



Centre for Energy and
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Transfers in Phase 1 of the EU ETS: A first reality check of transfer patterns

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Research questions & contributions

Research Questions:

- What transaction behaviour in the registry can be observed in the EU ETS Phase 1?
- Can we distinguish between specific transfer patterns?

Contributions:

- First analysis of unrefined data of EU Community Independent Transaction Log (CITL) data including Personal Holding Accounts
- Explorative study to derive further research questions



The CITL Data Base

- EU CITL is an electronic accounting system which provides two data sets:
 - Transaction data: all issuance, allocation, transfer, cancellation, retirement, and surrendering of EUAs (97,000 transactions 2005-2007)
 - Account information (11,273 accounts) including for OHAs allocation, verified emission, surrendering, compliance
- Transaction data: on account level, reported with 5-calender year delay (Period 2.2005 – 12.2007), 4 months true up period in 2008 missing
- Three types of accounts:
 - Operating holding accounts (OHAs): 6,873 active in 2005-2007
 - Personal holding account (PHAs): 729 in 2005-2007
 - Country accounts: 58 active in 2005-2007
- Different information for different countries (e.g. Austrian and Greek report no account identifiers for domestic transactions; Denmark different account identifiers between transaction data and accounts)
- No price data available

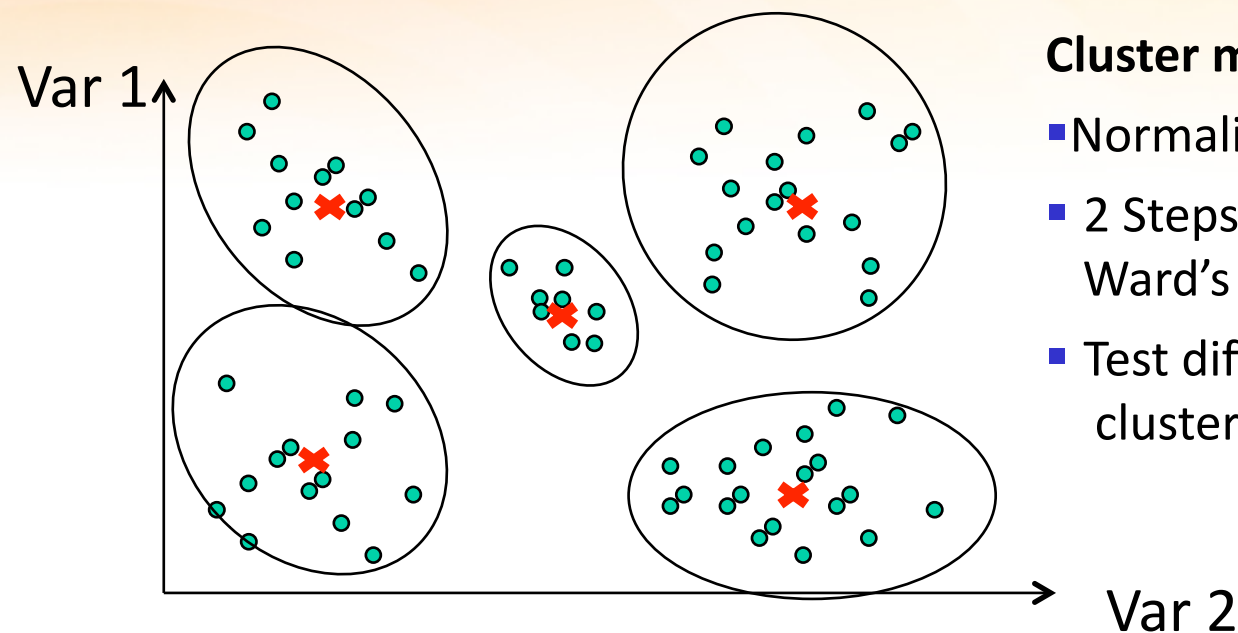


Data Processing

- Generate registry-specific identification codes (Unique IDs) to link account information with transaction data
- Includes market transfers: excluding allowance issuance, retirement, cancellation, surrender, allocation, and correction (CITL types 1-51, 3-21, 4-3, 10-0, 10-1, 10-2, 10-53, and 10-55 respectively)
- Market Transfers (2005 – 2007):
 - 2,85 Billion EUAs transaction volume
 - 42,956 market transactions
- Exclusion of 305 accounts e.g. 247 OHAs (comprising 0.75% of total market transfers) since no link possible and 58 country accounts
- Includes only accounts which conducted market transfers: 6,628 OHAs and 727 PHAs (Total 7,355 accounts)
- We detected that a number of transactions are missing from the CITL (few PHA accounts had transfers > acquired EUAs) and have been in discussion with European Commission to solve this problem (not finalised yet, but omitted data will not significantly affect our analysis since very few accounts).

