




European Commission

Sugar prices geographical aggregation:

feasibility study

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European Commission

Agriculture and Rural Development

Introduction

- The publication of **"regional" sugar prices** has been required by stakeholders and MS.
- The request is fully in line with the recommendations of the Agricultural Market Task Force: **enhancing market transparency.**
- DG AGRI launched a detailed analysis investigating the subject, focusing on three aspects:
  - **price correlation**
  - **price levels**
  - **confidentiality**

Why regional prices and not national prices?

A tentative "national price" should fulfil **confidentiality requirements:**

- Each single producer cannot be identified:
  ⇨ **exclude MS with only one producer**

- Knowing the MS average, trivial "reverse engineering" would reveal to one operator the price declared by the other national producer:
  ⇨ **exclude MS with two producers**

- Less trivial "reverse engineering" would reveal info in case of three producers, if only the standard deviation would be known:
  ⇨ **hide MS standard deviation**

Only 7 MS would be eligible to build a national price aggregate.

Again on Confidentiality

- As said, **confidentiality must be preserved** and by definition no information giving knowledge/insight advantage to any single market players should be disclosed.

- Another constraint is given by **market share**: no market player in the aggregate should cover **more than 70%** of the market, to avoid identification of the single entity with the aggregate.

- **We exploit data already available**, based on monthly price notification by Member States: in this sense **no additional burden is imposed** neither to the industry nor to MS.

Market framework

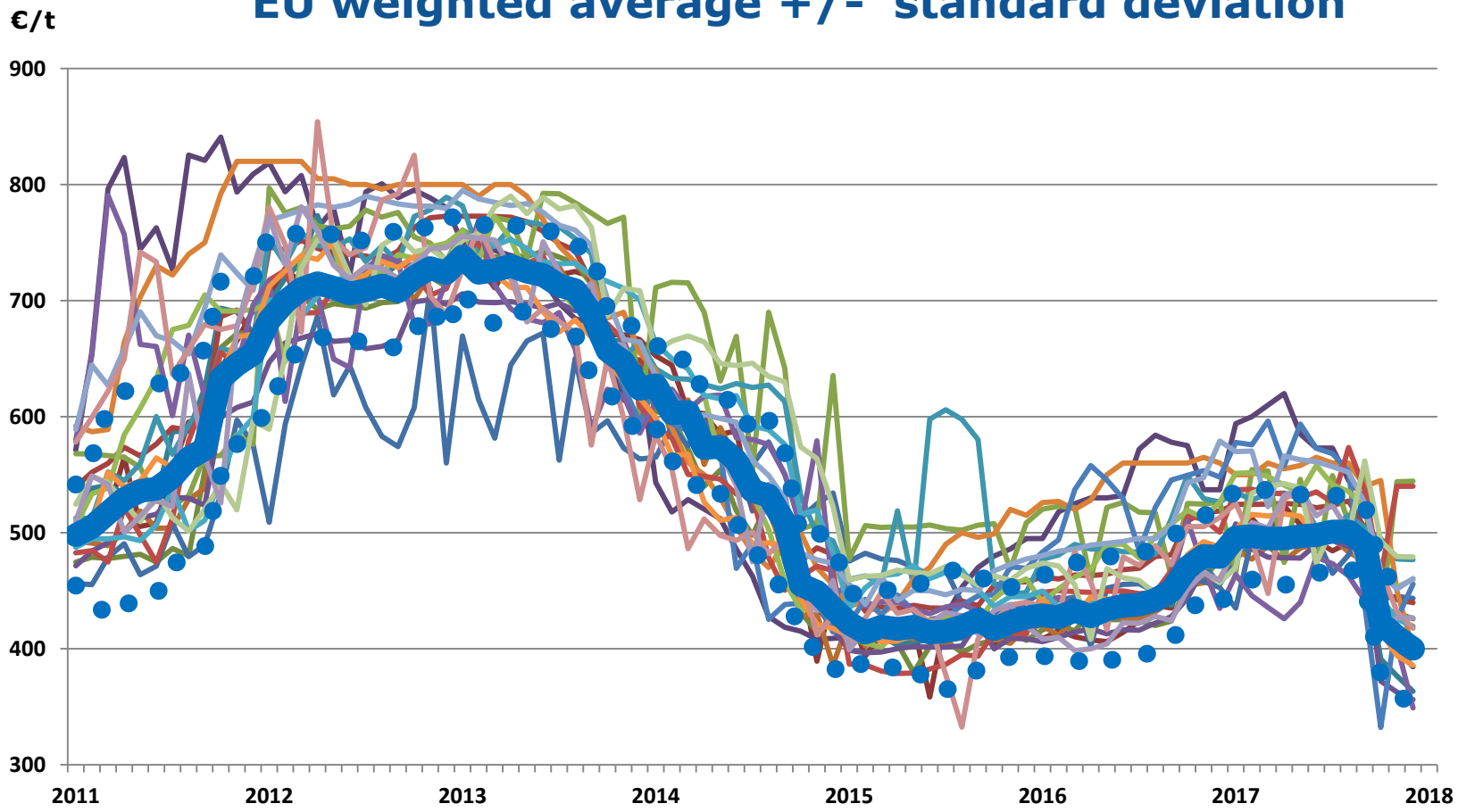
- The **EU sugar market is segmented**. Aim of this exercise is to give potential insight through regional analysis.

