

Liquidity analysis – Bidding zone reconfiguration study

Update for Consultative Group

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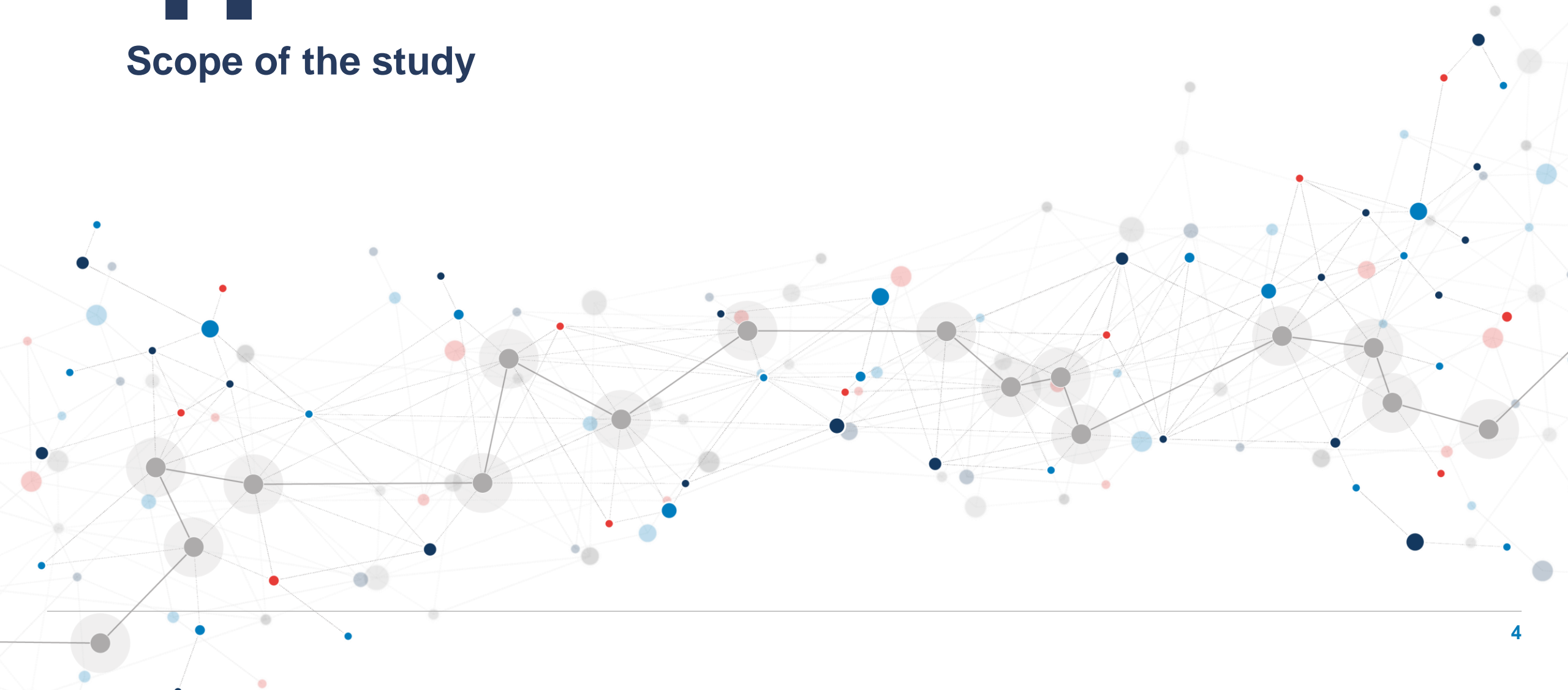
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Agenda

1. **Introduction and Overview**
2. **Literature Review**
3. **Analysis of the State of Liquidity**
4. **Expected Liquidity Metric Development from Bidding Zone Reconfigurations**

1.

Scope of the study



Scope of the study

The liquidity and transaction cost study includes several products across several power markets in Europe, in compliance with the requirements stated in the ACER methodology.

