

Estimating cost of Emissions Trading Scheme permits for use in calculating Effective Carbon Rates

Presenter:

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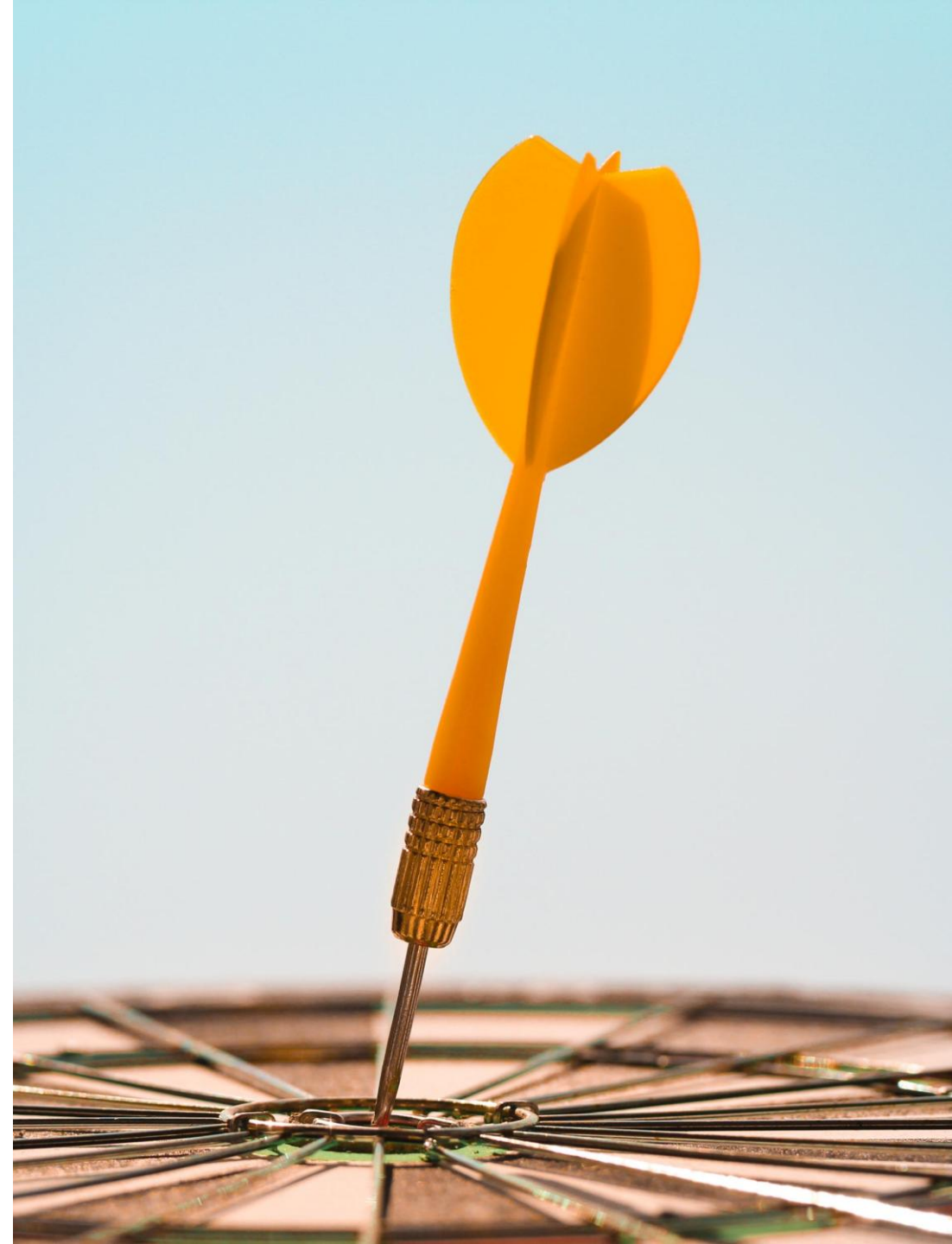