- The industry is **highly concentrated**: the top 6 players/producers cover 81% of the market, the top 8 reach 93%.

- The **production is dominated by the most efficient MS**: DE and FR together represent more than 50% of the EU production.

MS prices and EU average

EU weighted average +/- standard deviation



Target

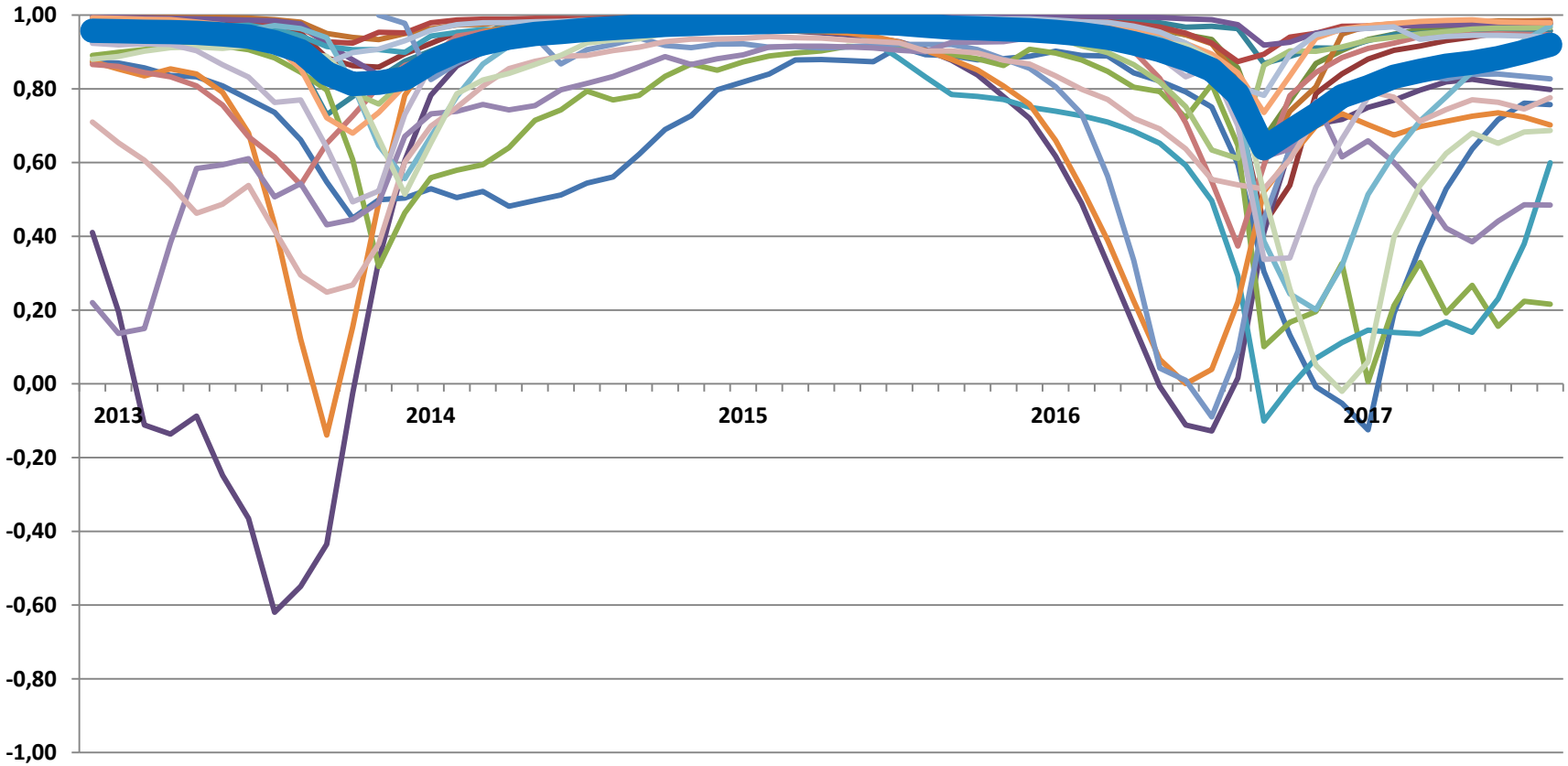
The goal is to **establish subgroups (clusters) of MS** for which **confidentiality is not put at stake** and for which the following conditions are met:

