National climate policies and the European Emissions Trading System

Frederik Silbye, Secretariat of the Danish Council on Climate Change

Peter Birch Sørensen, University of Copenhagen

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UNIVERSITY OF COPENHAGEN

Issues

- What are the prospects for the European carbon market after the 2018 reform of the ETS?
- Are national policies aimed at reducing emissions from the ETS sector ineffective?
- How can the future performance of the ETS be improved?

Main messages

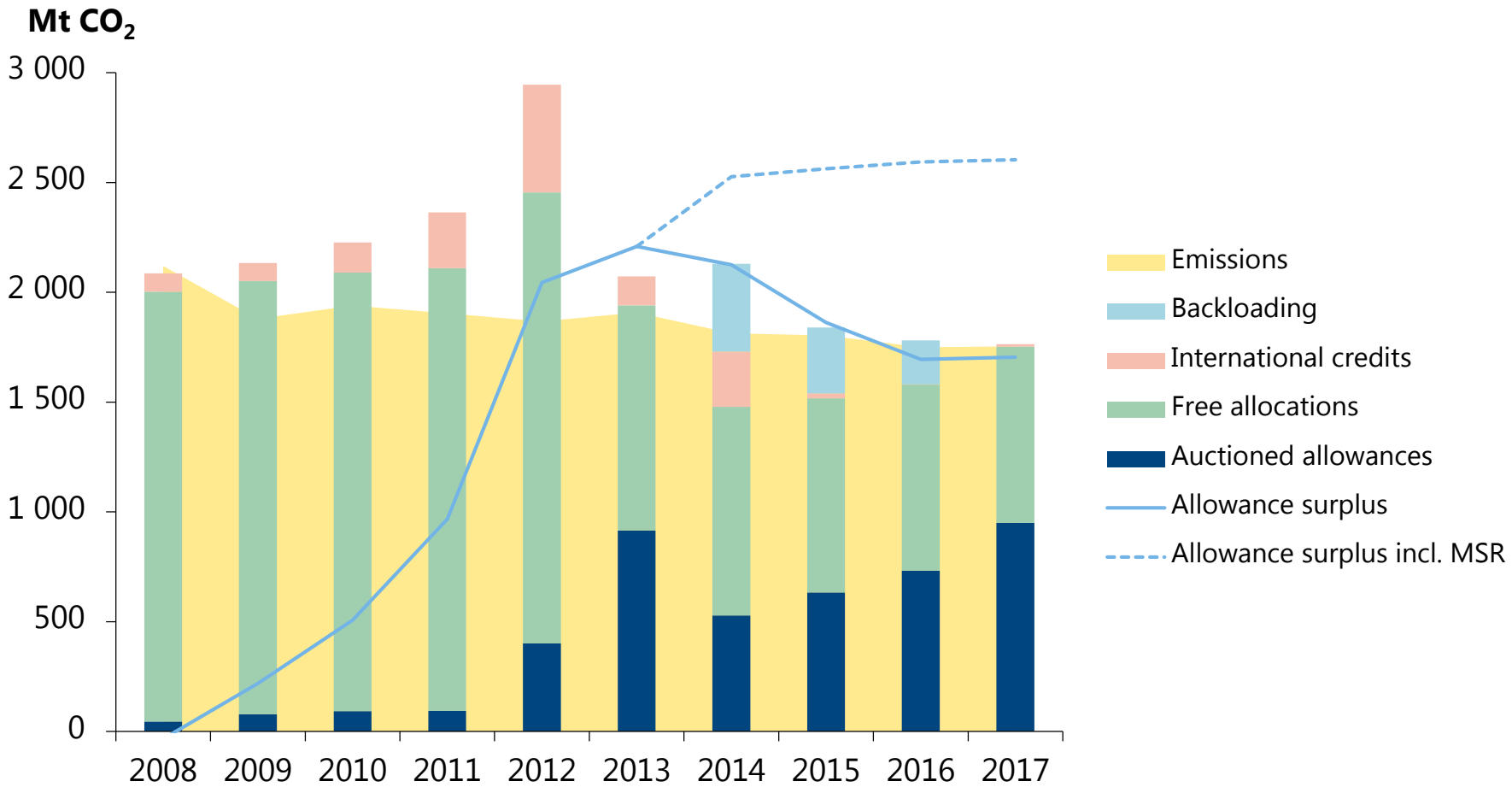
- The surplus of ETS emission allowances is likely to persist for several decades even after the 2018 reform
- The new Market Stability Reserve fundamentally changes the ETS: National climate policies that reduce the demand for emission allowances may now reduce emissions permanently
- In the next couple of decades, a national policy that promotes renewable energy via subsidies or carbon taxes is more cost-effective than annulment of emission allowances
- The next ETS reform should introduce a floor and a ceiling for the allowance price

