

Oversight of Carbon Markets



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Overview

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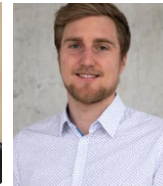
Reto
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Christian
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Patrick
Ludwig

Methods:

Experiments (field & laboratory)
Empirical (machine learning, econometrics)
Modelling and economic theory

Climate

Policy instrument design and evaluation
Emissions trading systems, Carbon taxes

Teaching/Continuing Education:

- CAS in Climate Strategies
- Elective: Climate and Energy Economics

Current research:

- SNIS: Effective and efficient carbon markets
- German Emissions Trading Authority: Market regulation
- DIZH Fellowship: Carbon Market Toolkit: Building trust and transparency for a net-zero emissions world
- Swedish Energy Agency: CER Ownership analysis

Energy

Electricity market design energy security, grid, flexibility
Renewable policies, Energy Efficiency policies

Teaching/Continuing Education:

- Elective: Energy Economics

Current research:

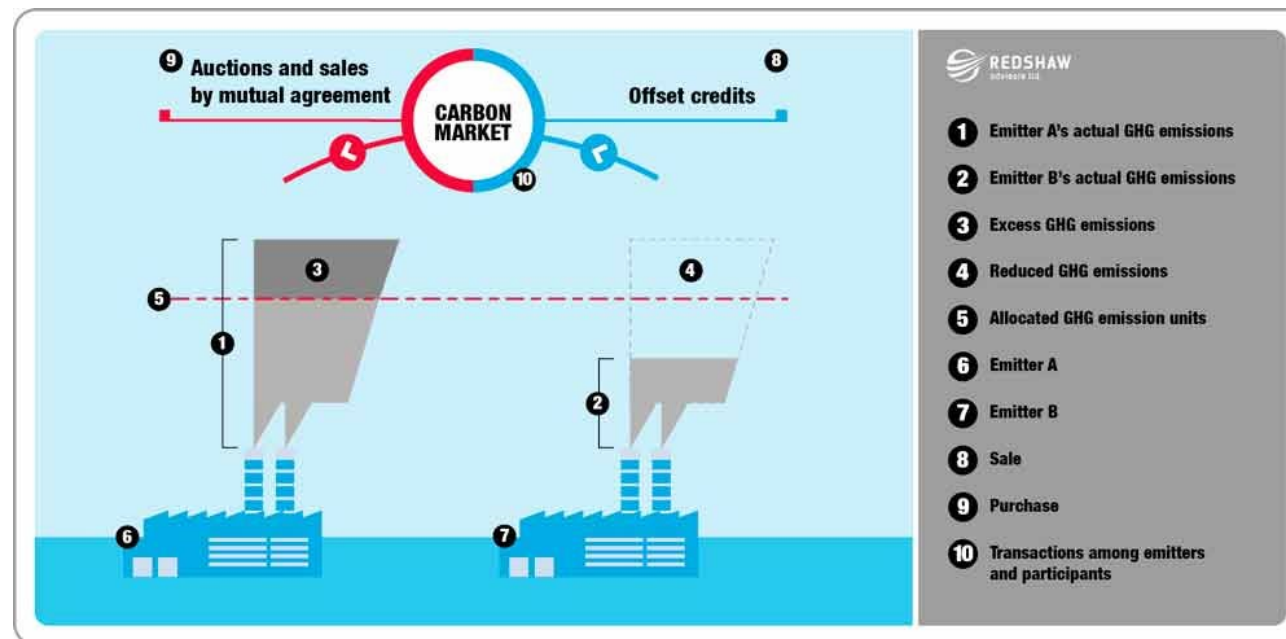
- Innosuisse: SCCER CREST (just ending)
- Swiss Federal Office of Energy: SWEET PATHFINDER
- Swiss Federal Office of Energy: NETLFEX
- BKW Foundation: Ready4Sustainability
- SNF Spark: Machine Learning for Demand Response
- H2020: Social Innovation in Energy transition (SONNET)

Claim

Carbon markets are **designer markets**, designed by regulators, therefore oversight by regulators is a must!

The traded units are **invisible**, therefore harder to control!

Trust in carbon markets is crucial and will require strong oversight!



Risks which need oversight

1. Environmental Risks

Monitoring, Reporting and Verification



2. Market Risks

1. Price Manipulation
2. Insider trading
3. Algorithm trading
4. Allowance Theft



3. Risks with regard to linked markets

1. Value Added Tax (VAT) Fraud
2. Money Laundering
3. Tax evasion

1. Environmental Risks: if a reported tonne of CO₂e does not equal a real tonne...

Methan

Löcher in der Leitung

Aus deutschen Industrieanlagen tritt klimaschädliches Methangas aus. Die Behörden ignorieren das Problem.

Von **Susanne Götze** und **Annika Joeres**

23. Juni 2021, 16:50 Uhr / Editiert am 27. Juni 2021, 15:43 Uhr / DIE ZEIT
Nr. 26/2021, 24. Juni 2021 / [121 Kommentare](#) / [🔒](#)

Municipal govt confirms company caught falsifying China ETS data

The municipal government of Wuhai city in Inner Mongolia on Friday released documentation showing that provincial authorities have issued administrative punishment to a company for falsifying data related to its CO2 allocation under China's national emissions trading scheme.