ACER methodology¹

- *“The analysis shall, at least, consider the following elements:*
 - *“A descriptive analysis of liquidity aiming to describe the starting point of market liquidity in the concerned BZs”*
 - *A correlation analysis, aiming to describe the correlation of average day-ahead prices of the concerned BZ with average day-ahead prices of other BZs or BZ combinations.*
 - *To describe possible liquidity impacts because of expected changes in competition”*
- changes of liquidity should not *“impact the existence of sufficient hedging opportunities for market participants”*

Liquidity and transaction cost definition

- Liquidity is an elusive concept but loosely speaking: *“the speed and easiness by which assets can be bought or sold without drastically impacting the underlying market price”*
- Transaction costs are *“intrinsically related”* to liquidity and included in the analysis through consideration of bid-ask spreads

Markets

- Bidding zones of France, Germany-Luxembourg, Italy, the Netherlands, and Sweden are subject to a potential bidding zone reconfiguration in this bidding zone review
- They show different specifications with regard to:
 - Several bidding zones per country (Sweden, Nordics, Denmark, Italy) vs single bidding zone (Germany + Luxembourg, France, Netherlands, ...)
 - Exchange-trading “obligation” (Nordics, Italy, Spain) vs bilateral trades (Germany, France, Netherlands, etc.)
 - Other design/regulatory specifications (French ARENH, Nordic system price, Italian PUN)

Products

- Short term products comprise the exchange traded Intraday (ID) and Day-Ahead (DA) market but, due to data unavailability, not over-the-counter trades. For ID, only traded volumes are considered
- Long term products comprise selected exchange-traded futures and cleared and non-cleared forwards. Data is sourced from EEX, NASDAQ, ICE, and LEBA. For the futures, bid-ask spreads are calculated

Limitations of the scope and the assessment of future liquidity metrics

Limitations regarding the exhaustiveness of products and markets considered

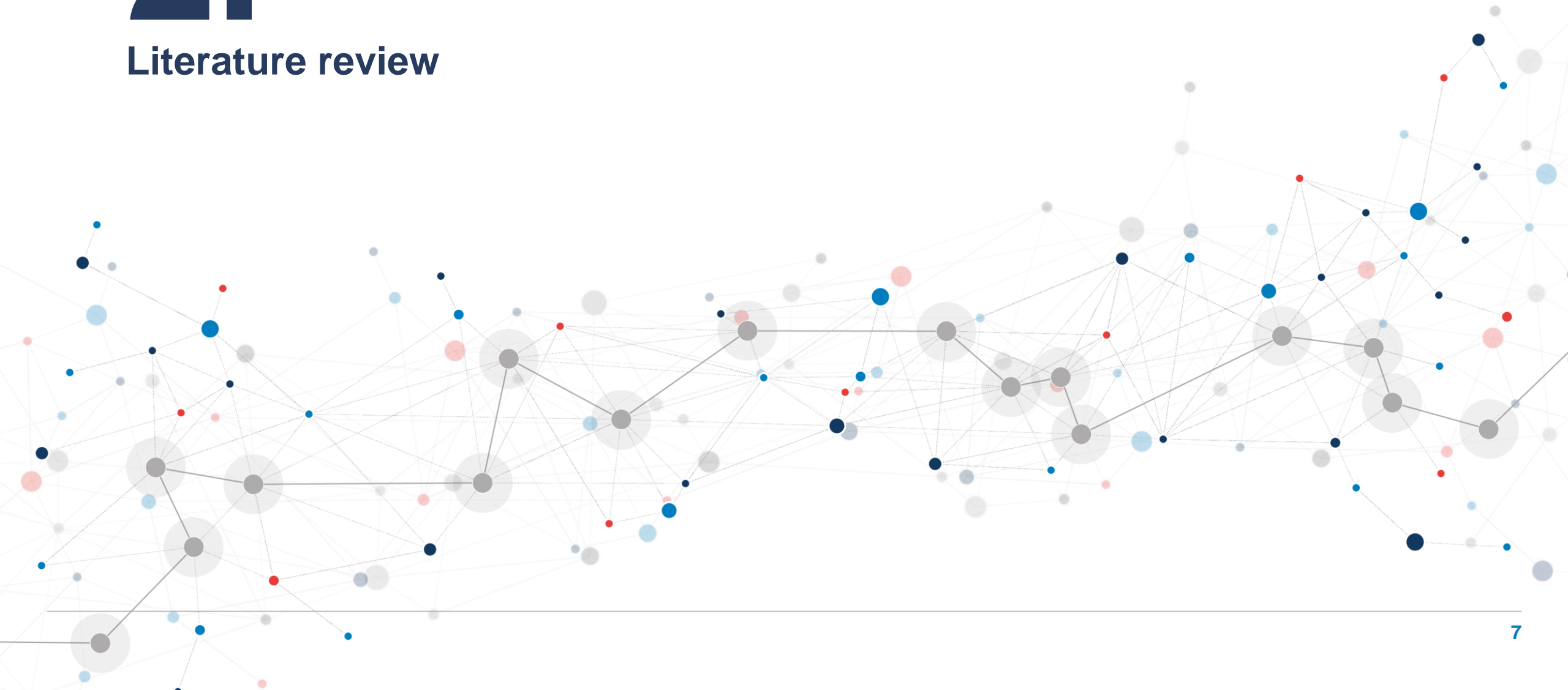
- We focus on each **BZ that is subject to a potential reconfiguration individually** and do not account for potential cross border effects
- We were not able to obtain data on **intraday-OTC** markets
- A newly-developing market for OTC-long-term products – **PPAs** – could not be analysed further, because it was out of scope and there were not data available
- Same limitation with regards to **combined bidding zone changes** as the dispatch model used by TSOs (not implemented yet)