- i) **intra-cluster correlation is HIGHER** than the overall EU average correlation

- ii) **intra-cluster dispersion is LOWER** than the overall EU average dispersion

Dynamic correlation with EU average

24-months rolling window correlation with EU average



Correlations among pairs of MS

Average correlation is 85%

0.85																				
	1.00	0.97	0.74	0.98	0.98	0.84	0.97	0.90	0.98	0.90	0.88	0.67	0.94	0.96	0.85	0.95	0.97	0.95	0.86	0.91	0.97
		1.00	0.70	0.97	0.99	0.86	0.98	0.90	0.98	0.89	0.87	0.76	0.92	0.97	0.80	0.96	0.96	0.93	0.84	0.91	0.96
			1.00	0.78	0.70	0.42	0.78	0.52	0.70	0.70	0.91	0.88	0.86	0.77	0.77	0.57	0.83	0.86	0.87	0.51	0.75
				1.00	0.98	0.84	0.98	0.89	0.98	0.91	0.91	0.69	0.96	0.96	0.87	0.94	0.98	0.96	0.89	0.90	0.97
					1.00	0.87	0.98	0.91	0.99	0.90	0.87	0.70	0.93	0.96	0.84	0.97	0.97	0.94	0.85	0.92	0.96
						1.00	0.84	0.85	0.87	0.78	0.63	0.30	0.74	0.79	0.71	0.90	0.79	0.76	0.66	0.89	0.82
							1.00	0.88	0.98	0.91	0.90	0.75	0.96	0.97	0.87	0.94	0.98	0.98	0.89	0.89	0.97
								1.00	0.91	0.84	0.72	0.40	0.79	0.86	0.76	0.94	0.86	0.82	0.73	0.92	0.89
									1.00	0.91	0.85	0.69	0.93	0.95	0.85	0.97	0.96	0.94	0.84	0.93	0.96
										1.00	0.80	0.36	0.88	0.87	0.80	0.90	0.91	0.89	0.77	0.87	0.91
											1.00	0.88	0.93	0.90	0.80	0.76	0.94	0.92	0.93	0.69	0.88
												1.00	0.88	0.84	0.40	0.51	0.82	0.81	0.78	0.41	0.68
													1.00	0.94	0.85	0.86	0.96	0.97	0.90	0.81	0.94
														1.00	0.80	0.91	0.97	0.94	0.86	0.86	0.95
															1.00	0.80	0.85	0.89	0.86	0.78	0.85
																1.00	0.91	0.88	0.76	0.97	0.93
																	1.00	0.97	0.91	0.86	0.97
																		1.00	0.93	0.83	0.94
																			1.00	0.71	0.86
																				1.00	0.89
																					1.00

Intra-cluster correlations

0.85					
	1.00	0.74	0.67	0.94	0.86
		1.00	0.88	0.86	0.87
			1.00	0.88	0.78
				1.00	0.90
					1.00