SWI swissinfo.ch Unreported Lonza emissions have 'negative impact' on climate objectives

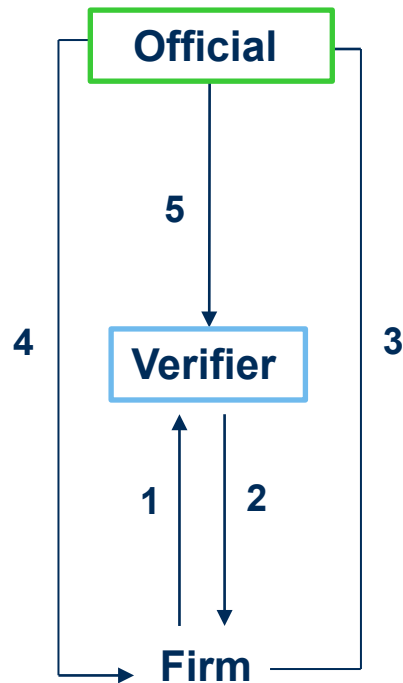
Reconciling reported and unreported HFC emissions with atmospheric observations

Mark F. Lunt, Matthew Rigby, Anita L. Ganesan, Alistair J. Manning, Ronald G. Prinn,  Simon ...

[+ See all authors and affiliations](#)

Monitoring, reporting and verification process

In environmental regulation, firms are required to report their emissions to the administrative body/officials (3 and 4)



To enhance truthful reporting, an overlapping system of emissions monitoring is applied:

- A third-party verifier is required by the official (1 and 2)
- The official carries out additional random checks (5)

BUT: The overlapping monitoring system may be problematic

- The verifier is selected and paid by the polluting firm.
- Repeated interaction or even long-term relationships between verifiers and firms which helps to build up trust that can lead to corruption and the exchange of bribes
- Competition among verifiers
- The official's random check is underspecified in almost all schemes and incentive to detect underreporting may be low.

Rotation of both verifiers and regulators improves truthful reporting significantly compared to the baseline

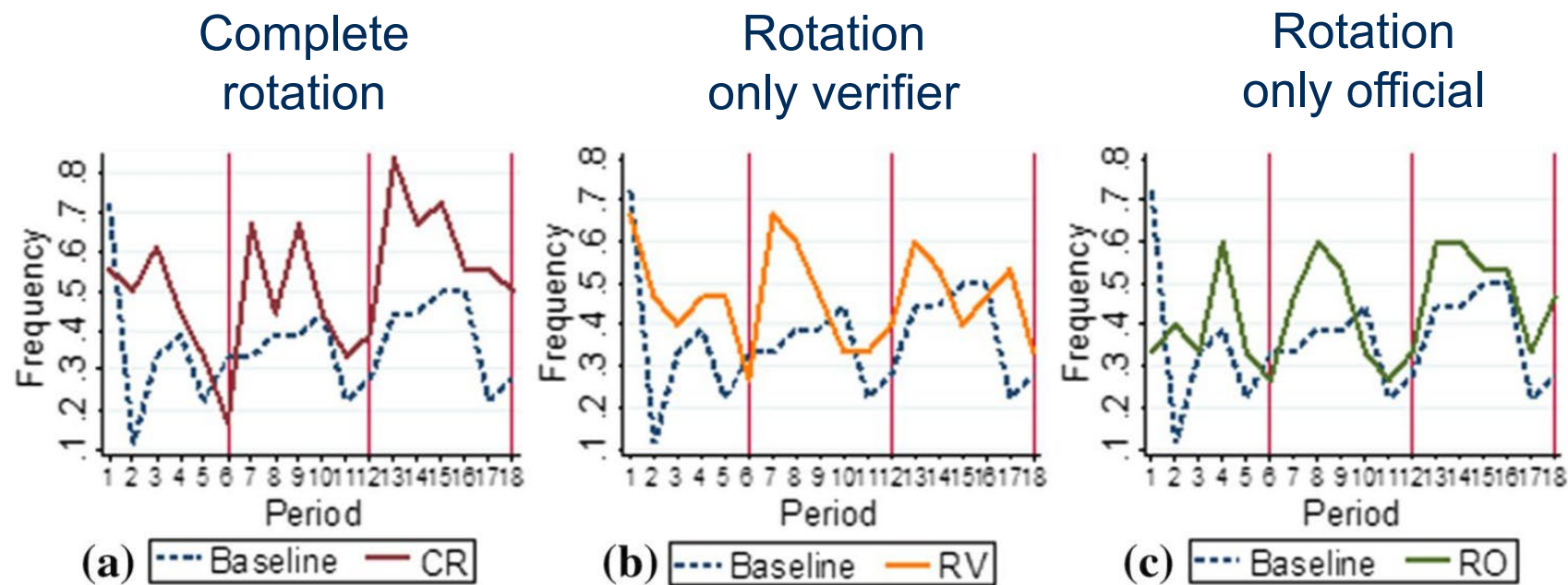


Fig. 3 Frequency of truthful reporting over time. *Note:* The vertical lines indicate the three different parts featured in each treatment