Limitations due to restriction in scope, data and chosen methodology

- No modelling of **behavioural trading dynamics** – like interplay between short-term and long-term markets or exchange traded vs. OTC
- Conclusions on **LT vs. ST** markets are **indirectly inferred** from results of the **econometric analysis**
- No consideration of **mitigation measures** (out of scope)
- We have identified some **non-linear relationships** between liquidity metrics and drivers, which we cannot capture here

2.

Literature review



Literature review – Approximation of market liquidity

Metrics to assess transaction and liquidity costs are based on a review of academic sources and reports from market participants.

Market characteristics



Metrics to assess liquidity

Bidding zone size:

- It has been asserted that the **size of bidding zones** positively correlates with liquidity due to the increased number of market participants.
- This has been questioned, i.e. as “the experience from different markets [...] does not show a clear link”.³

Market concentration

- The European Commission stated in its decision on Brittany’s capacity tender that **market power** “contributes to a loss of liquidity”.⁴
- Others have again noted from splitting a congested bidding zone, competition may in fact increase because more cross-border parties may participate.⁵

Other market characteristics

- Literature on **other market characteristics** is considered as well.

- The **traded volume** is a principal metric to assess liquidity, as established by the ACER methodology.¹
- The **churn rate**, the ratio between total traded volume and the volume of the product, is a meaningful indicator for continuous* markets, because of the possibility of secondary trading of products.²
- **Bid-ask spreads** and the **time to maturity** are relevant indicators for continuous markets as well.

Literature review – Analysis of BZ reconfiguration effects on liquidity

Past bidding zone reconfigurations have been discussed in a restricted number of publications. In most cases, liquidity was assessed ca. 1 year after the split by considering traded volumes, churn rates and BAS.

Past reconfiguration: Germany-Luxembourg-Austria

- The review of literature on past reconfigurations suggests that the split had positive effects for the short- and negative for long-term products.
- DNV GL noted an increase of 13% and 20% of **DA volumes** between the 12 months before and after the split for Epex Spot and EXAA respectively. ACER attributed the increase partially to the case that companies trading in both areas cannot net their positions and have to close their position on both markets after the split.
- For **long-term products**, it was highlighted that traded volume in Austria was very limited directly after the split. Bid-ask spreads for the Austrian market decreased between the baseload products for 2019 to 2021 but remained significantly higher than in the BZ before the split. German futures remained on a high liquidity level and saw slightly decreasing BAS between 2019 and 2021 products.