Background to the recent ETS reform

Rules of the ETS

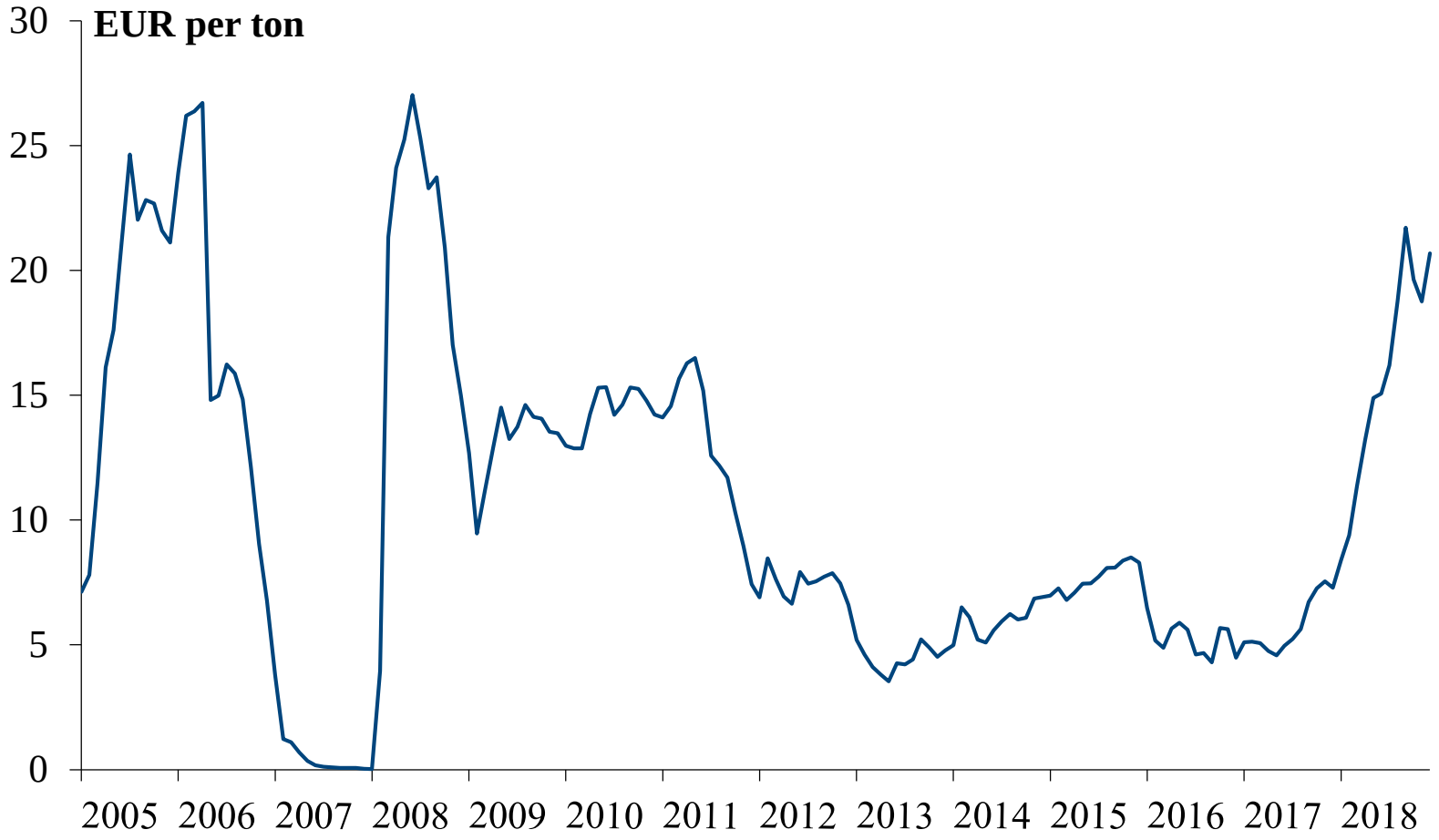
- For every emitted ton of CO_2, an installation within the ETS must surrender an allowance
- Surrendered allowances are cancelled
- New allowances are issued each year at a declining rate
- Some new allowances are auctioned, others are allocated cost-free
- Allowances are tradable and can be banked for later use

