What drives the price in the EU ETS?

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The EU Emissions Trading Scheme (EU ETS)

World largest mandatory multi-sector cap-and-trade program

- Most significant market-based instrument of its kind

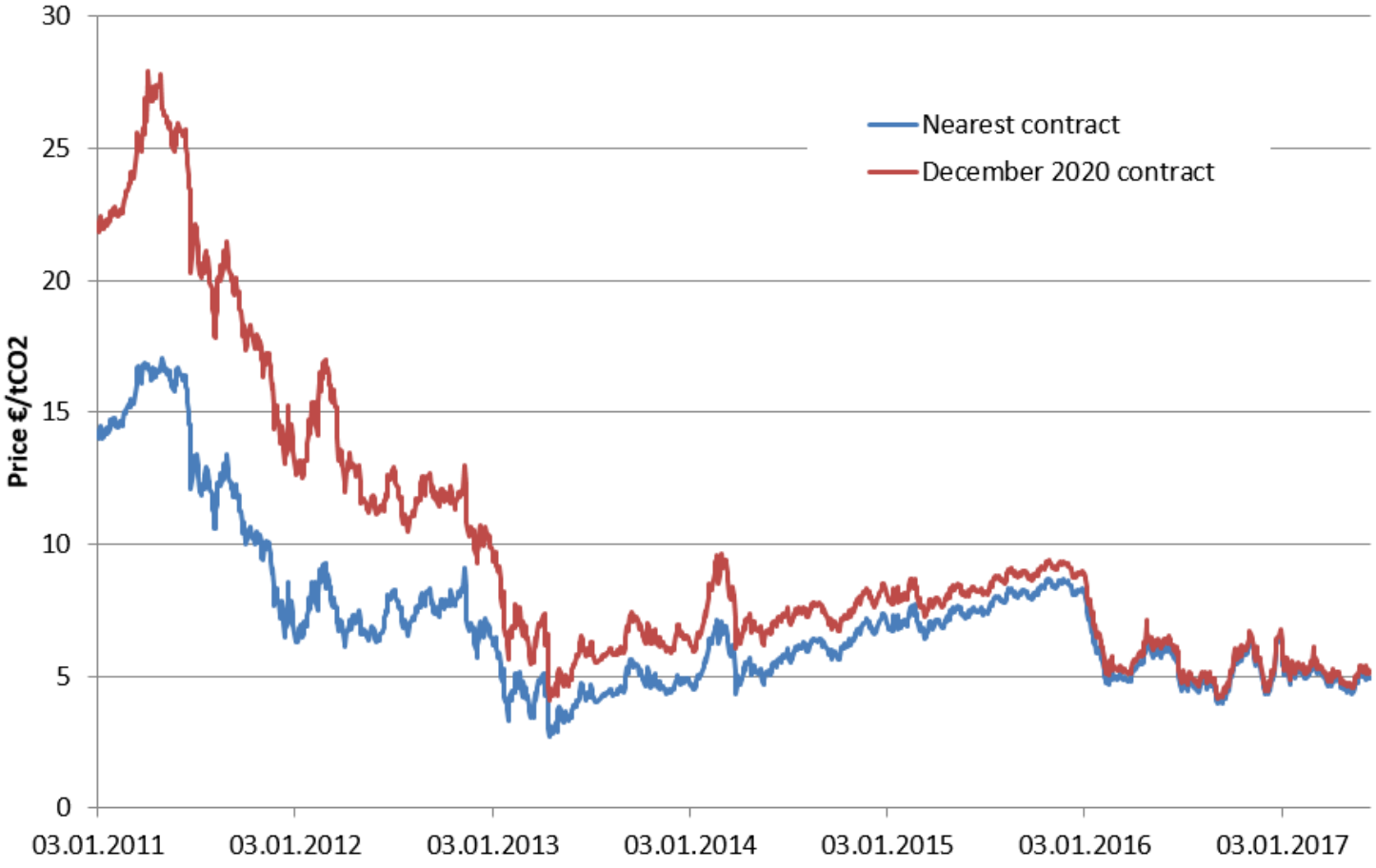
10 years of experience, data, and studies on

- how market forces determined the price of GHG emissions (market functioning)
- how regulated firms responded to the policy (market outcomes)

Motivation: Unique opportunity to distill empirical lessons learnt for the operation and design of ETS

Creation of stable carbon price?