0.88						
	1.00	0.89	0.87	0.98	0.90	0.97
		1.00	0.76	0.86	0.92	0.89
			1.00	0.85	0.78	0.85
				1.00	0.86	0.97
					1.00	0.89
						1.00

0.92						
	1.00	0.99	0.86	0.98	0.96	0.89
		1.00	0.87	0.99	0.97	0.90
			1.00	0.87	0.90	0.78
				1.00	0.97	0.91
					1.00	0.90
						1.00

0.94				
	1.00	0.90	0.97	0.98
		1.00	0.90	0.92
			1.00	0.94
				1.00

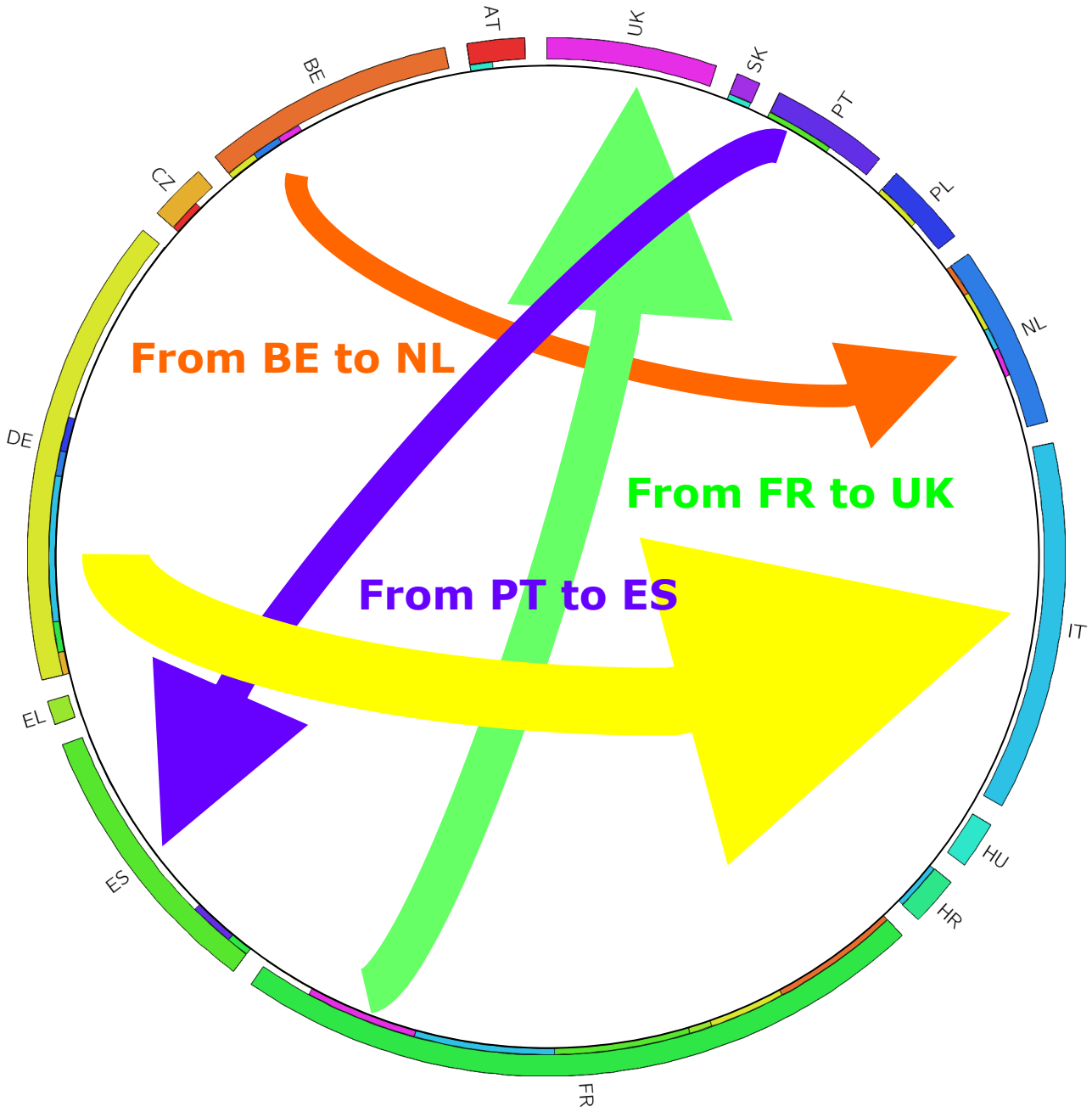
Price level analysis

Even if the correlation among two MS could be particularly high, **prices could be rather distant among themselves**, thus triggering a high standard deviation within the cluster.