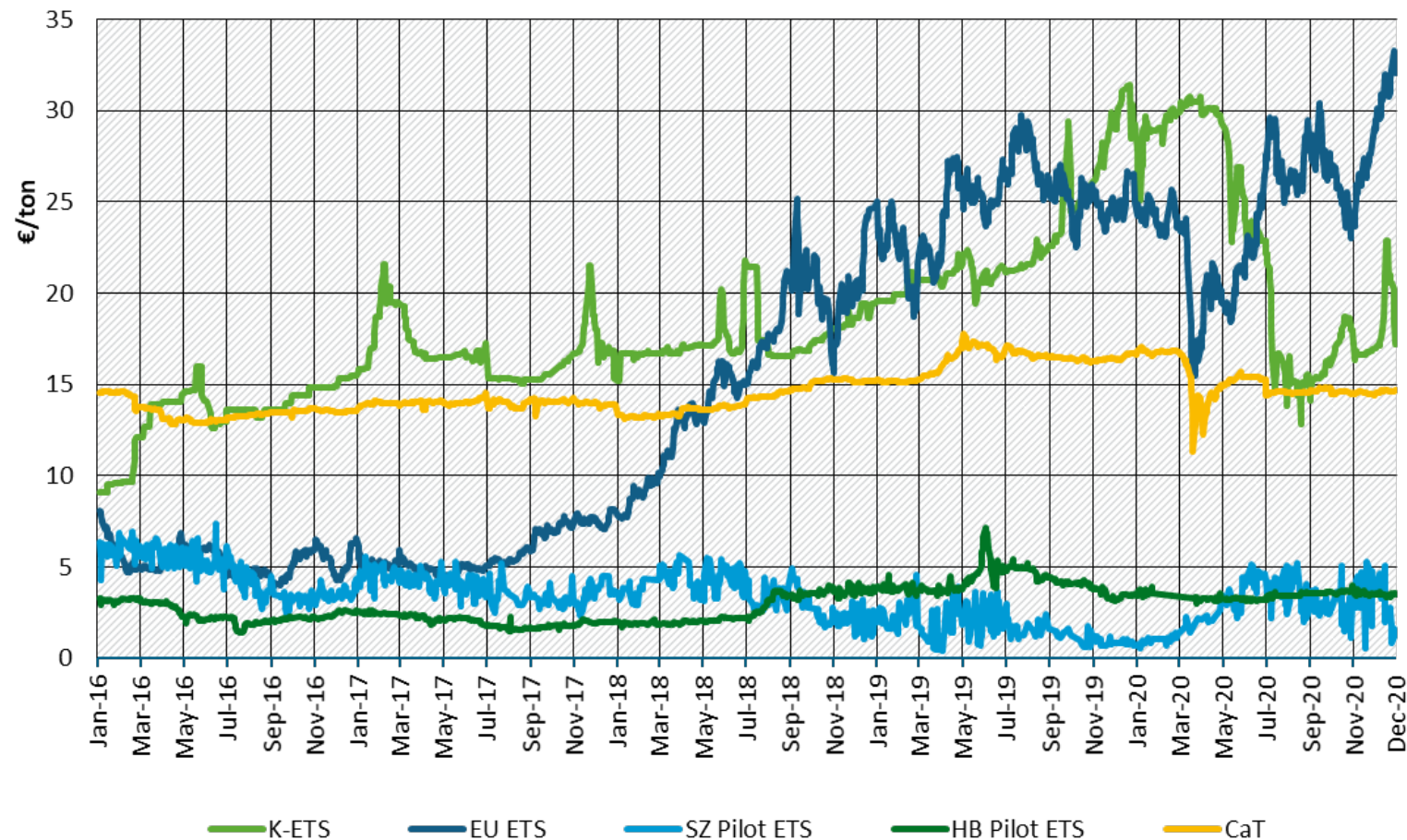
- Complete rotation would reduce the probability of untruthful reporting by 23.7% and also reduces the level of under-reporting
- Being checked by an official in the preceding period has a highly significant, negative effect
- It is difficult to incentivize officials as they are not monitored by anybody else.

2. Market risks: What drives price developments?



Figure 2. Allowance price developments across systems during 2016 – 2020

Secondary market settlement prices, converted to euros using average quarterly exchange rates^[1]



^[1] Data from: KRX 2021; EEX 2021; California Carbon 2021; and Sinocarbon. Exchange rates from IMF 2021.

Risk of price manipulation... trading beyond compliance?

- Theoretically **dominant firms** may have an incentive to manipulate permit prices up by holding allowances above compliance level
- Necessary conditions
 - Dominant in both markets: carbon and good market e.g. electricity
 - Free allocation up to a certain level
 - Pass-through of allowance price on good price
- Empirical analysis for electricity sector in 1st phase of EU ETS support that dominant firms (RWE 6 Vattenfall) are holding / banking permits above compliance