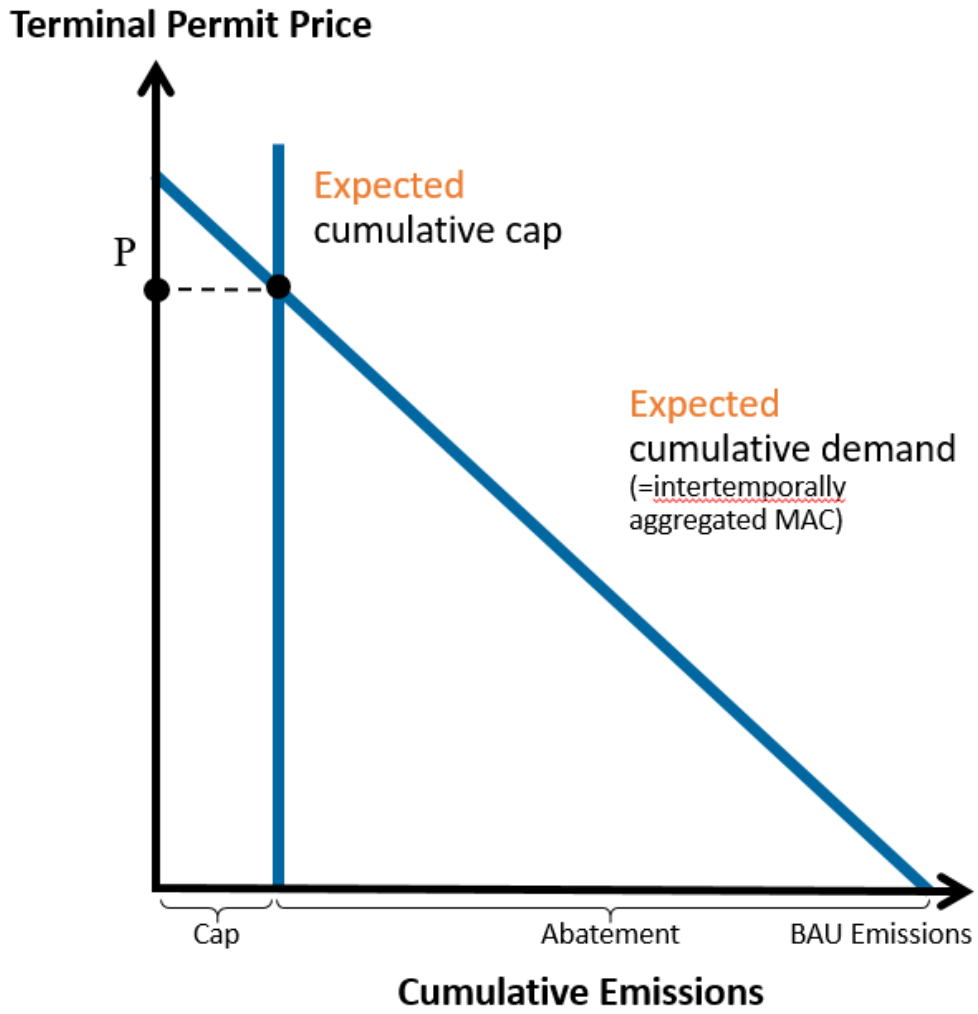
- Persistent decline of EU allowance (EUA) price
- Currently, no substantial price increase expected for 2020



Quelle: ICE Futures Europe

Price formation in cap-and-trade programs

with intertemporal flexibility and foresight



Cumulative demand and supply determine price of last permit surrendered in the system

Price formation in cap-and-trade programs

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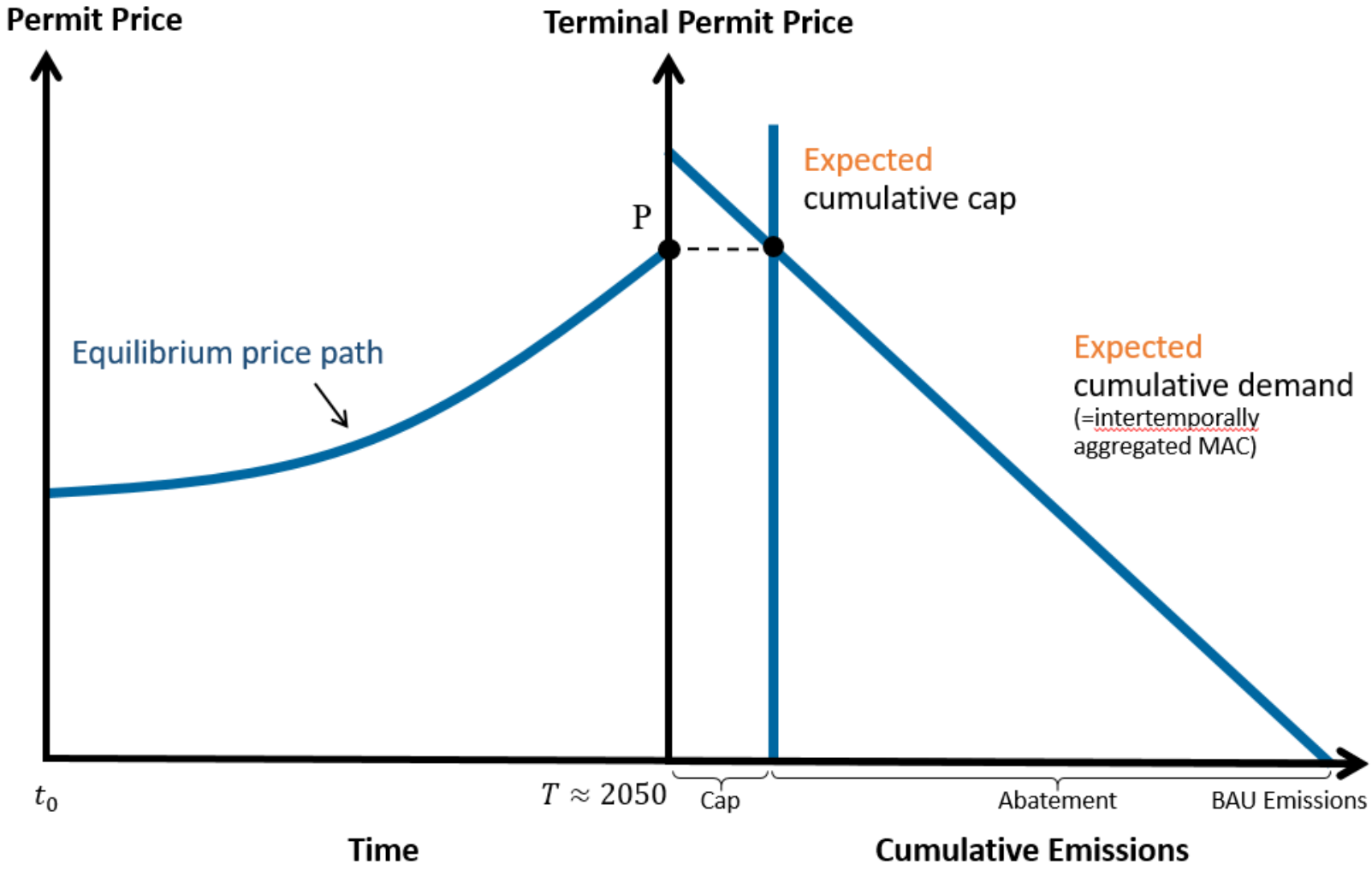
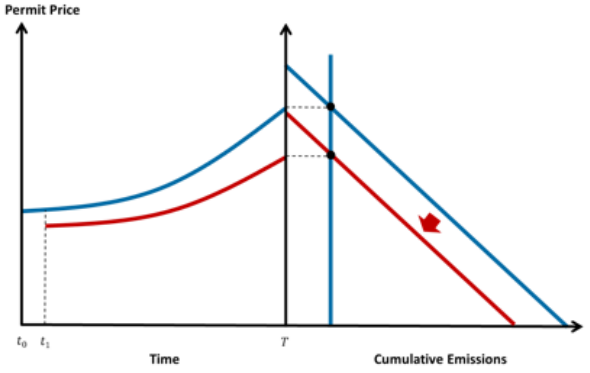