Problems: The huge allowance surplus…



…and the unstable allowance price

(Euros per ton of CO_2, monthly averages)



The controversy on the ETS: The defenders

Defenders of the ETS argue that:

- The system works: Emissions are below the cap
- The allowance surplus reflects efficient smoothing of abatement costs over time
- National subsidies to renewable energy are ineffective and distortive

The controversy on the ETS: The critics

Critics of the ETS argue that:

- The system has been flooded with questionable credits from outside Europe
- The allowance price has been too low and volatile to support sufficient investments in renewable energy
- National subsidies to renewables can reduce EU-wide emissions from the ETS sector

A sticking point: The waterbed effect

Unilateral Danish support to renewable energy

↓

Demand for allowances declines

↓

The allowance price decreases

↓

Emissions increase somewhere else – now or later

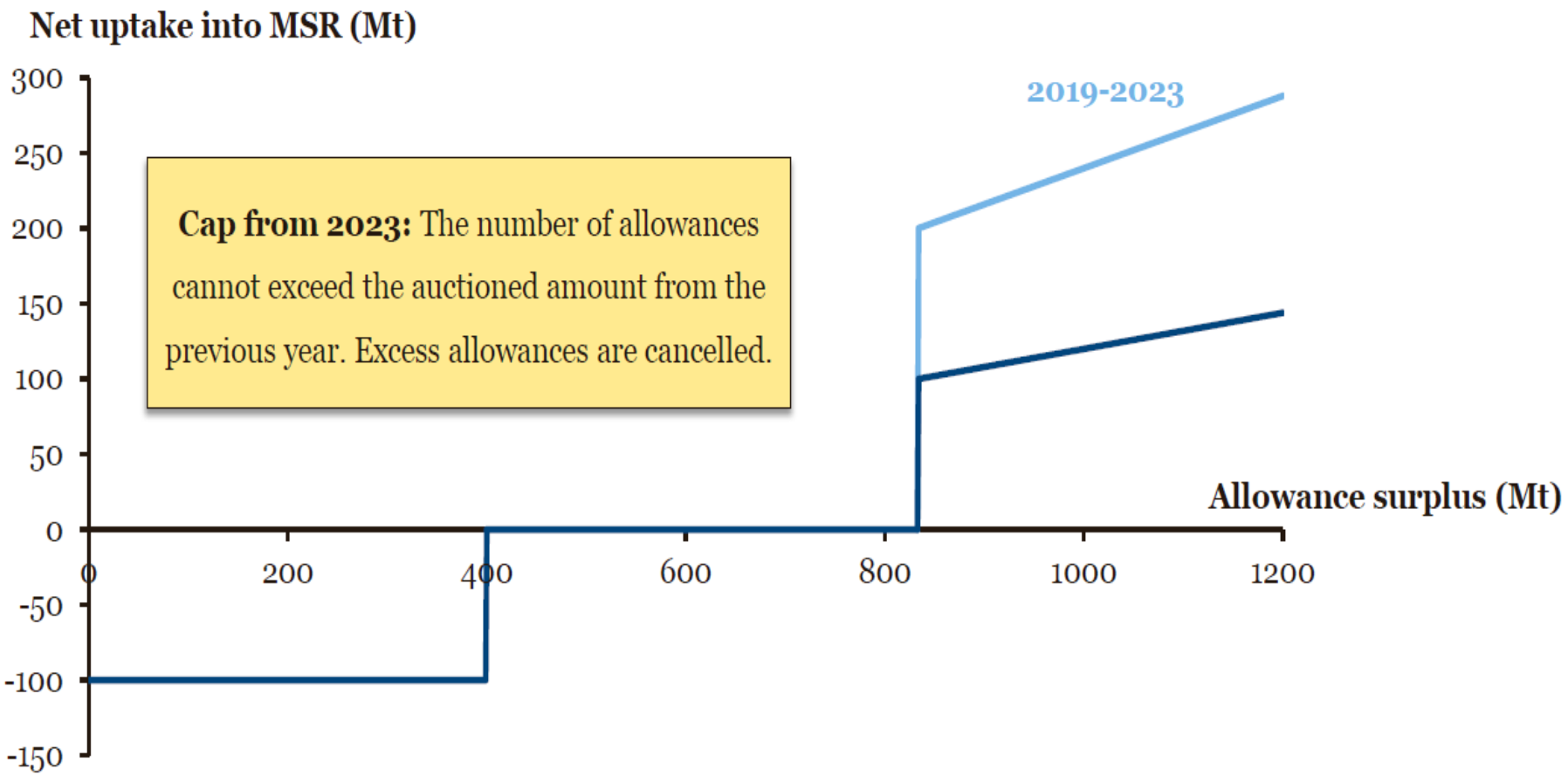
↓

Total European emissions are unaffected

Economists have emphasized the waterbed effect,
but the recent ETS reform has punctured the waterbed

The recent ETS reform

Reform: The Market Stability Reserve (MSR)



Evaluating the reform: A simple model of the ETS

- A 1 euro rise in the allowance price reduces annual CO_2 emissions by 2.2 million tons (Sandbag)
- For a given allowance price, the demand for emission allowances falls by *z* percent per year
- Agents are forward-looking
- No one will hold a surplus of allowances unless they expect an increase in the allowance price (*r* = required expected price increase)
- The supply of allowances follows the rules prevailing after the recent ETS reform in all future years