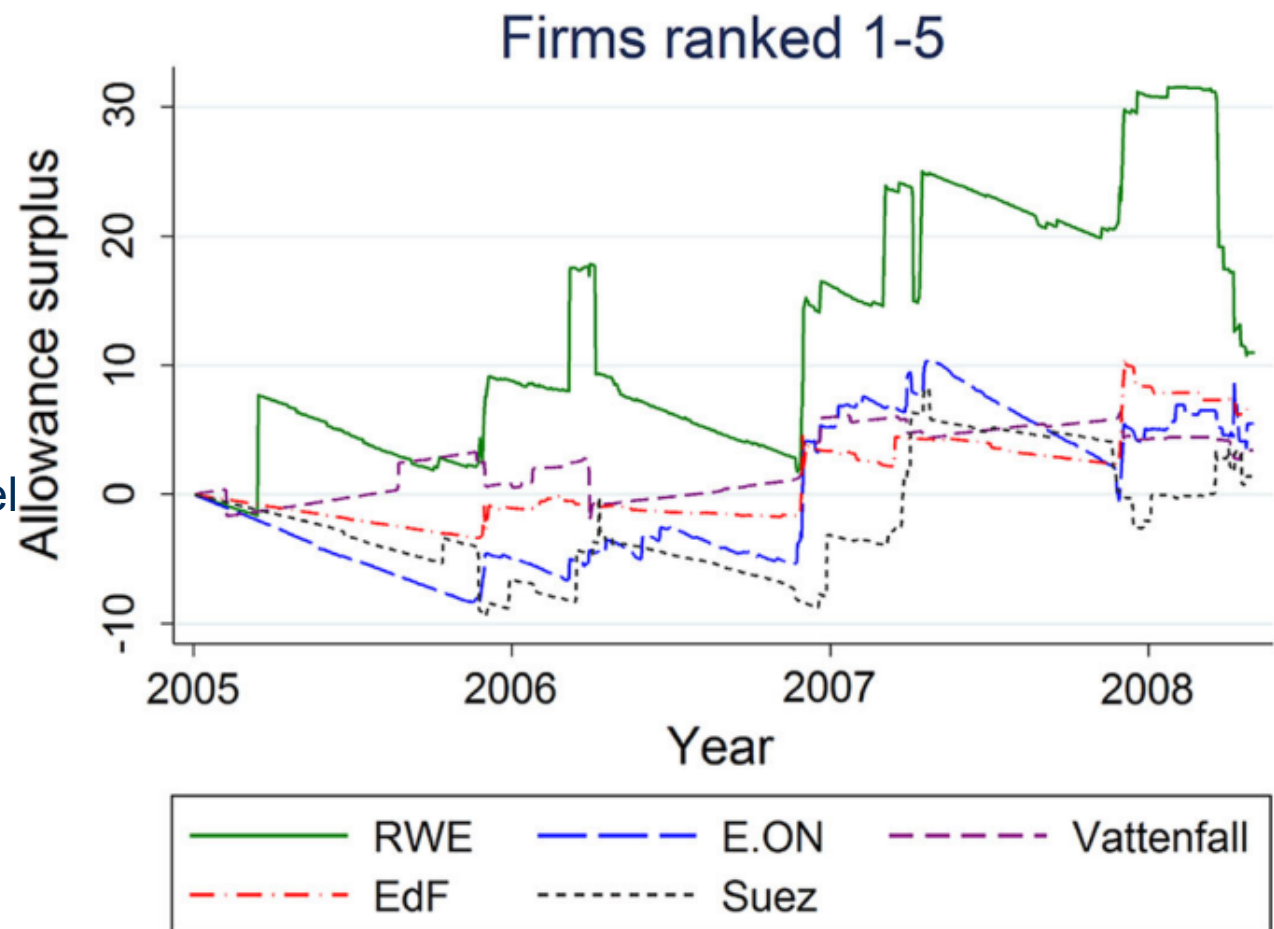


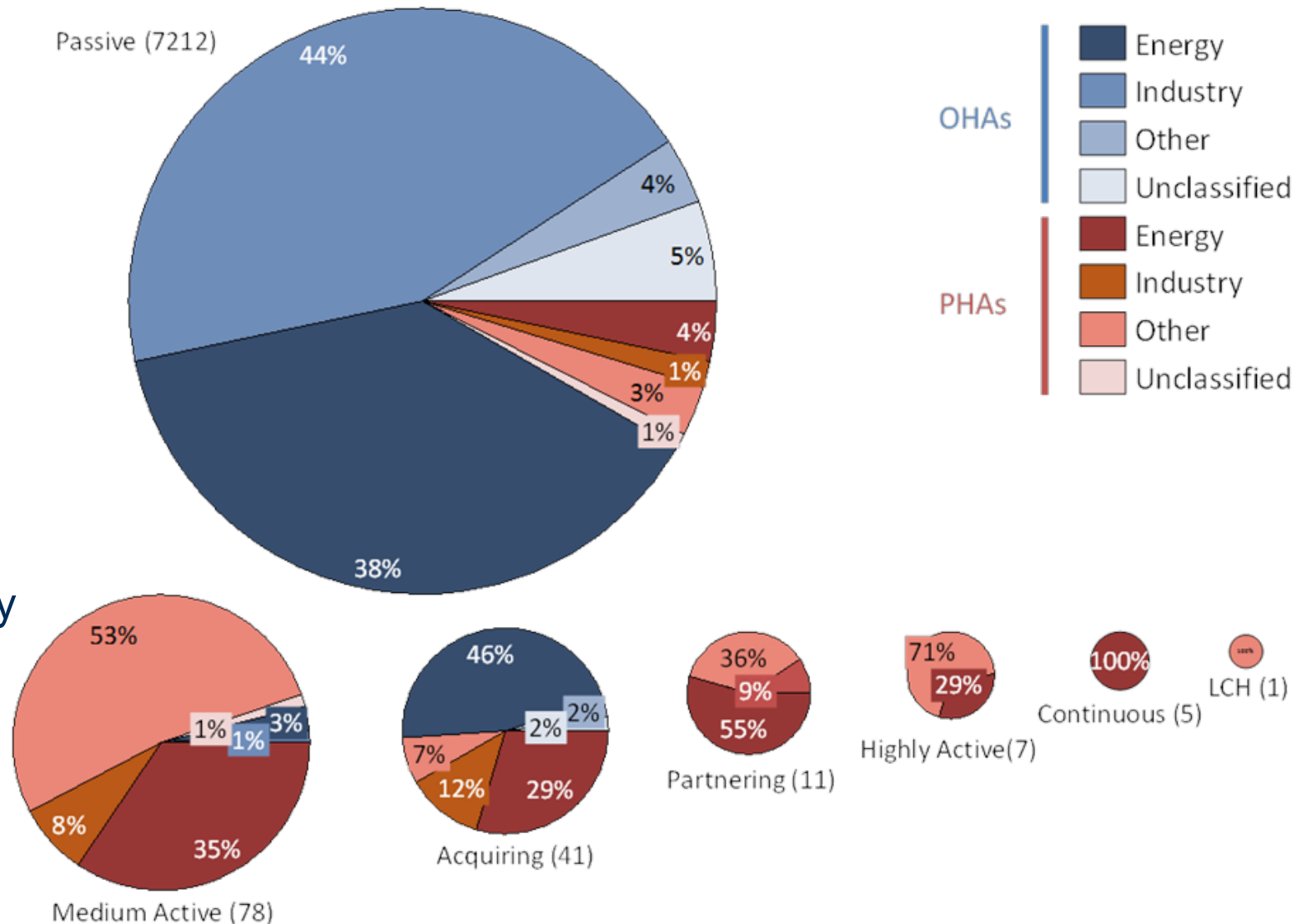
Fig. 2 Net allowance surplus in phase I

Hintermann, B. 2017. Market Power in Emission Permit Markets: Theory and Evidence from the EU ETS, *Environmental and Resource Economics*, 66, pp. 89–112

Who trades in carbon markets is important...

Cluster Analysis shows:

- Vast majority passive (mainly regulated companies)
- More active accounts dissimilar trading patterns