Over time, the allowance price rises with the interest rate (Hotelling's rule).

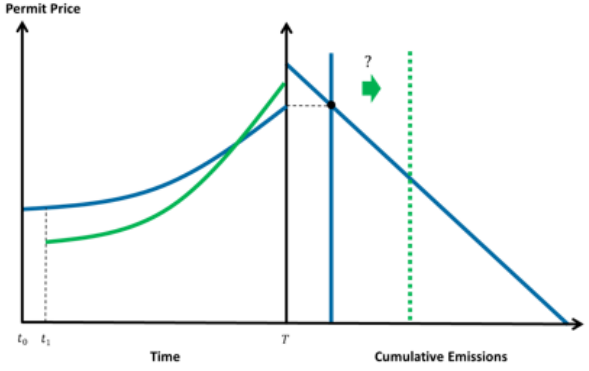
Cumulative demand and supply determine price of last permit surrendered in the system

Why are prices low?

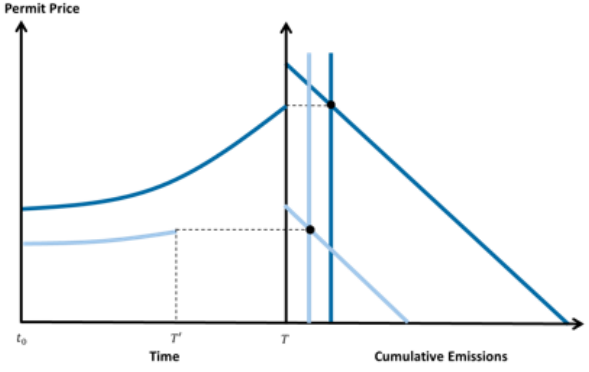
Three non-mutually exclusive explanations (Fuss et al. 2017)



Demand shock
(conventional wisdom)