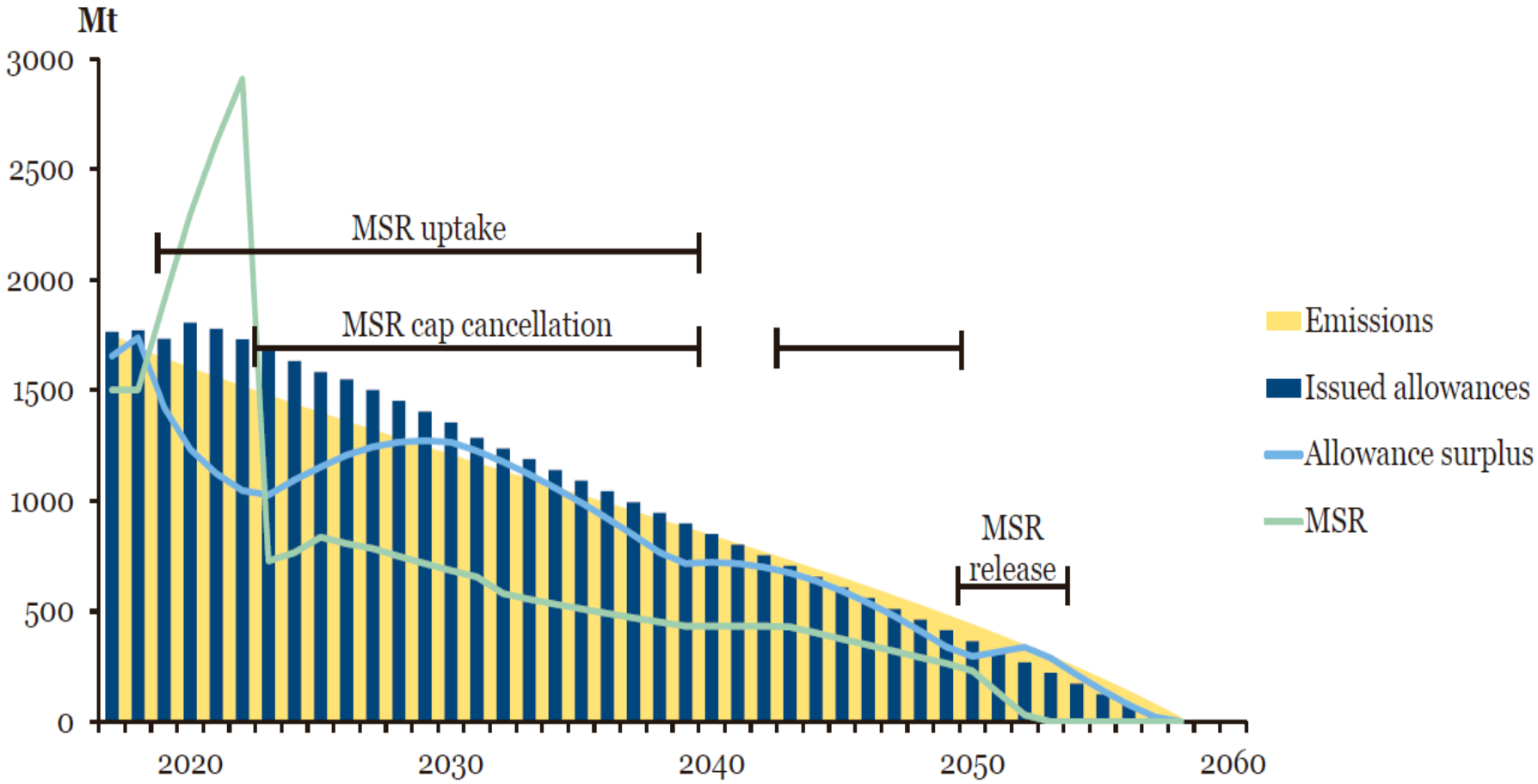
Calibrating the model

- Model parameters (including z) are initially chosen so that the model reproduces the observed allowance price and emissions in 2017

- The increase in the allowance price from 2017 to 2018 is seen as an effect of the ETS reform and may be explained by a fall in r from 10% to 7.44% (lower risk premium)