- These are mostly Personal Holding Accountss: partly of regulated firms (energy and industry), partly of financial industry (e.g. hedging partner)

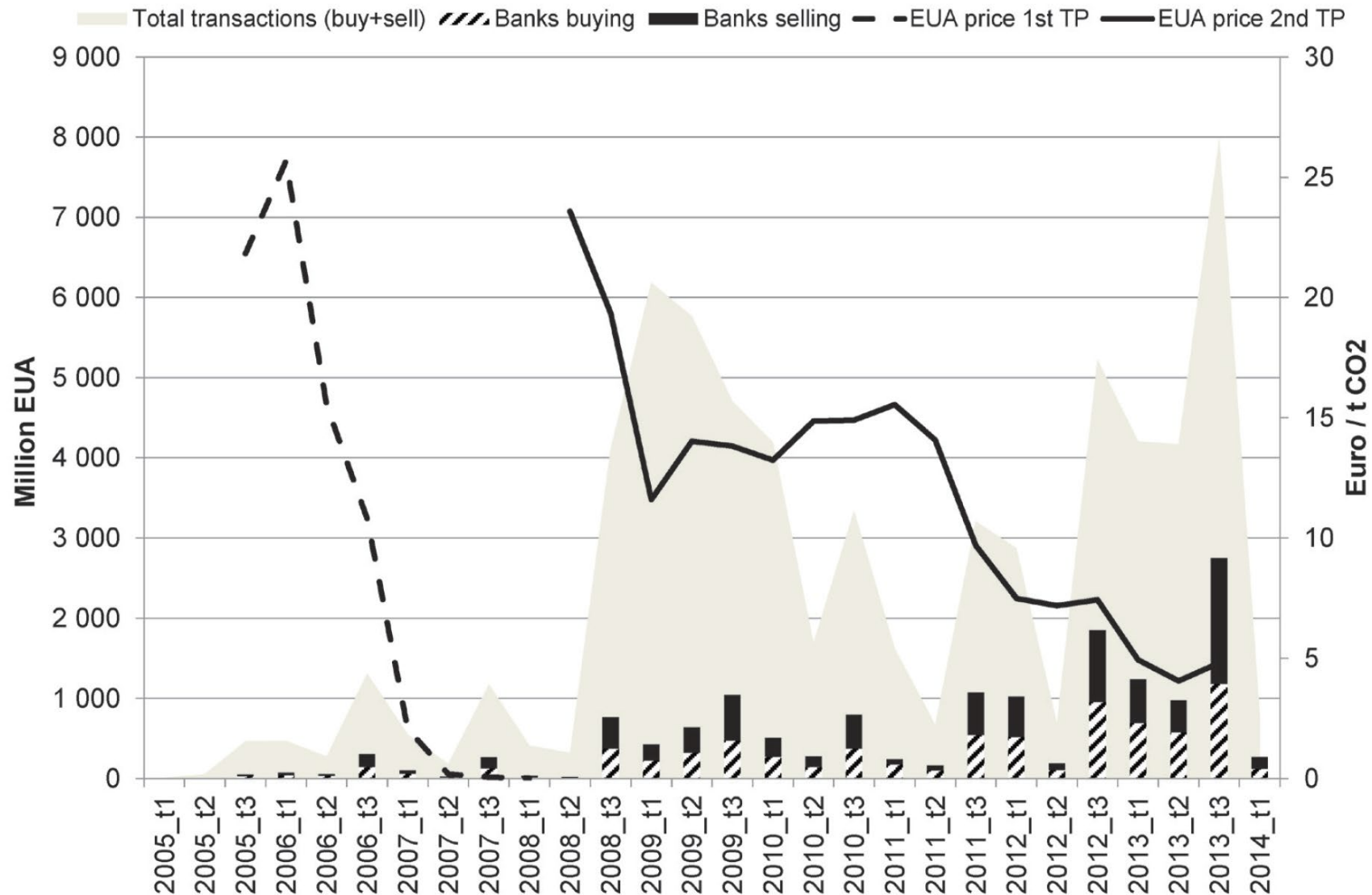


Note: LCH = London Clearing House

Betz and Schmidt 2016, Transfer patterns in Phase I of the European Union Emissions Trading System: A first reality check based on cluster analysis, *Climate Policy*, 16:4, pp. 474-495

What role did banks play in the EU ETS?