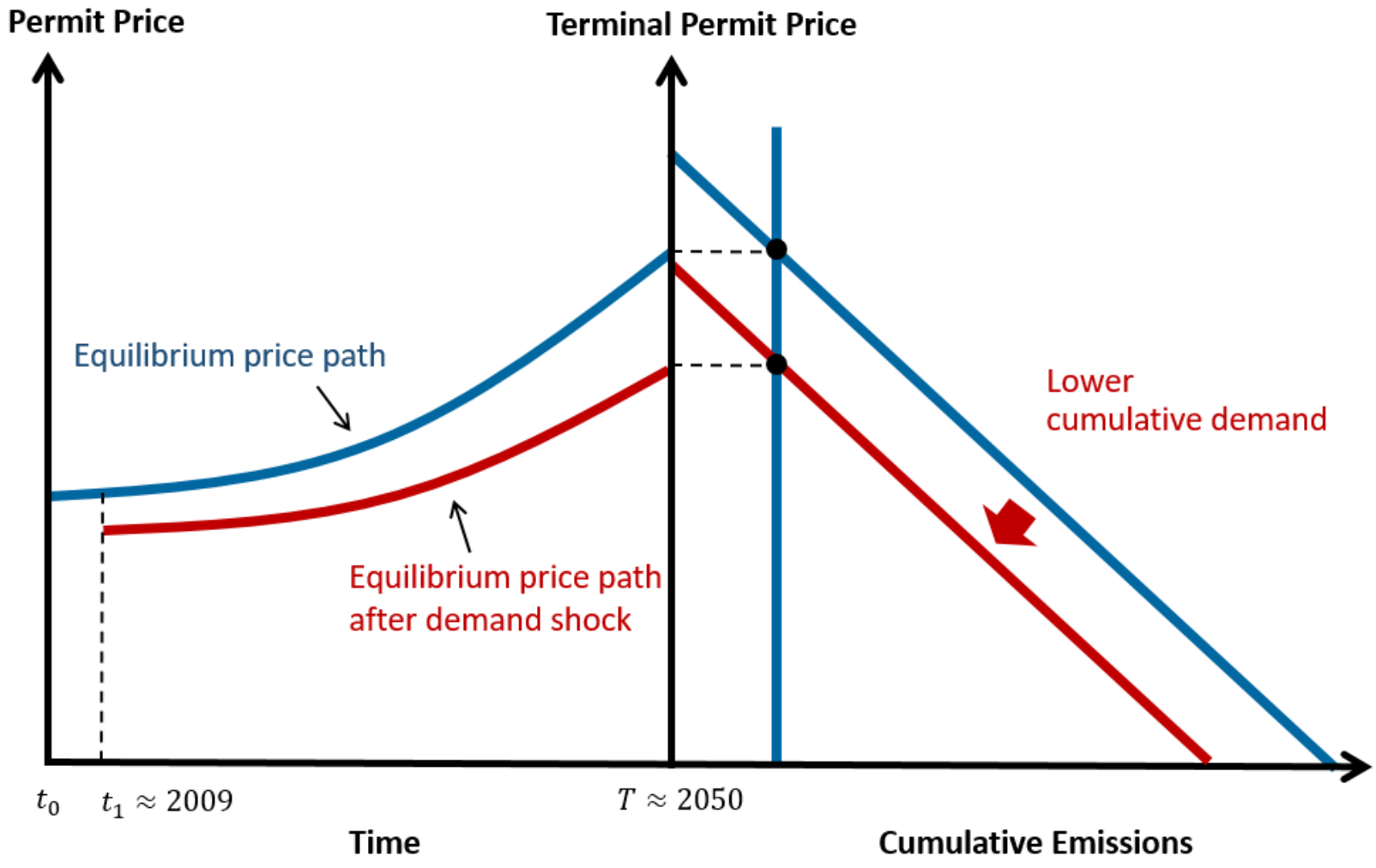


Speculative supply shock



Myopia

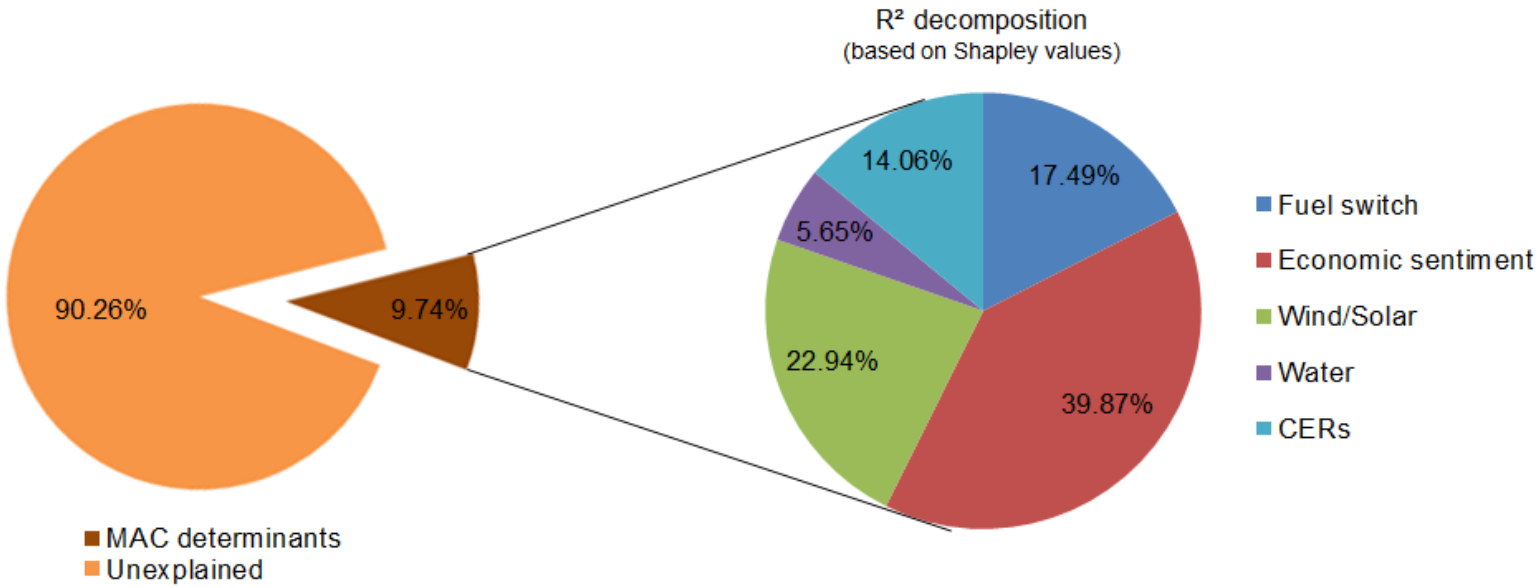
I Demand shock



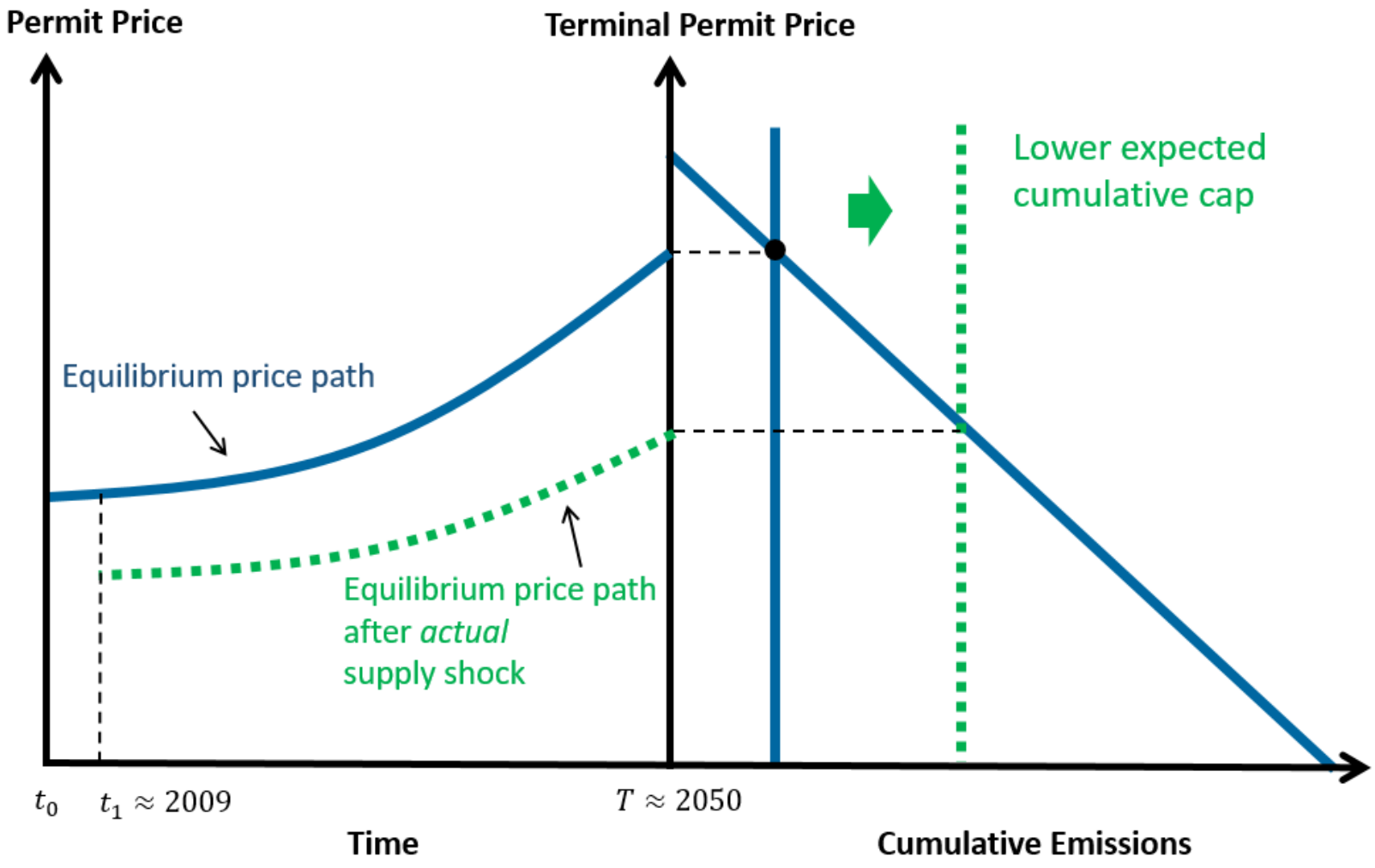
The cap is unchanged, but BAU emissions are reduced.

Empirical evidence: demand shock

- Consensus that carbon prices are driven to *certain extent* by market fundamentals related to abatement cost *(Alberola et al. 2008, Hintermann 2010)*
- But: EUA price dynamics cannot be solely explained by demand-side fundamentals *(Koch et al. 2014)*