Past reconfiguration: Sweden

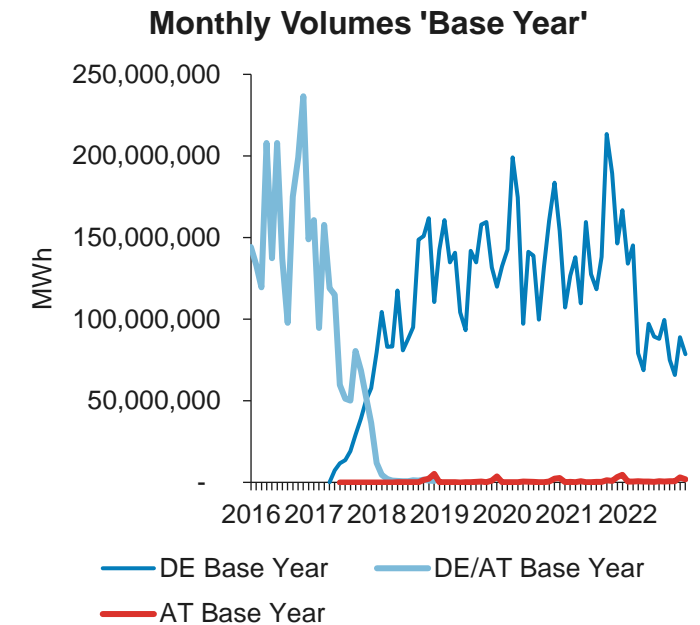
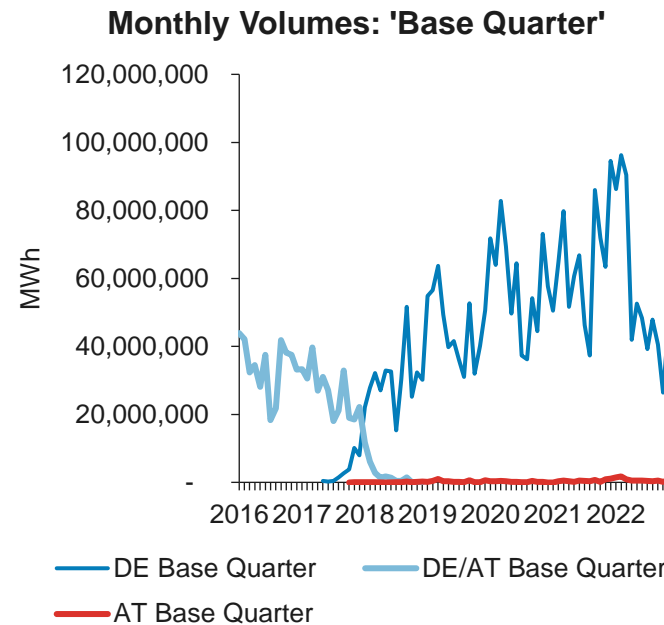
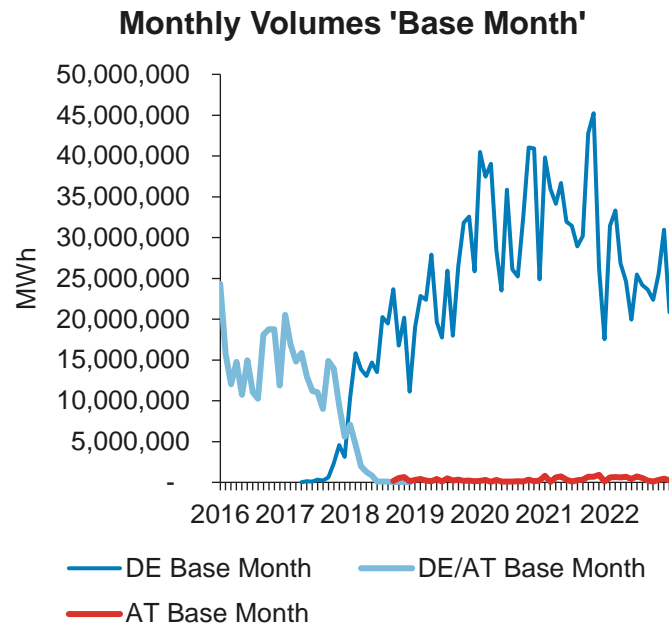
- Results Sweden's bidding zone split have been largely similar: The **DA volumes** have arguably increased by 10% between 2011 and 2012 but traded volumes for **long-term products** have decreased.
- Researchers and market participants are not clear about the role of the reconfiguration on the decrease of turnover. Other causes such as decreasing demand and increasing exchange fees may have also contributed to the decrease of traded volumes.