Figure 1: EUA transactions and the involvement of banks



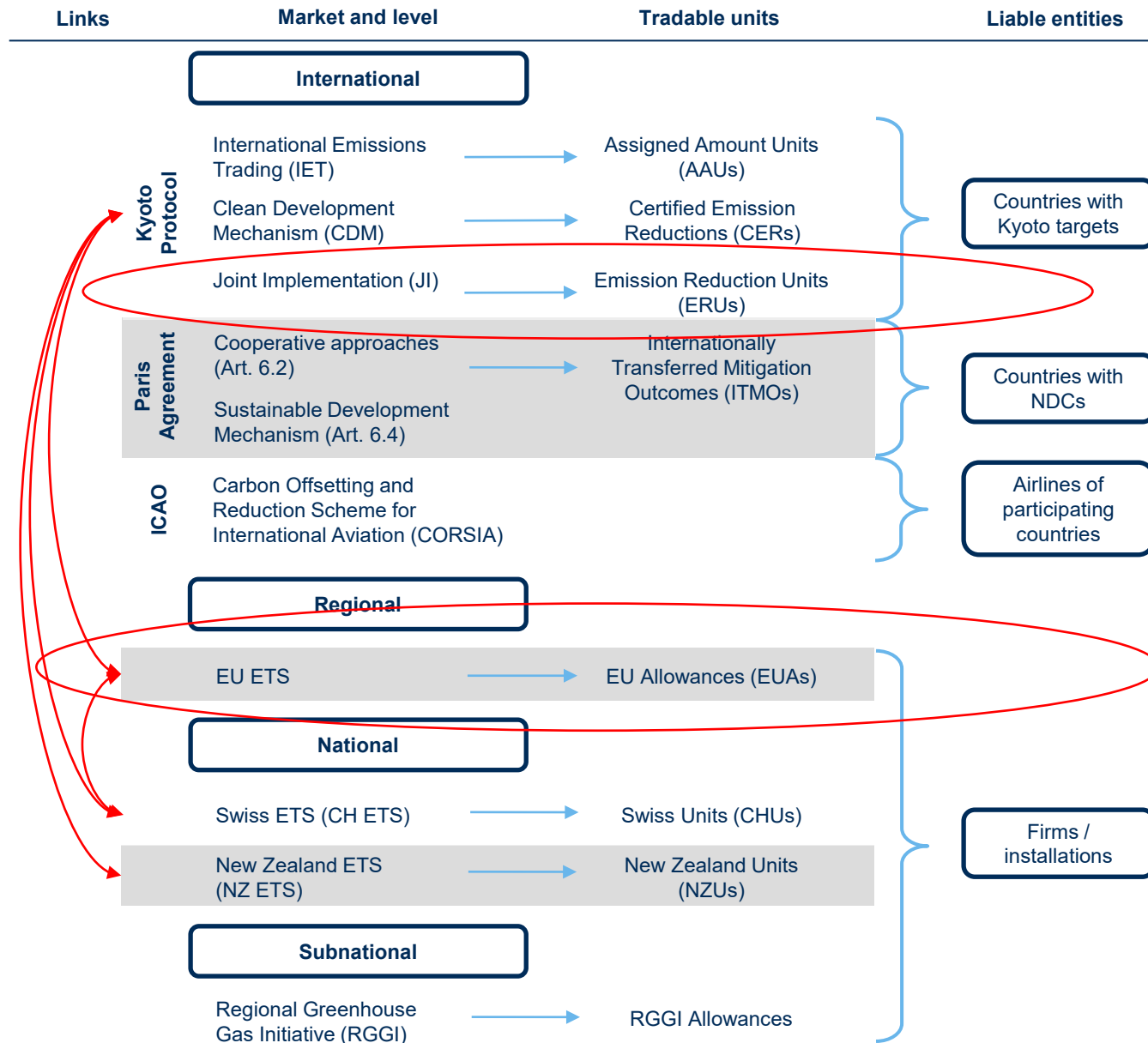
Role of banks:

1. Intermediary
2. Hedging
countparty
3. Aggregator
4. Market maker
5. Speculator
and
Arbitrageur
6. Service
provider
7. Market
Analyst

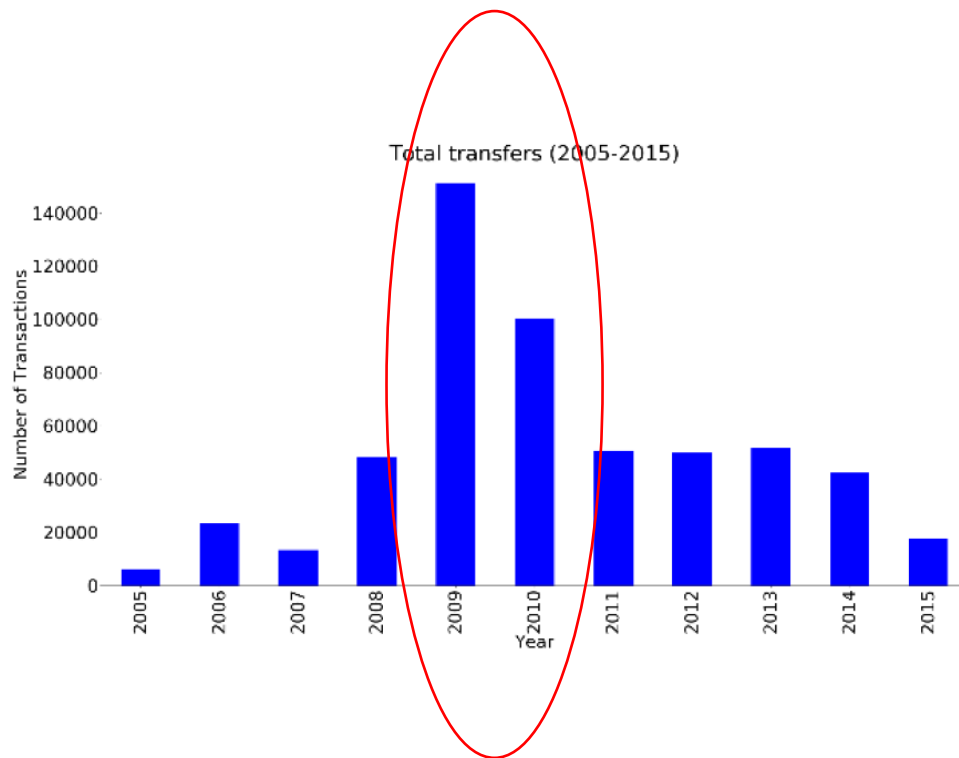
Source: EUTL, Point Carbon, EEX, ICE, own calculation and illustration

