracted and combusted
  - Significant part of Norwegian economy: 50% of export, 20% of investments and GDP, 30% of public revenue
  - In global terms: 2% of oil supply, 0.5% of World GDP
- Same time: Among the most ambitious in the Paris Agreement

**Possible solution:** Use extraction cuts as climate policy

- Does it affect the climate?
- Is it worthwhile?

# Background

Hoel (1994, *JEEM)*: YES, IN THEORY

- Unilateral cost-effective action to curb global emissions should normally combine demand side and supply side policy

Fæhn et al. (2017, *EJ)*: YES, IN PRACTICE

- Unilaterally cutting supply of oil will reduce global emissions and add to domestic demand side measures
- The optimal combination for Norway for given global impact is

  2/3 by oil supply, 1/3 by demand side

Since then: The Paris Agreement

- **Is supply side policy still a good idea?**

# Revisiting unilateral supply side policies

1. Will global emissions fall?
   - In light of the Paris Agreement

2. The insurance (and signalling) argument
   - Harstad (2016)
   - as the eventual success of the Paris A is uncertain

3. Would it be worthwhile in terms of costs (monetary,other)?

# 1. Will global emissions fall?

## Example OIL (not GAS)

### Direct:

1A. $CO_2$ content of the oil saved will stay in the ground, as will the emissions from the extraction

### Oil market carbon leakage:

1B. Price increase → global consumption ↘ supply ↗ Net ?

### Substitution effect:

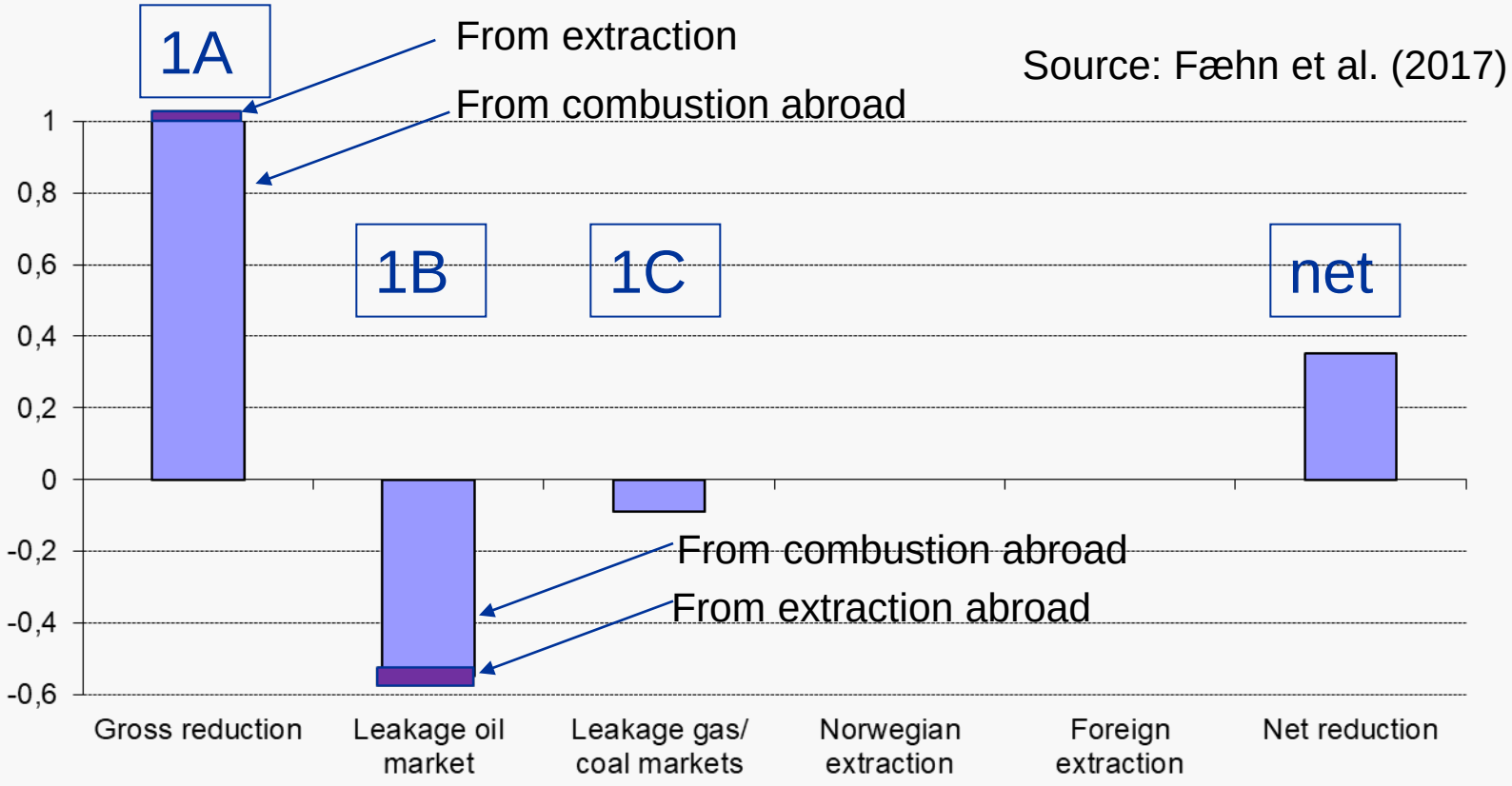
1C. of oil consumption by other fossil fuels