Methodology: Cluster Analysis

- Cluster analysis is a multivariate technique for grouping datasets on the basis of distance of each object
- Aim: to split datasets into groups (clusters) which exhibit high internal homogeneity and high external heterogeneity



Cluster method:

- Normalization of all variables
- 2 Steps:
Ward's hierarchical + k-means
- Test differences between clusters for significance



Methodology: Variables

Transfer Variables

1. Total transaction volume (EUAs acquired + EUAs passed on)
2. Net acquisition volume (EUAs acquired - EUAs passed on)
3. Transactions relative to allocations (Total transaction volume/sum of allocated EUAs)
4. ***Number of accounts from which EUAs have been transferred into the account***
5. Number of partners transferred to (number of different accounts)
6. Dispersion of transfers (st dev of account's transfer volume/mean of all accounts' transfer volume)

Attributes of Accounts

- For all accounts:
 1. Account type (operation or person holding account)
 2. Sector affiliation (based on NACE codes)
- For OHAs, only:
 3. Size (in terms of average verified emissions p.a.)
 4. Allocation position (allocated emissions – surrendered emissions)



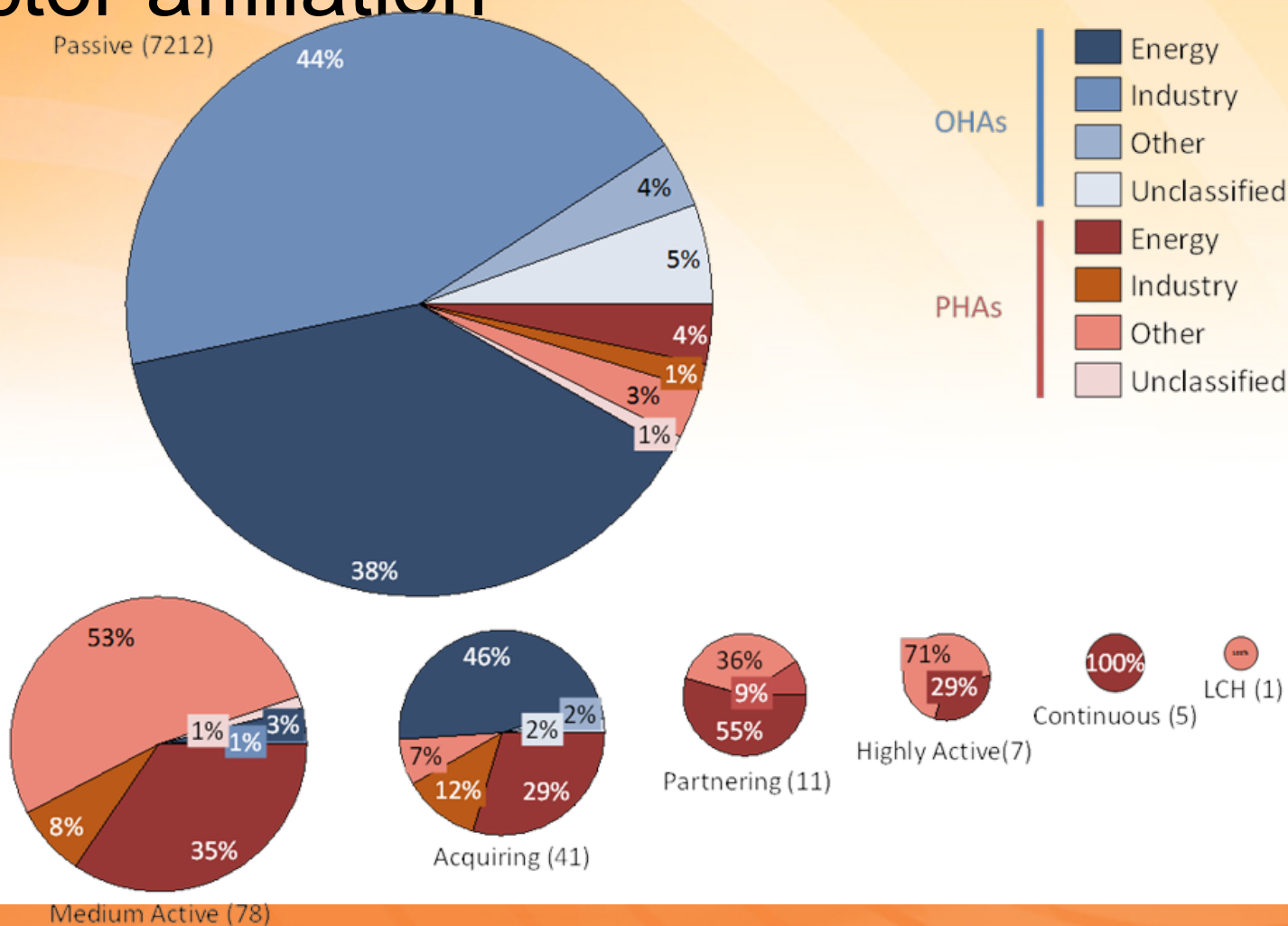
Results: Cluster Centers

Transfer pattern	Passive	Medium Active	Acquiring	Partnering	Highly Active	Continuous	Future Clearing
Total transfer volume [Million EUAs]	290	14,742	18,526	37,776	97,480	78,368	221,464
Net transfer volume [Million EUAs]	-38	382	7,526	1,016	332	19,147	0.0
Transfers relative to allocation	97	14,384	12,448	37,776	97,480	78,368	221,464
Number of accounts transferred from	1.11	34.82	11.78	121.55	50.29	37.20	24.00
Number of accounts transferred to	1.25	20.68	6.90	67.00	41.43	30.80	23.00
Discontinuity of transfers	2.40	1.36	1.74	1.03	1.36	1.06	1.74
No. of accounts	7,212	78	41	11	7	5	1
% of total accounts	98.06%	1.06%	0.56%	0.15%	0.10%	0.07%	0.01%

- Vast majority in the passive cluster
- 2% of accounts show significantly higher transfer activities



Clusters' composition: account type and sector affiliation





Results: Attributes of accounts/account holders

	Passive			Medium Active			Acquiring		
	mean	st. d.	N	mean	st. d.	N	mean	st. d.	N
Size (in k tons CO ₂ e)	220	1,013	6,604	1,189	1832	3	5,333	5,118	21