Source: Cludius, J. & Betz, R. The role of Banks in emissions trading, The Energy Journal, 41/2, pp. 275-299. ¹¹

3. Risks in linked markets



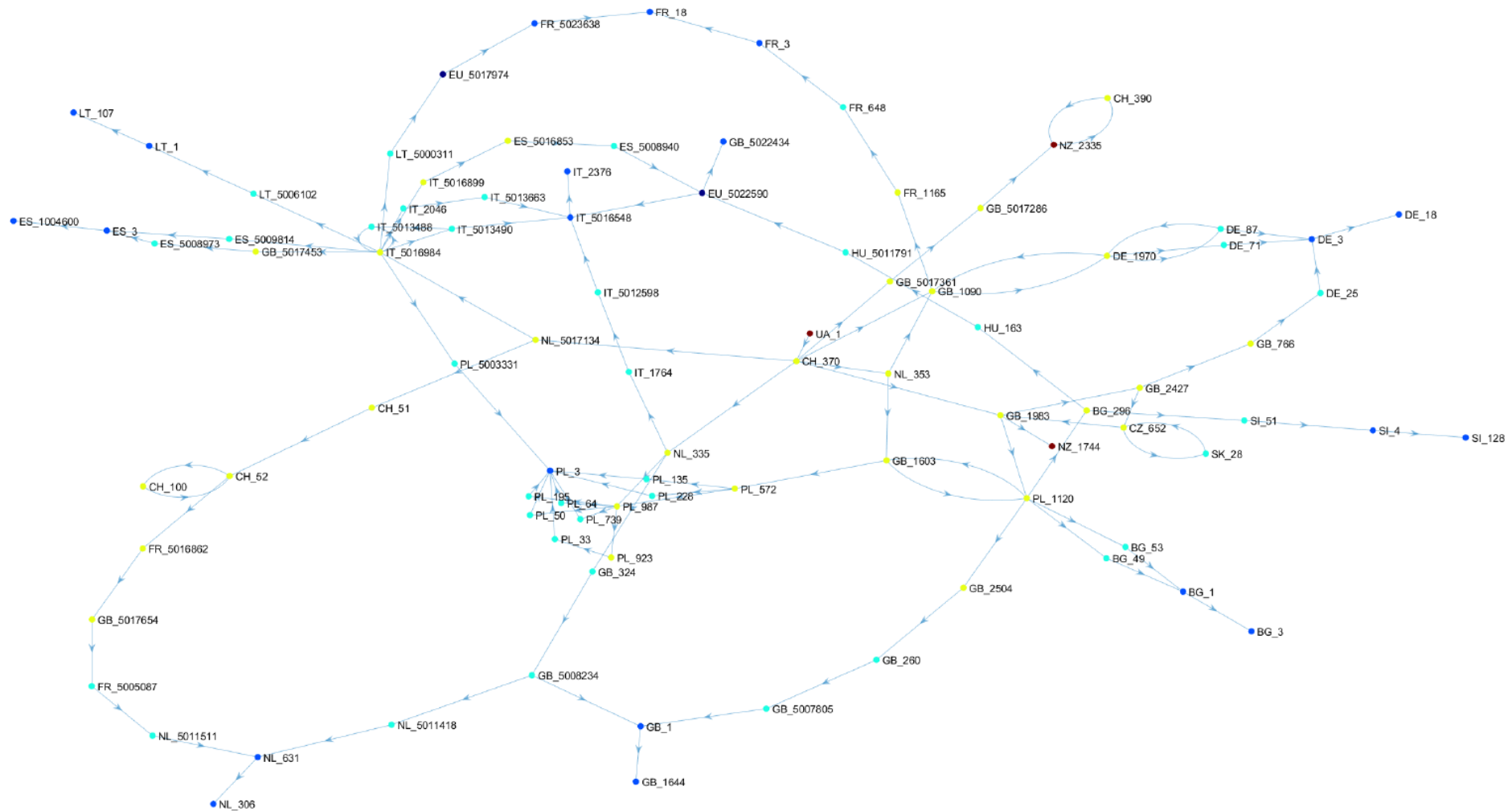
The volumes are important... e.g. to detect VAT fraud