Past reconfiguration: Italy

- Liquidity effects on Italian reconfigurations have seen little discussion in the literature so far.

Excursion: DE/AT Bidding zone split – traded volume of key products

Market participants in Austria were confronted with significantly decreased turnover after the reconfiguration while liquidity in Germany seems to not have been compromised in general.



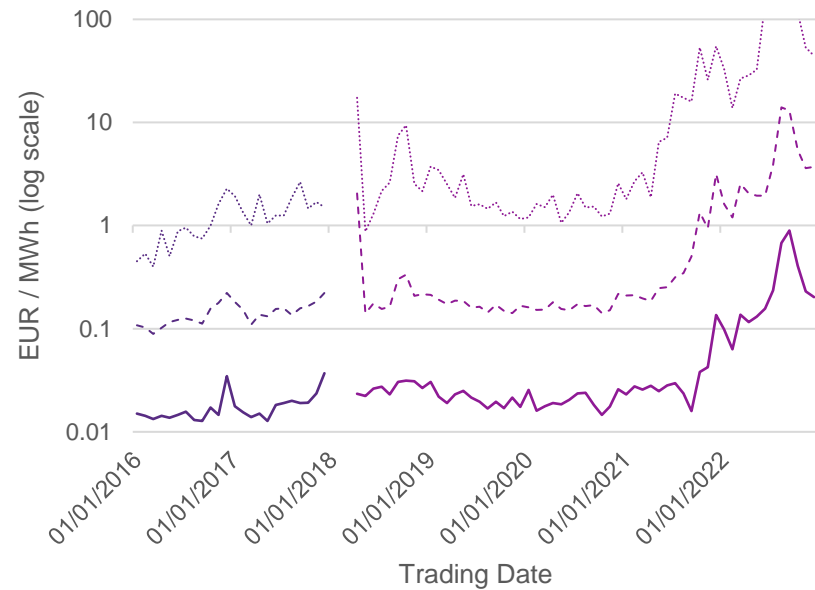
Excursion: DE/AT Bidding zone split – Bid-ask spreads of key products

Transaction costs (i.e. bid-ask spreads) have not changed significantly for German market participants but increased substantially for Austrian participants.

Liquidity and transaction cost

- Bid-ask spreads (BAS) remained largely unchanged in **Germany**: while BAS decreased for Q+1 base load products slightly also after the split, year-ahead products showed a slightly higher avg. spread.
- In contrast, **Austria** (not shown) saw significantly less turnover after the split. In association, BAS – when bids were actually made – were substantially higher than before the split.