How to measure the distance among two time-series?
Two **dispersion indicators** could be proposed:

- Standard deviation of the differences
- Average of absolute values of the differences

The same clustering principles shown for correlations analysis is applied to the price levels (on the contrary with respect to correlation, low differences are good!)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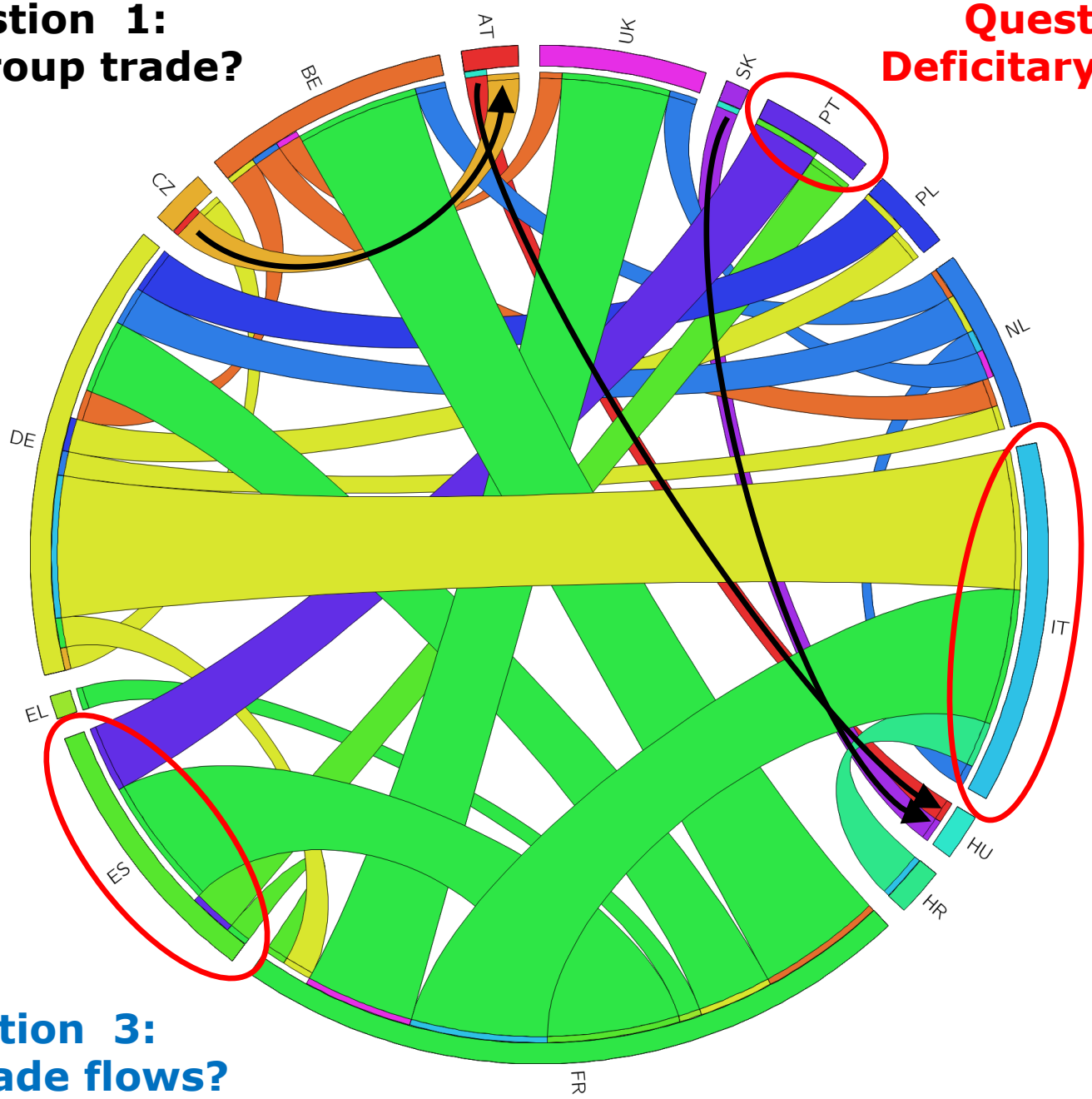
From BE to NL
From FR to UK
From PT to ES