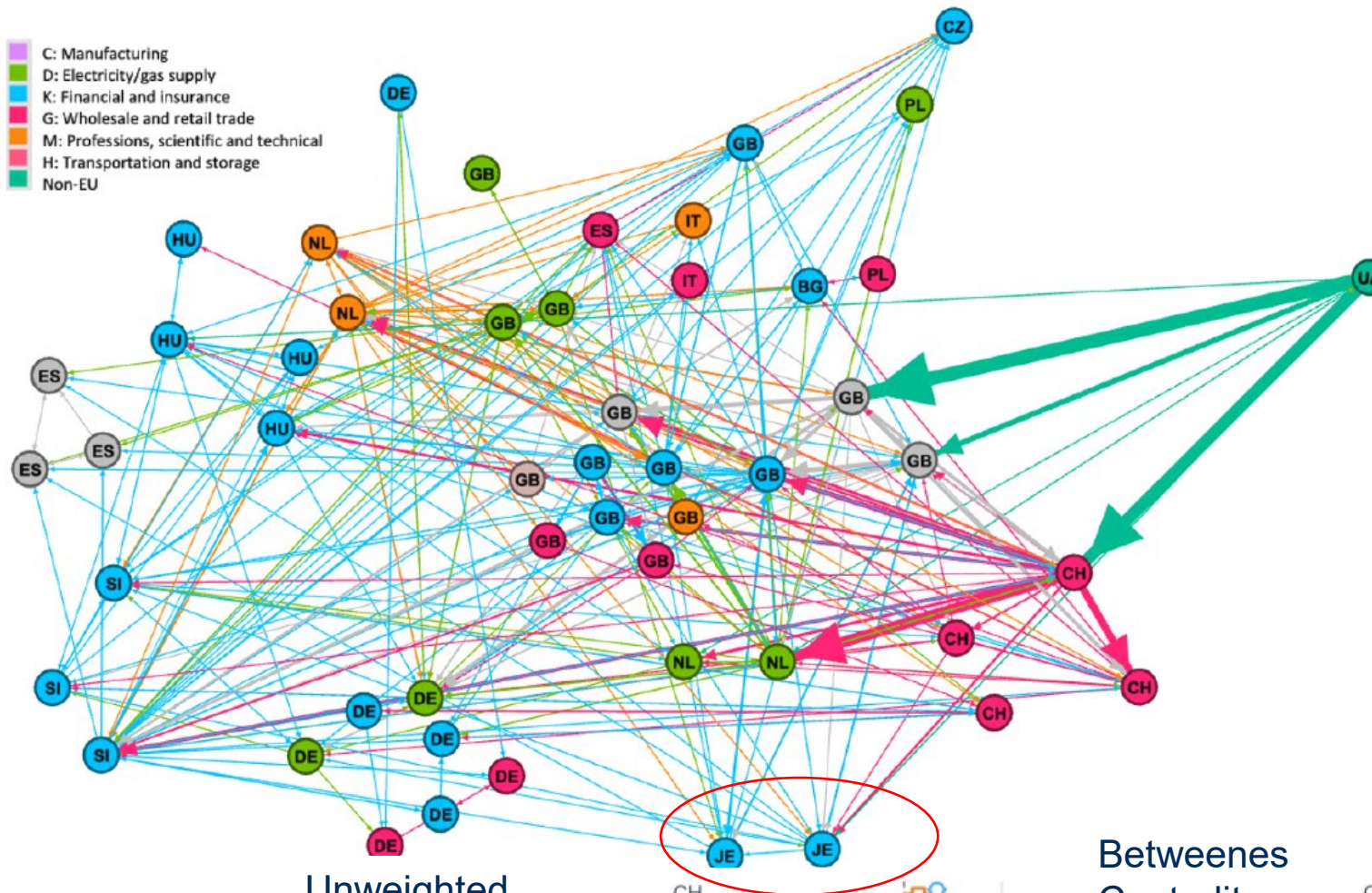
Source:: EU ETL Data

- VAT fraud requires transfers via national borders (linked carbon markets)
- The VAT losses for the entire EU are estimated at a total 3,341 million euros.
- VAT fraud started in mid-2008, peaked in May 2009 and decreased after 2010.
- VAT Fraud is strongly connected with the tax havens overseas, including Hong Kong, the United Arab Emirates, Switzerland and Singapore.
- More than half of the fraudulent volumes were transferred by conduit accounts and missing traders registered in Denmark

Single JI Project ERU flows



Networks analysis of ERU transfers to detect key players



Degree centrality:
The sum of in and outgoing trades of one node

Betweenness centrality: Measures for each node the number of shortest path that pass through the node. Indicator for key brokers and intermediaries

Unweighted
Degree
Centrality

Betweenness
Centrality

CH
GB
HU
RU
UA
Channel Islands
Region 2 (AT, DE, LI)
Region 3 (BE, FR, NL, LU)
Region 4 (BG, HR, RO, ME)
Region 5 (CZ, SI, SK)
Region 7 (EE, LT, LV, PL)
Region 8 (AU, NZ, JP)
Region 10 (Asia)
Region 11 (Africa)
Region 12 (Americas)

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Region 12 (Americas)

Final thoughts

Markets can be made more robust by:

- Ensuring that conflict of interests and information asymmetries are reduced (e.g. rotation of verifiers and spot checks by officials)
- IT security ensured

Market oversight needs

- Access to data
- Adequate staffing and skills of regulators
- Mandate to intervene
- Coordination if markets are linked

Data analysis according to:

- Volatility (impact of price containment) -> depends on maturity and liquidity
- Who is trading (country, sector, regulated entities) -> Market access
- Development of volumes
- Holding time of allowances
- Beyond compliance trading

Methods: Cluster Analysis, Network Analysis, Machine Learning

Thank you for your attention!
Questions?