Monthly averages of daily Bid-ask spreads of Y+1 products in GER BZ*



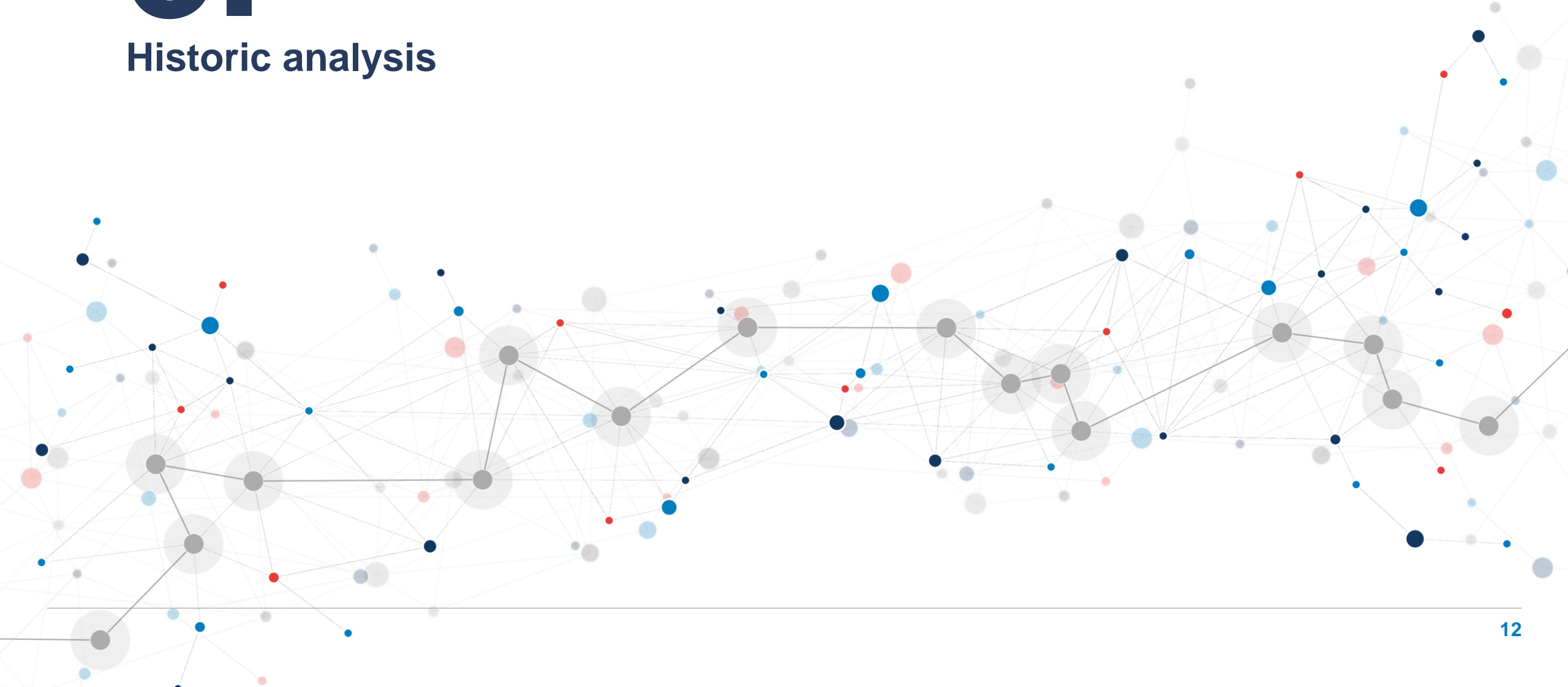
Monthly averages of daily Bid-ask spreads of Q+1 products in GER BZ



— MinBAS DE-AT-LU - - - - MeanBAS DE-AT-LU MaxBAS DE-AT-LU — MinBAS DE-LU - - - - MeanBAS DE-LU MaxBAS DE-LU

3.