Prospects for the ETS after the 2018 reform

Model forecast



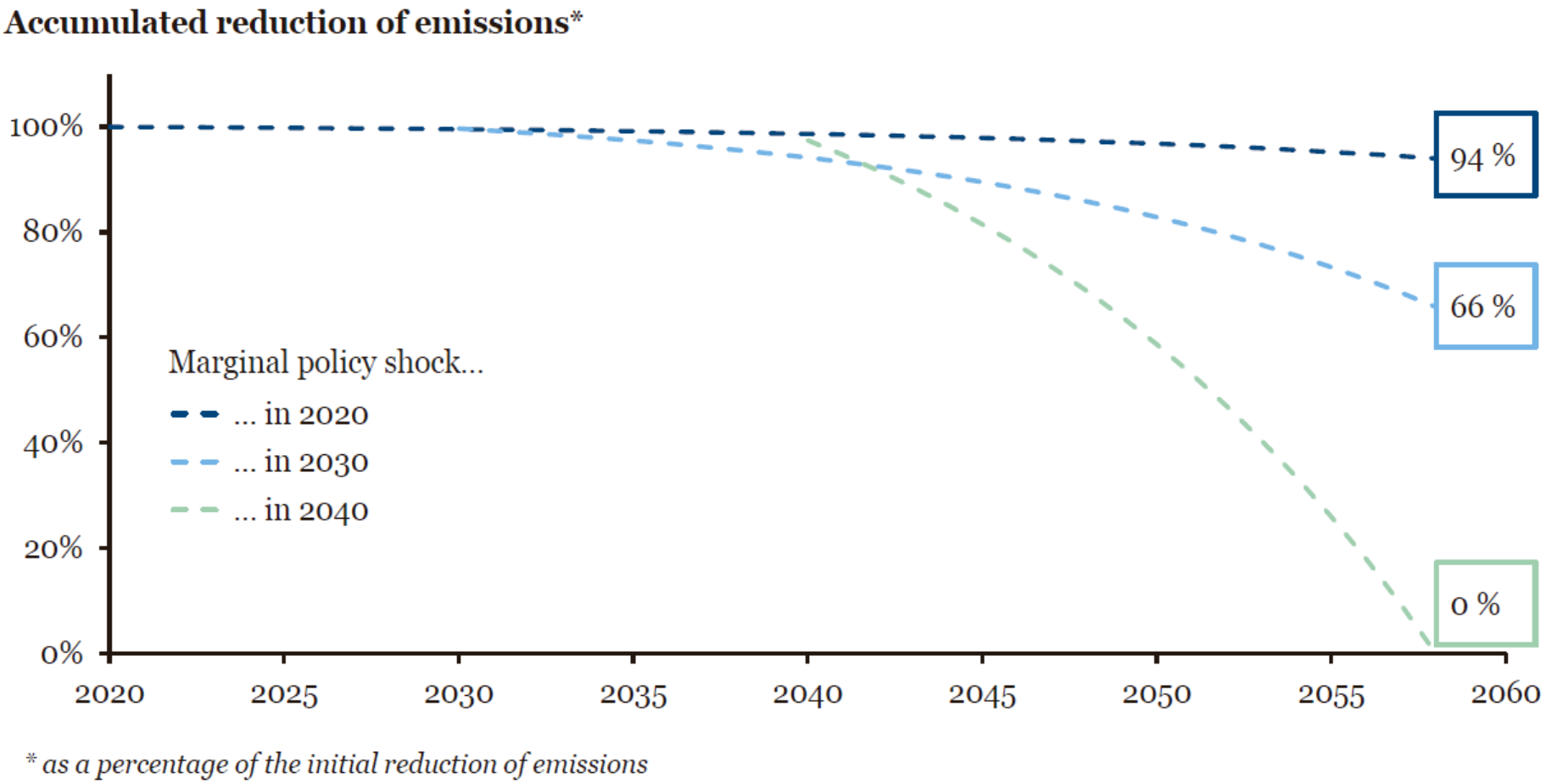
Effects of national climate policies

Alternative national climate policies

- Subsidies to renewable energy and carbon taxes on