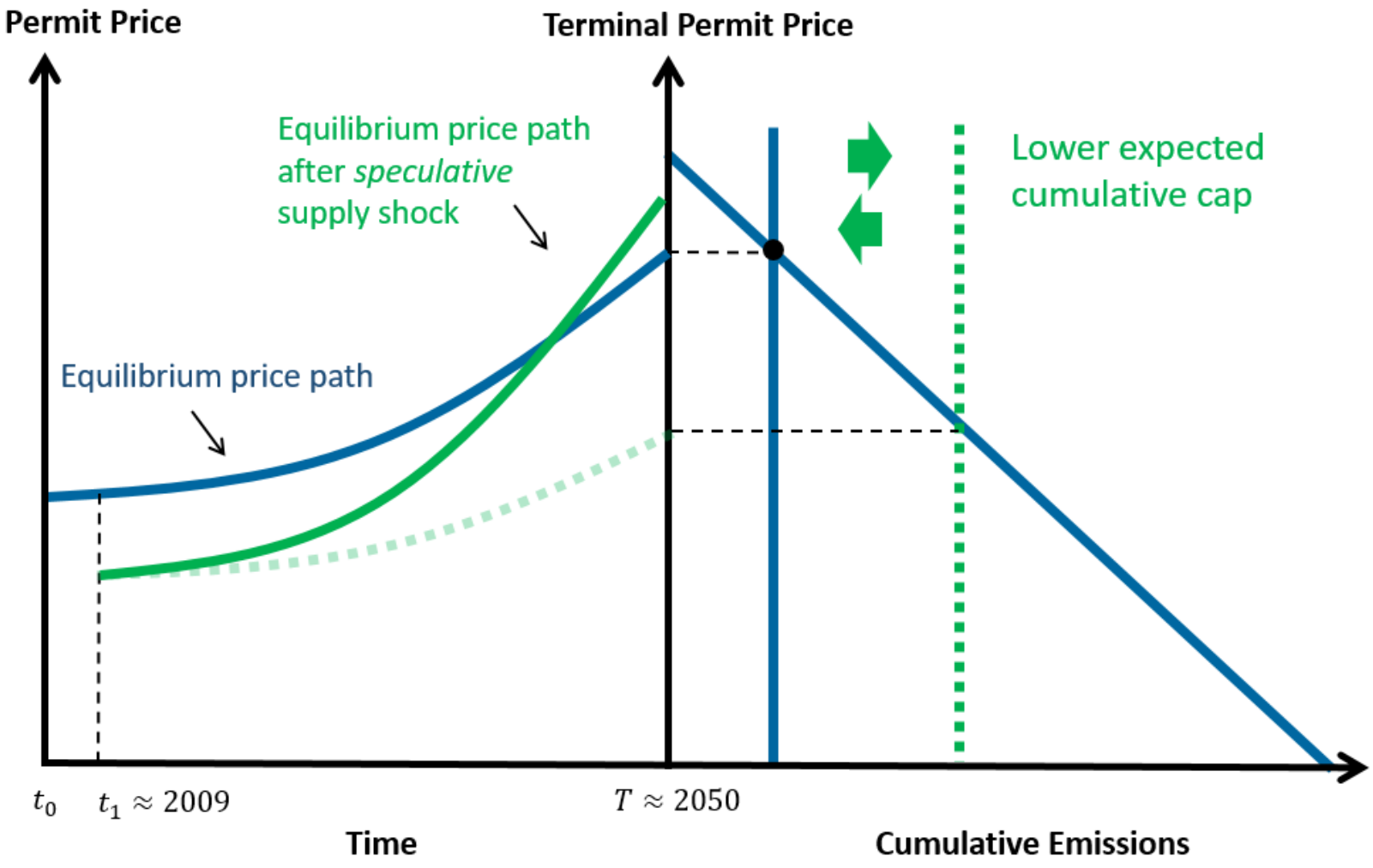


II Supply shock (real)



Market actors anticipate that governments will eventually relax the cap. Indeed, they do.

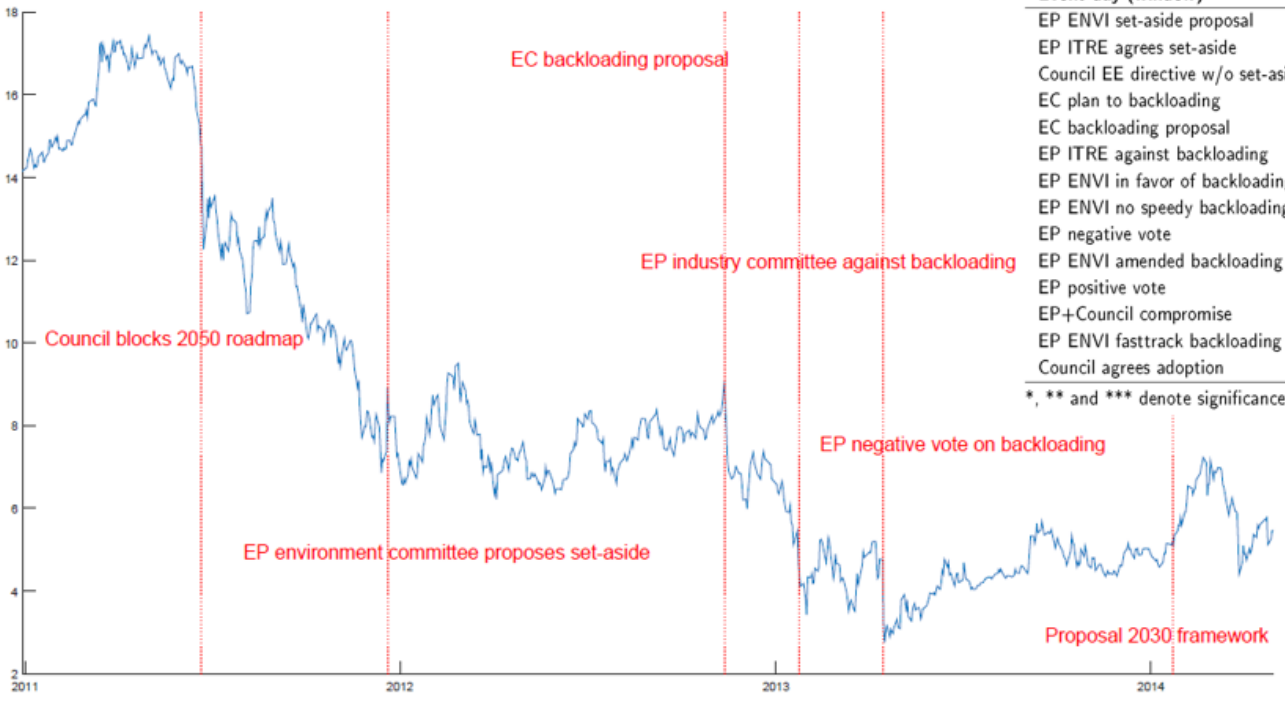
II Supply shock (speculation)



Market actors anticipate that governments will eventually relax the cap. But they stay strict.