### "Paris effect"

1D. If Paris succeeds as a *globally binding* demand side agreement → Emissions are capped → oil supply cut allows emissions to increase elsewhere → No net effect

# 1 Will global emissions fall?

Reduction in global emissions of 1A direct cut (combustion and extraction) and 1B oil market leakage (also from extraction)+ 1C substitution leakage




1A+1B+1C→ About 1/3 of the gross effect remains

What about 1D: Paris effect……?

# 1 Will global emissions fall?

## 1D: The Paris effect

**What is new?**

Kyoto: Few participants, but ambitious target.

Their abatement implies carbon leakage to outsiders

Paris: Bottom-up approach, each decides their target

Different ambitions, but **targets for all** countries

If they are binding:

Less oil supply can cause emissions to fall (1A+ 1B+1C) →

(shadow) price of carbon falls in each country →

emissions increase again until target is exactly met (1D)

i.e. full carbon leakage and no effect of supply side policy

# 1 Will global emissions fall?

## 1D: The Paris Effect

**Binding?**

Many countries' pledges (mostly for 2030):

- do not formulate clear targets
- are conditioned on unclear conditions
- ambitions are low and will – even without efforts – be met with good margin

Paris A as an institution:

- A challenge to measure and monitor that participants comply with their obligations
- If commitments breached - Paris A has few sanctions/ enforcement tools.
- Pledges for post-2030 periods still not given

# 1 Will global emissions fall?

**Preliminary conclusion based on empirical results and the features of the Paris Agreement:**

1A+1B+1C: probably net effect

1D: still net effect, but reduced

# 2 The insurance argument

Large uncertainty about the Paris Agreement

If low expectations to the Paris A., too little abatement investments will take place and failure becomes likely

SUPPLY SIDE POLICY AS AN INSURANCE

- Ensures that at least some combustion will be curbed and most dramatic climate change avoided (Harstad, 2016)
- The larger the supply side coalition, the more effective

SUPPLY SIDE POLICY AS A SIGNAL FROM PRODUCERS

- We believe in the Paris process
- We leave resources in the ground because expect a low value
- We will not take on high costs of stranded assets

If influential, large coalition: signalling and cost effect can spread -
→Paris becomes more likely

# 3. Would it be worthwhile?

YES – for suppliers wishing to reduce climate change

*on top of* pledges in a still imperfect and possibly failing Paris A.

The relevant question:

- what is a cost-effective *package* of “on-top”-measures?