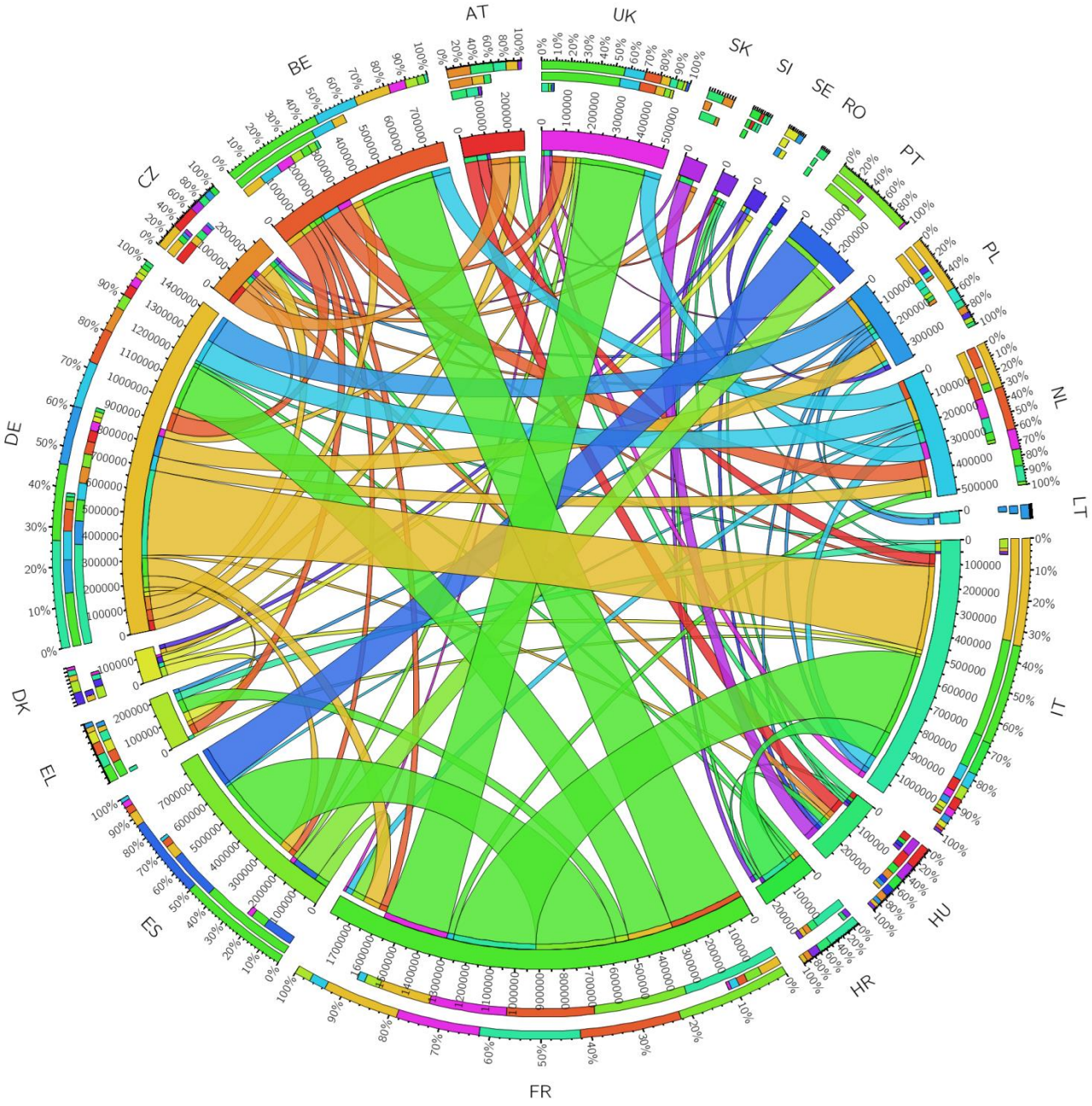
Question 1:
Intra-group trade?