emissions from the ETS sector reduce the *demand* for emission allowances

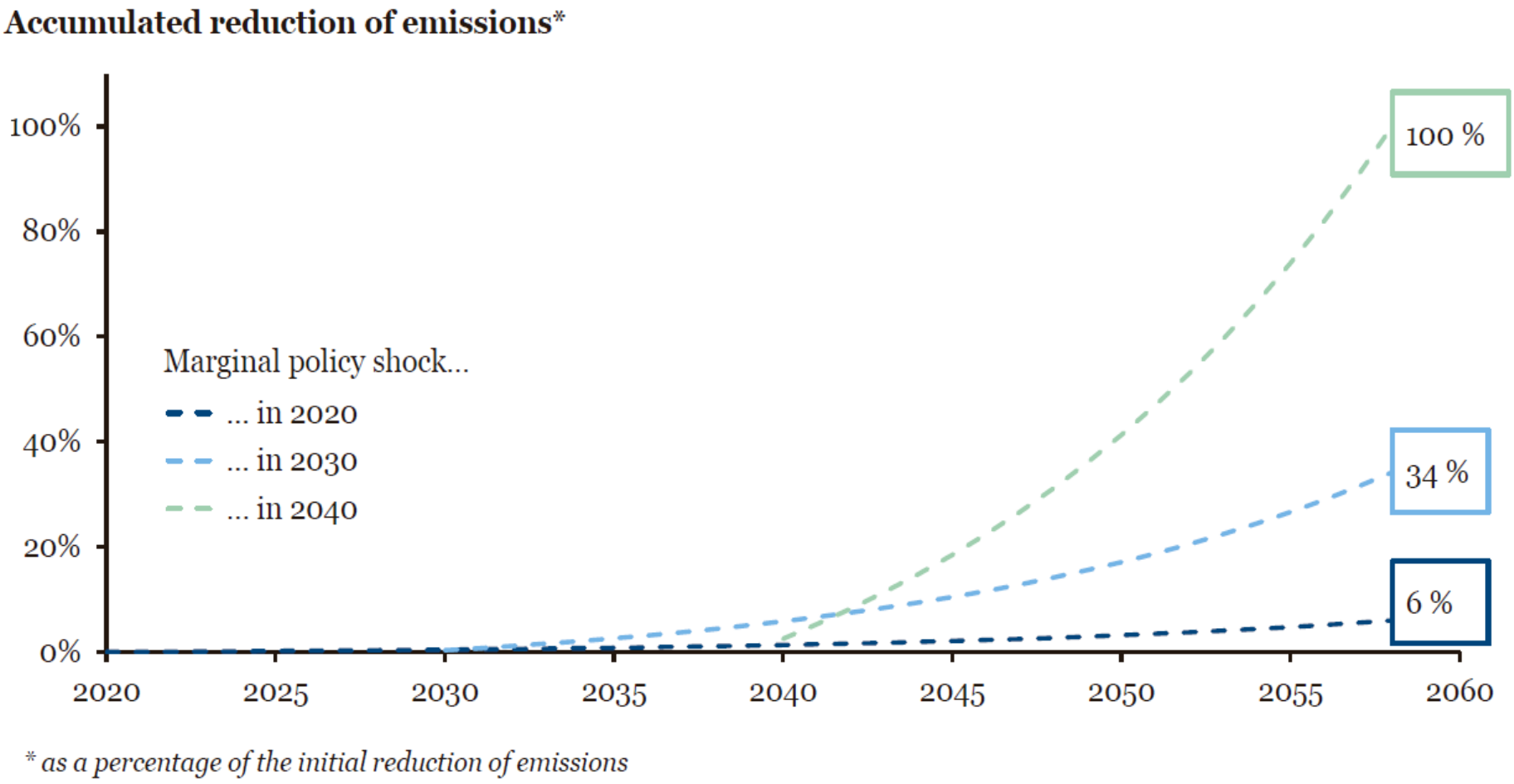
- Annulment of emission allowances (e.g. via a cut in auctioned allowances) reduces the *supply* of emission allowances