Empirical evidence: speculative supply shock

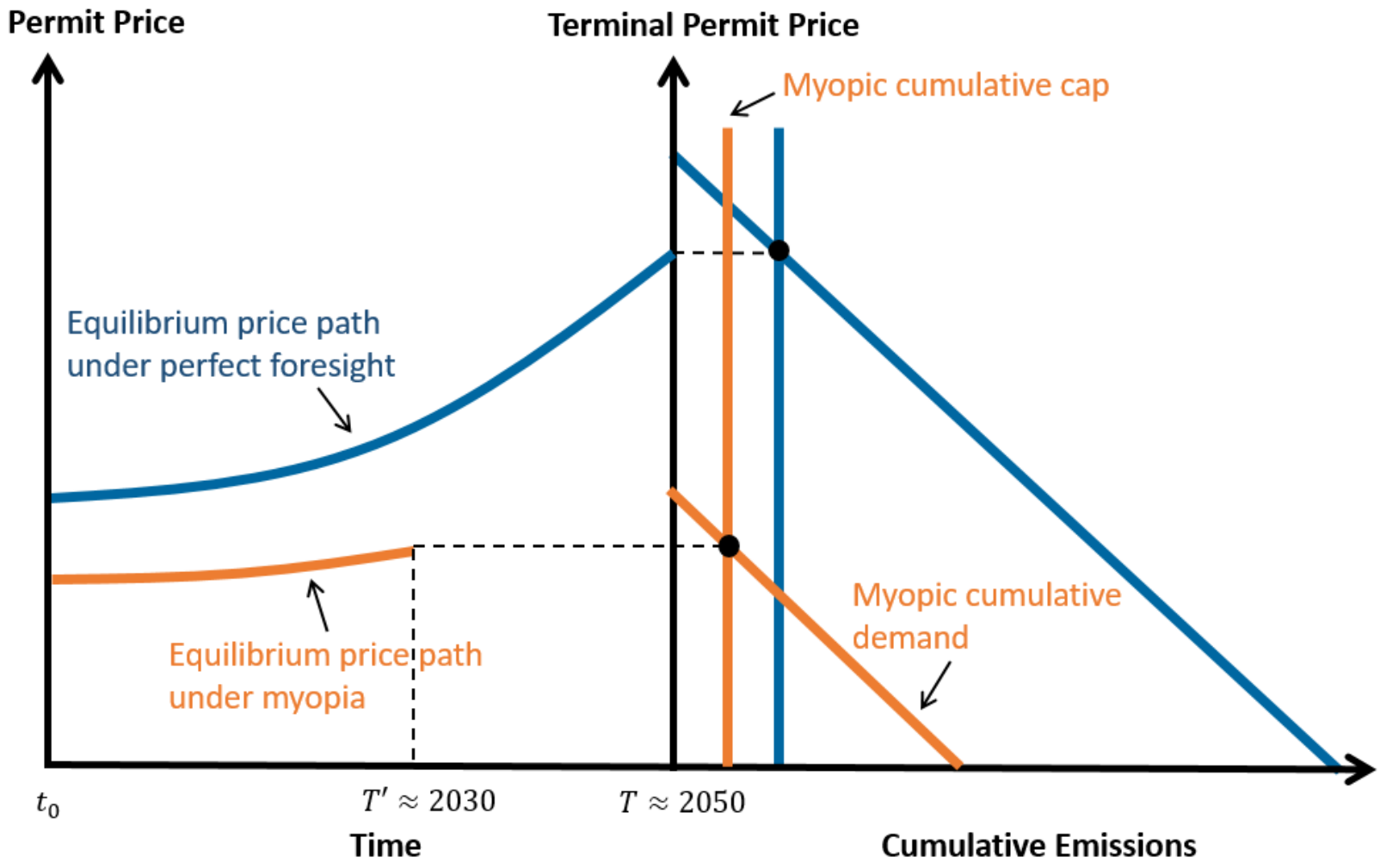
- Degree of commitment enshrined in policy program is a central force of price formation *(Koch et al. 2016)*
  - Release of supply-side news caused substantial price declines
    1. Policy process signaled (i) overall political support for EU ETS + (ii) challenges to implement any reform
    2. Event-induced price falls reflect downward adjustment of expectations about cap stringency



Event day (window)	-3;-1	0	+1;+3	-3;+3
EP ENVI set-aside proposal	4.22%	17.97%***	0.48%	22.67%***
EP ITRE agrees set-aside	3.60%	-5.43%**	2.32%	0.50%
Council EE directive w/o set-aside	0.16%	1.44%	7.08%	8.68%
EC plan to backloading	2.80%	-4.70%***	0.92%	-0.98%
EC backloading proposal	-1.14%	8.19%***	-30.27%***	-23.21%***
EP ITRE against backloading	-19.20%***	-5.79%***	-5.45%***	-30.43%***
EP ENVI in favor of backloading	13.01%***	-10.36%***	8.88%***	11.53%*
EP ENVI no speedy backloading	8.88%***	-13.35***	-0.20%	-4.67%
EP negative vote	7.48%**	-42.96%***	4.47%	-31.02%***
EP ENVI amended backloading	13.36%***	-6.24***	-3.98%**	3.14%
EP positive vote	-4.12%**	4.42%***	-9.58%***	-9.28%**
EP+Council compromise	-5.56%***	-2.16%***	4.37%***	-3.34%
EP ENVI fasttrack backloading	1.11%	3.37%***	-1.57%	2.91%
Council agrees adoption	4.50%	-3.20%***	-10.78%***	-9.49%

*, ** and *** denote significance at 10%, 5%, and 1%, respectively

III Myopia



Market participants take a 2030 perspective, ignoring the tight reductions needed afterwards.