With funding from **eurostat** 



Background and objectives

- Part of a Eurostat grants project from 2024 by Statistics Sweden
- Objectives:
 1. Improve and update measurement methods for Effective Carbon Rates (ECR)
 - Focus on including costs from the EU ETS
 2. Analyse methods and data sources for measuring ETS secondary market



Effective Carbon Rates (ECR)

- Carbon pricing metric
- Cost of fossil fuel use per unit of CO₂ emitted

$$ECR = \text{Total taxes} / \text{Emissions (CO}_2\text{)}$$

$$\text{Total taxes} = \text{Energy tax} + \text{Carbon tax} + \text{ETS payment}$$

- Calculated by economic activity (NACE) and fuel type
- Reported to Eurostat in *Potential Environmentally Damaging Subsidies* (PEDS)
- Data sources:
 - Environmental Taxes by Economic Activity (ETEA)
 - Air Emissions Account (AEA)

Costs from ETS

- Calculating costs from emission permit purchases by industries covered by the EU emission trading system (EU ETS)
- Challenges:
 - Free allocation of permits
 - Government auction revenue $\neq$ domestic company costs
 - Government share of auctioned allowances is predefined and auctions are EU-wide
 - Swedish firms can purchase permits from foreign firms on secondary market
 - When should the cost be registered?
 - Surrender of emission permits occur the year after emission

Costs from ETS: Revised method

- New method measures only the cost of allowances that companies must purchase
 - i.e. deducting free allowances
 - Installation level-data from the Swedish EPA
- Only companies with a “ETS deficit” need to purchase permits
- Permit (EUA) price is average auction price

$$ETS\ deficit_{NACE,y} = \sum (Verified\ emissions_{i,y} - Free\ allocation_{i,y})$$