Question 2:
Deficitary markets?



Question 3:
Small trade flows?

Complete intra-EU sugar trade flows



Methodology wrap-up

- **Price Correlation Analysis** suggests some clustering principles: some MS prices move together, some other move independently.

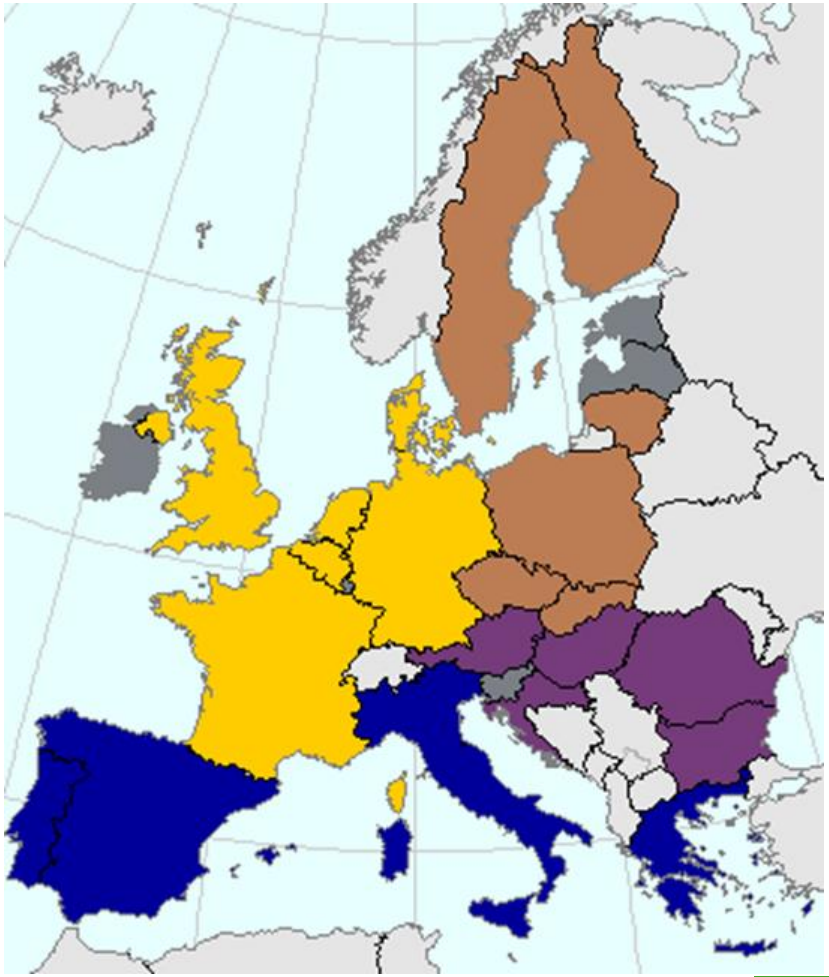
- Even if correlation among two MS is high, prices could be rather distant thus triggering a high standard deviation within the cluster. So a **Price Level Analysis** is needed, in order to fine-tune the clusters.

- Even if statistically robust, the aggregations needs an **intra-EU trade flow analysis and a cross-border ownership investigation:** indeed, there are important constraints due to the presence of supra-national industrial groups, cross-border ownership, branches and subsidiaries.

Final results

	Intra-cluster correlation	Intra-cluster price difference indicator #1	Intra-cluster price difference indicator #2	Quality check: Intra-cluster standard deviation
Region 1	0.85	52.8	44.4	37.7
Region 2	0.92	40.1	36.9	31.9
Region 3	0.88	48.6	46.0	40.1
Region 4	0.94	37.9	44.9	37.1
Overall EU average	**0.85**	**53.3**	**47.3**	**42.6**

Geographical areas



REGION 1	**AT-BG-HR-HU-RO**
REGION 2	**BE-DE-DK-FR-UK-NL**
REGION 3	**CZ-FI-LT-PL-SE-SK**
REGION 4	**ES-GR-IT-PT**

Thanks for your attention

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