Empirical evidence: myopia

- No comprehensive analysis available
- Futures trading activity as proxy for foresight
  - EUA futures contract maturity ranges until 2020 at ICE
  - Electricity futures with maturity 2021 traded at EEX
  - Transaction volume decreases rapidly within nearest contracts
- Hedging activity of power companies suggest 5-6 years foresight

In a nutshell

The EU ETS

1. experienced a persistent price fall
2. showed a high responsiveness to political events
3. seems to suffer from mutually-reinforcing distortions: credibility problem + myopic behavior

Key thread

- Very low ETS prices for several years (possibly decades)
- Lock into carbon-intensive infrastructure
- 'Hockey stick' ETS price curve with significant higher societal costs in the long-term $\rightarrow$ politically tenable?

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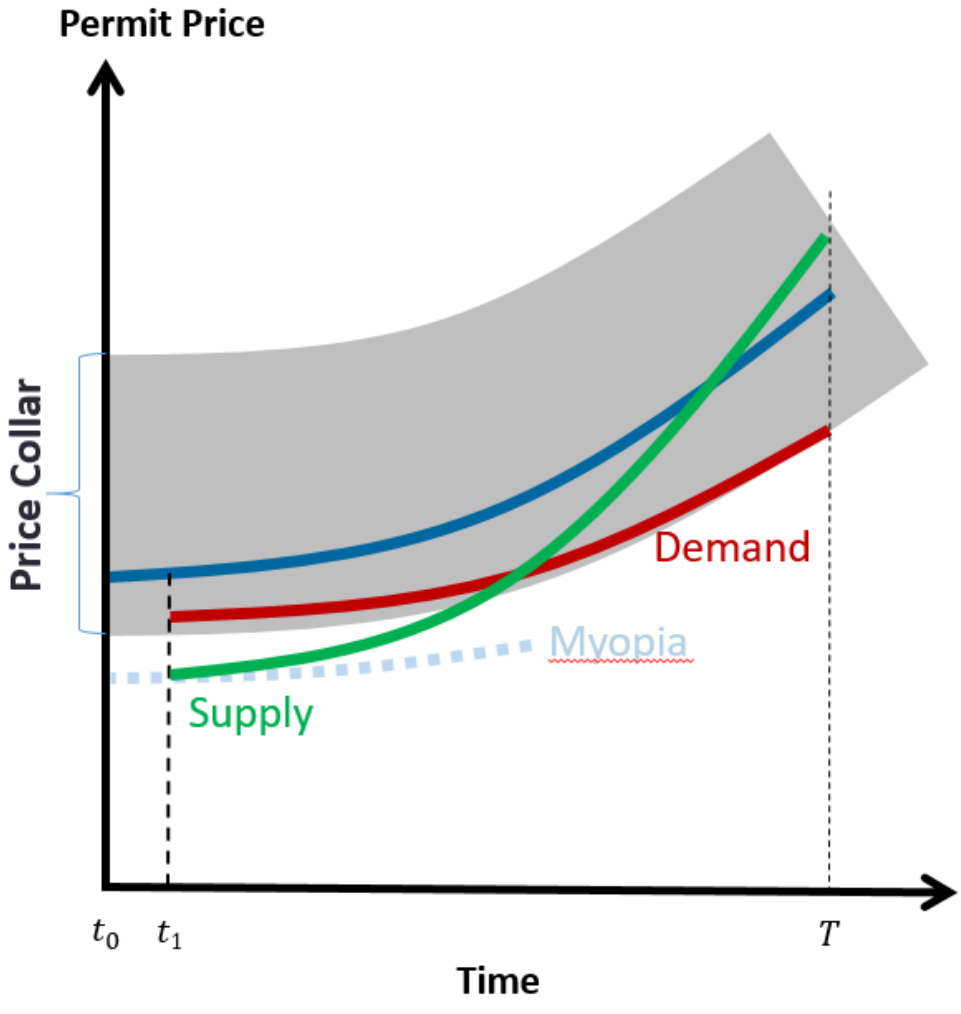
The Way Forward

One Price Collar to Address Them All?



For more information

- Koch / Grosjean / Fuss / Edenhofer (2016): Politics matters: Regulatory events as catalysts for price formation under cap-and-trade, *Journal of Environmental Economics and Management, 78, 121-139*.
- Koch / Fuss / Grosjean / Edenhofer (2014): Causes of the EU ETS price drop: Recession, CDM, renewable policies or a bit of everything?—New evidence, *Energy Policy*, 73, 676-685.
- Hintermann / Peterson / Rickels (2016): Price and Market Behavior in Phase II of the EU ETS: A Review of the Literature, *Review of Environmental Economics and Policy*, 10, 108-128.
- Fuss / Flachsland / Koch / Kornek / Knopf / Edenhofer (2017): An assessment framework for intertemporal economic performance of cap-and-trade systems: lessons from the EU-ETS, *Review of Environmental Economics and Policy*, accepted.

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Thank you!

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