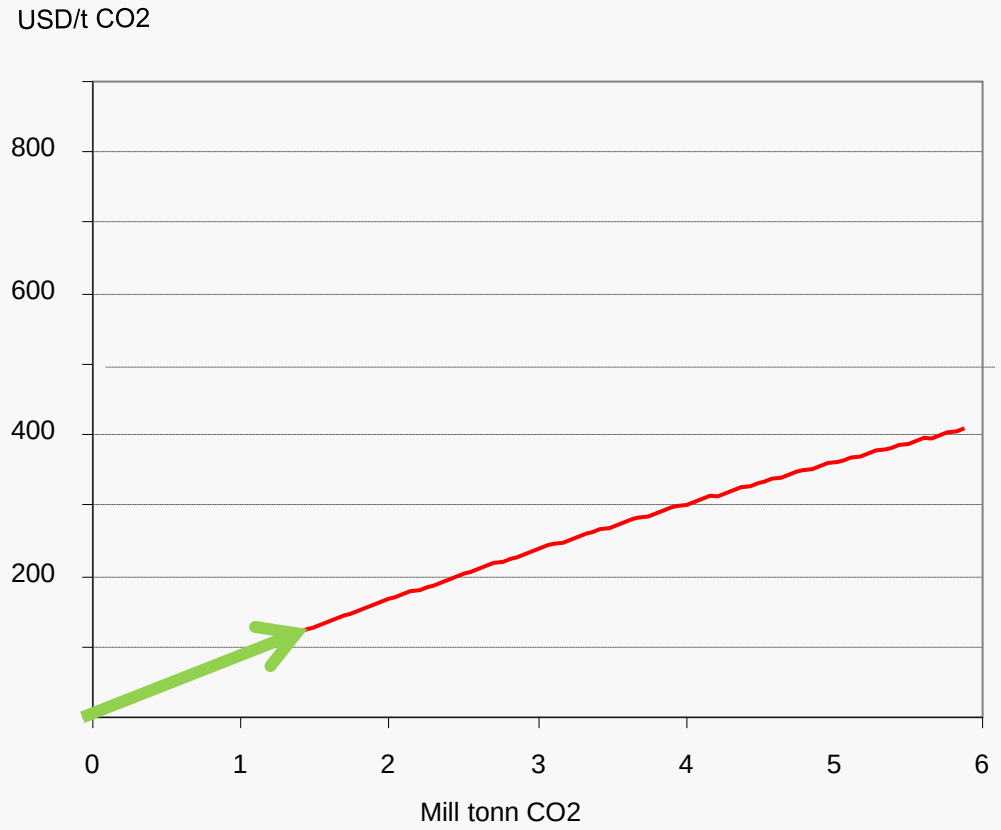
The package will include elements of many types:

- R&D investments
- Green Fund transfers
- Rain forest conservation
- and – Supply side cuts

# 3. Would it be worthwhile?

On the margin, petroleum profit is zero →

There will always be some cheap oil barrels to spare;
how many will depend on the ambition and costs of alternatives




Source: Based on field cost information for Norway, see Fæhn et al. (2017)

# 3. Would it be worthwhile?

What if the UNFCCC process turns out to be a success?

- Supply side policy is still worthwhile
- Or at least does no harm:
- No added climate effect, but no costs, either.
- unextracted resources would have been unprofitable, anyway
  - Could even reduce costs by avoiding stranded assets, i.e. making the demand side efforts less costly
  - Other hand: Some costs of coordinating, negotiating supply side on top of demand side agreements

# CONCLUSIONS

## Supply side policy is still a unilateral option

Can obtain to:

- Add to global abatement because as is the Paris A. is not binding

- Even if Paris A. is/becomes binding it has a role:
  Makes it slightly easier/cheaper for the world to obtain the global goal – because less stranded assets

- Work as an insurance if Paris fails

- Norway is small, but can initiate the work towards a larger, more effective, supply side coalition

# Thanks for your attention

## References:

Fæhn, T ., G. Asheim, M. Greaker, C. Hagem, B. Harstad, M. Hoel, D. Lund, K. Nyborg, K. E. Rosendahl and H. Storrøsten (2018): Parisavtalen og oljeeksporten, *Samfunnsøkonomen* 3/2018

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Harstad, B. (2016): Making Paris sustainable, in Stavins, Robert N., and Robert C. Stowe, eds. “The Paris Agreement and Beyond: International Climate Change Policy Post-2020.” Cambridge, Mass.: Harvard Project on Climate Agreements.