where: $Verified\ emissions_{i,y} > Free\ allocation_{i,y}$

$$ETS\ payments = ETS\ deficit\ (tCO_2e) \times EUA\ price\ (SEK/tCO_2e)$$

Costs from ETS: Before & after

Figure 1: ETS payments, 2016–2023

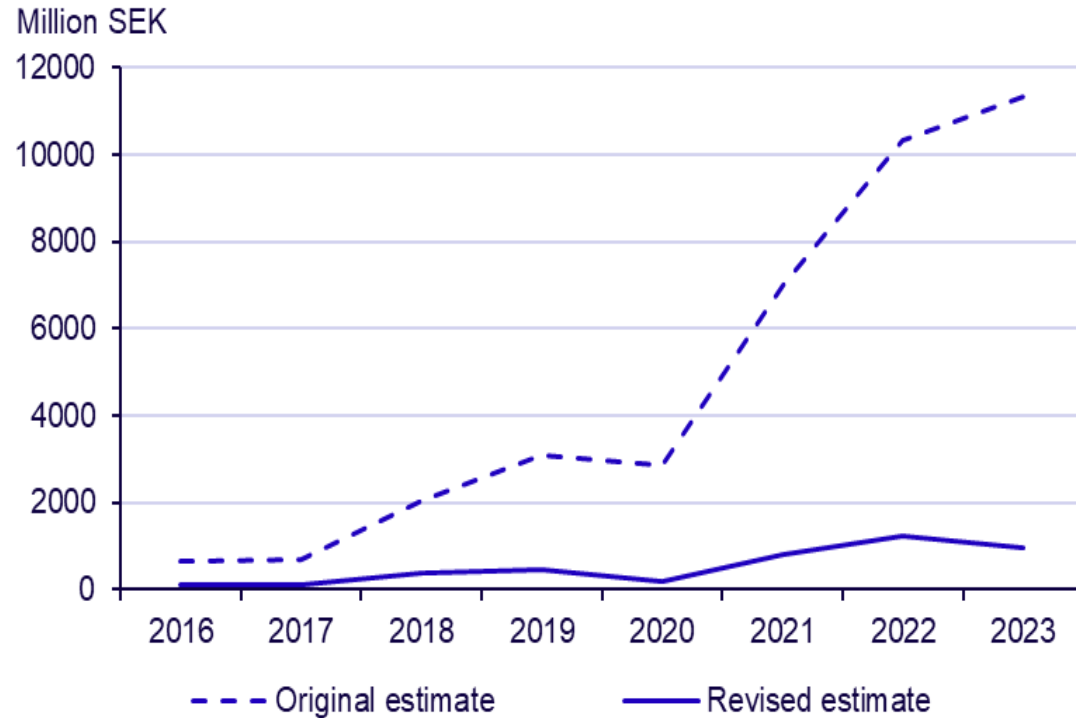
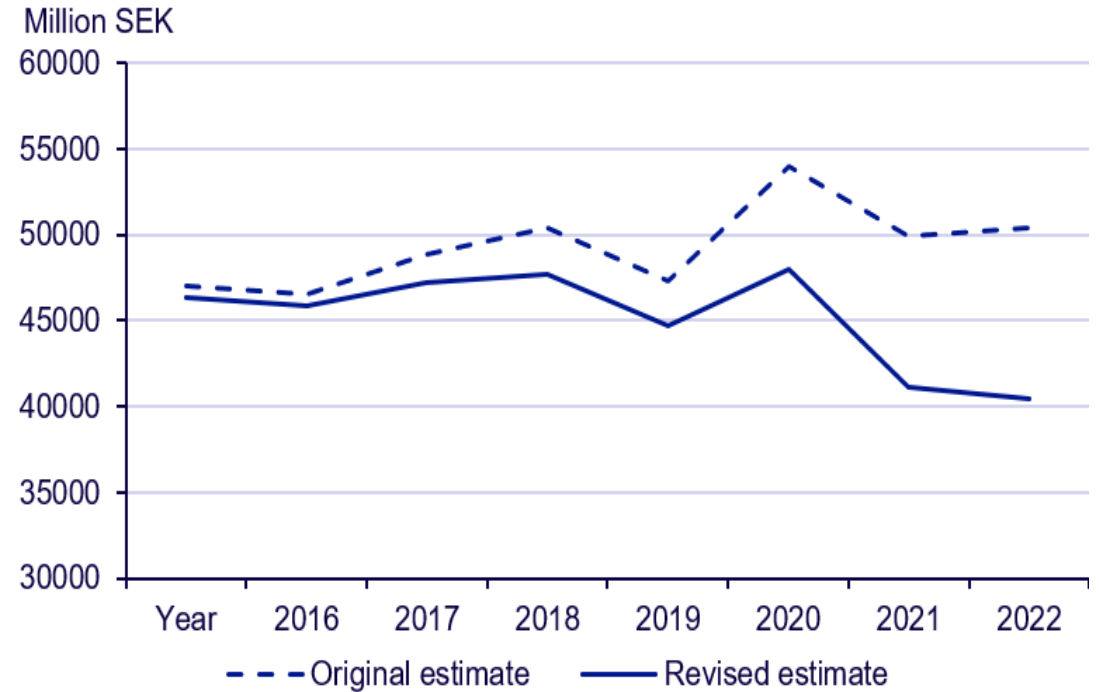


Figure 2: Total taxes on fossil fuel combustion, 2016–2023



Costs from ETS: Consistency with national accounts

- According to SNA and ESA2010:
 - ETS permits as pre-paid tax up until surrender
- Practical implementation under ESA2010:
 - Date of surrendering permits as proxy for accrual date
 - April 30th each year (year after emissions)
 - Value should be based on the value at issuance
 - May 1st (t-1) to April 30th (t).
 - Conclusion:
 - $Taxes\ fossil\ fuel\ combustion_t = fossil\ fuel\ taxes_t + ETS\ payments_{t-1}$
 - Use avg. auction price between May 1st (t-1) to April 30th (t).