Effects of a national expansion of renewable energy



* *as a percentage of the initial reduction of emissions*

Effectiveness of national annulment of allowances



* *as a percentage of the initial reduction of emissions*

A blueprint for future ETS reform

Mix between price and quantity control of emissions is superior

- The new rules for the MSR are intransparent and may fail to generate sufficient stability of the allowance price
- If a choice between a carbon tax and a cap-and-trade scheme has to be made, the carbon tax is more efficient
- A pure carbon tax and a pure cap-and-trade scheme are dominated (in efficiency terms) by a mixed system that imposes a price floor and a price ceiling on the allowance price under cap-and-trade. This can be implemented via the auctioning procedure

Supplementary slides

Two types of annulment policies

- "Ordinary" annulment of emission allowances (e.g., the Swedish *utsläpsbromse*): Reduces the recorded allowance surplus used to calculate the cap on the MSR

- Annulment under the non-ETS Flexibility Mechanism (FM annulment): Does not reduce the recorded allowance surplus used to calculate the cap on the MSR

Coefficients of emissions reduction after the 2018 ETS reform

Policy horizon (*H*)	Demand reduction in year *t* $(CER^{D}_{t,H})$			Annulment in year *t* $(CER^{Q}_{t,H})$			FM annulment in year *t* $(CER^{Q}_{t,H})$		
	t = 2020	t = 2025	t = 2030	t = 2020	t = 2025	t = 2030	t = 2020	t = 2025	t = 2030
H = **2030**	1.00	0.99	1.00	0.00	0.01	0.00	0.09	0.06	0.01
H = **2040**	0.99	0.96	0.94	0.01	0.04	0.06	0.25	0.22	0.18
H = **2050**	0.97	0.91	0.83	0.03	0.09	0.17	0.59	0.56	0.52
H = **2060**	0.94	0.83	0.66	0.06	0.17	0.34	1.11	1.08	1.05

Note: The table considers policy experiments where 1 million allowances are annulled; alternatively renewable energy is subsidized to the extent needed to crowd out 1 Mt CO_2, given the initial allowance price. The numbers show the accumulated fall in emissions occurring up until year *H*.

Comparison with other studies

- Perino and Willner (2016) estimated that the allowance surplus would have disappeared already in 2036 under the MSR rules agreed in 2015.

- Perino and Willner (2017) estimated that the new cap on the MSR introduced by the recent ETS reform will only be effective for a few years during the 2020s.

- However, these authors do not allow for a downward trend in the demand for emission allowances, thereby implicitly ignoring technical progress in renewable energy technologies.

- The Swedish National Institute of Economic Research (2018) presents results much closer to ours.