Allocation Position (in Millions EUAs)									
2005	16	218	6,604	266	460	3	-2,413	1,904	21
2006	10	241	6,604	-553	991	3	-2,757	2,157	21
2007	8	245	6,604	-218	483	3	-2,556	1,923	21

- Passive cluster: small OHAs, from both Energy and Industry
- Medium active: mainly PHAs across all three sectors (e.g., Total Gas, RWE Vertrieb, Thyssen Krupp, Morgan Stanley)
- Acquiring: 50/50 PHAs/OHAs, mainly Energy, under-allocated (E.on UK, RWE Power, Vattenfall, EnBW, SWM but also UBS...)
- Partnering: all PHAs of large energy and financial industry (BP, Shell, GDF, Fortis Bank, Carbon Capital Markets)
- Highly active: PHAs of large energy and financial industry (RWE, EdF, Barclays, CdD)
- Continuous: PHAs of large power (EdF, Nuon, RWE, SSE)
- Future Clearing: LCH.clearent (clearing house)



Summary

Research Questions:

- What transaction behaviour in the registry can be observed in the EU ETS Phase 1?
- Can we distinguish between specific transfer patterns?

Key results:

- Vast majority quite inactive
- More active accounts dissimilar trading patterns
- These are mostly PHAs: partly of regulated firms (energy and industry), partly of financial industry



Future Research Agenda

- Majority of installations passive: What is the role of transaction costs? Can management transactions explain some of the passive accounts (aggregation of accounts on firm/MNC level)?
- Not only financial intermediaries but also big oil and big power companies seem to act as brokers: Did they make use of their market insights?
- Power generators appear in 5 different clusters: Which strategies were more successful (winners/losers)? How do electricity market and emission market strategies interact?
- Banks appear in many clusters: What role did banks play – providing liquidity vs. injecting volatility?
- We find the same firms in different clusters (e.g., RWE): Do (especially large) firms split their emissions trading activities between different business units and use different strategies?
- State owned companies vs. private owned companies: Do we see any differences (firm level aggregation necessary)?
- Country specific patterns: Why are many accounts opened in Denmark?

Thank you.



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