ETS - Secondary market

- How to incorporate Secondary market data?
- Primary market = bought at government auction
- Secondary market = trade between corporations



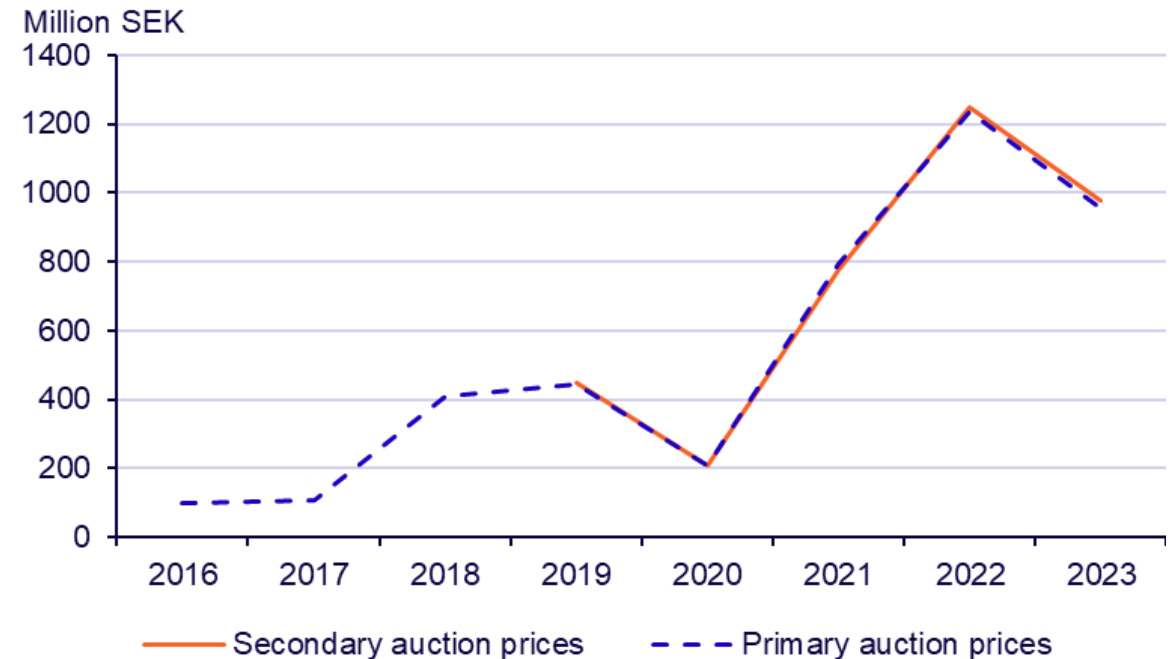
ETS - Secondary market

- Used Union Registry transaction data (2005-2022) to identify:
 - Primary market purchases
 - Secondary market purchases
 - Secondary market sales
- Plan:
 - Calculate net secondary purchases by subtracting sales from purchases.
 - Weighted average EUA price based on share bought on primary- and secondary market.
- Main challenges:
 - Tracing allowances from auction to final user
 - Specific permits are not identifiable
 - Transactions pass through intermediaries and also within companies.,

ETS - Secondary market

- Main findings:
 - Almost all Swedish companies buy in the secondary market
 - Data limitation prevent full tracking of allowance flows
 - Small difference in primary and secondary market prices
- Conclusion:
 - Limited usability of Union registry
 - Weighted average model of little use
 - Use of secondary market average prices

Figure 3: ETS payments, primary and secondary market, 2016-2023



Key takeaway

- Recommendation:
 - More accurate estimates of ETS costs by deducting free allowances & calculating installation level deficits.
 - Consider balance between primary and secondary market purchases
 - Alignment with national accounts
- Limitations/challenges:
 - Difficult to track permit trades and exact prices
 - Difficulty mapping to fuel-specific emissions



Thank you!

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