Hoel, M. (1994). "Efficient Climate Policy in the Presence of Free Riders." Journal of Environmental Economics and Management 27(3): 259-274

# Background

- $CO_2$ extracted $\approx$ $CO_2$ combusted
- Instead of agreeing on capping combustion and emissions (**demand side policy**)

  the world could agree on a cap on extraction

  (**supply side policy**)
- Hoel (1994, *JEEM)*: The optimal instrument would be a uniform extraction tax
- Fæhn et al. (2017, *EJ)*: For the *climate-ambitious* + *oil-producing* Norway, unilaterally cutting supply will reduce global emissions and add to domestic demand side measures
- Since then:
  - The Paris Agreement with broad participation and high ambitions
  - The integration of Norway's with EUs climate policy

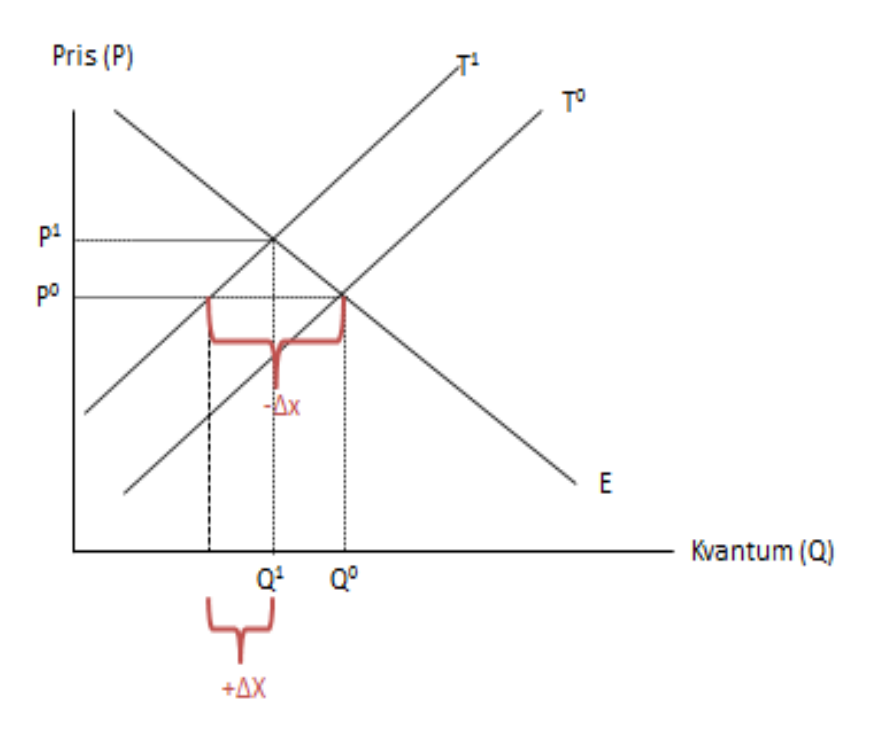
# 1 Will global emissions fall?

- 1B oil market effect depends on the supply and demand curves → carbon leakage
- The *relative* price elastisities matter:
  - Same slope → leakage 50%
  - Larger demand el → leakage less than 50% and global cut larger
  - Larger supply el → leakage more than 50% and global cut smaller

# 1 Will global emissions fall?

- 1B oil market carbon leakage depends on the slopes of the supply and demand curves
- The *relative* price elasticities matter:

  If same slope → leakage 50% (literature review: reasonable assumption)



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