Historic analysis

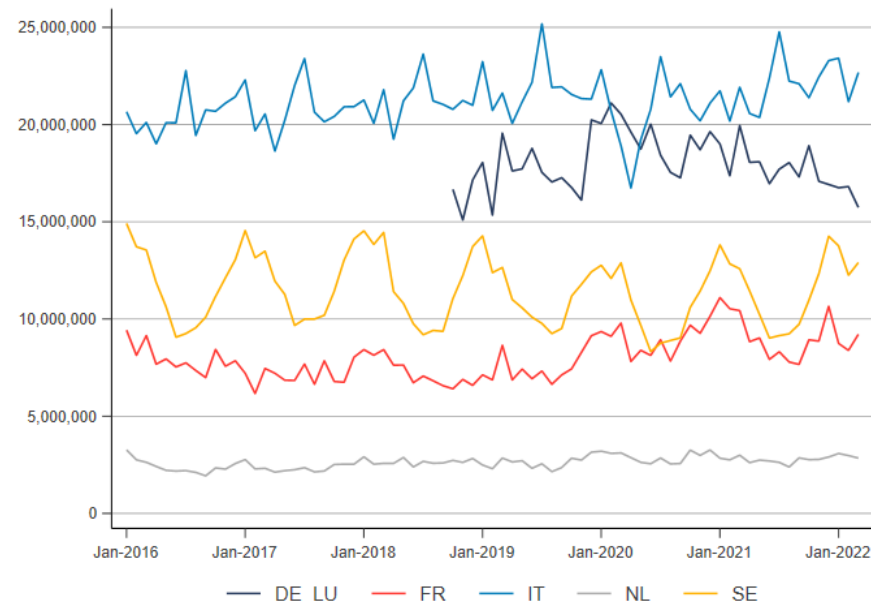


Market liquidity “starting point” – Exchange-traded short-term products

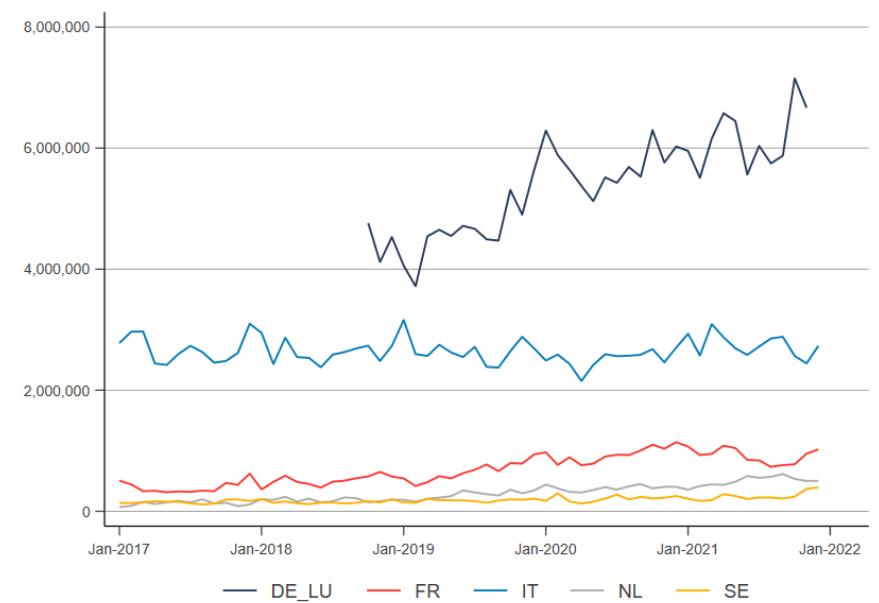
Traded volumes in Day-Ahead have been relatively stable over the past few years. Traded volumes in intraday have increased in most markets, but remain a fraction of amounts traded in Day-Ahead.

- **Traded volumes on the DA market** tend to be relatively stable between 2016 and 2022. In DE_LU and FR, a significant share is traded OTC such that their exchange turnover is lower compared to SE (for FR) or IT (for DE_LU)
- **ID traded volumes** in all countries except for IT exhibit a significant and positive trend, which is the most pronounced for DE_LU.
- **Seasonal variation** is generally higher in the DA-market with SE and IT showing significantly more variation than i.e. FR.

DA-market traded volumes
(monthly aggregate, MWh)



Intraday-market traded volumes
(monthly aggregate, MWh)

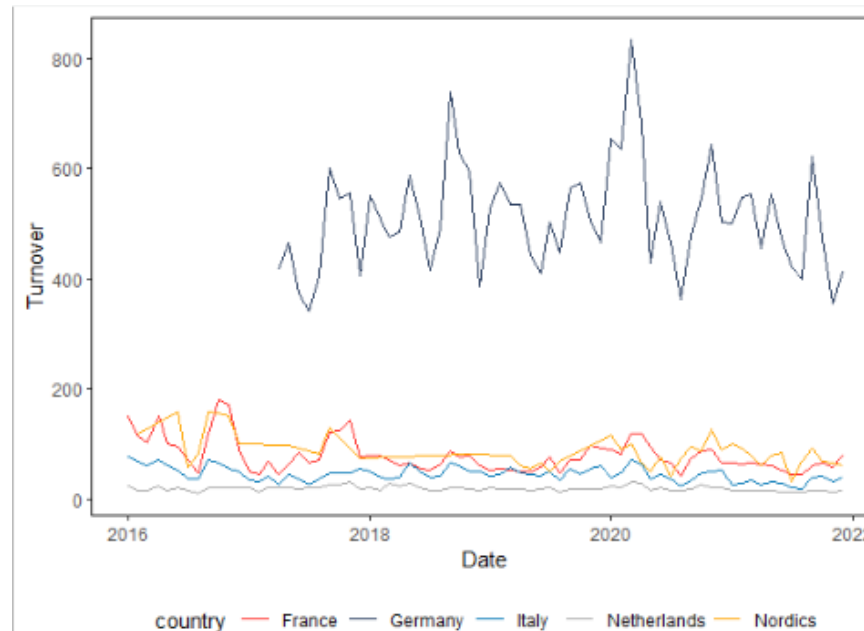


Market liquidity “starting point” – Long-term products

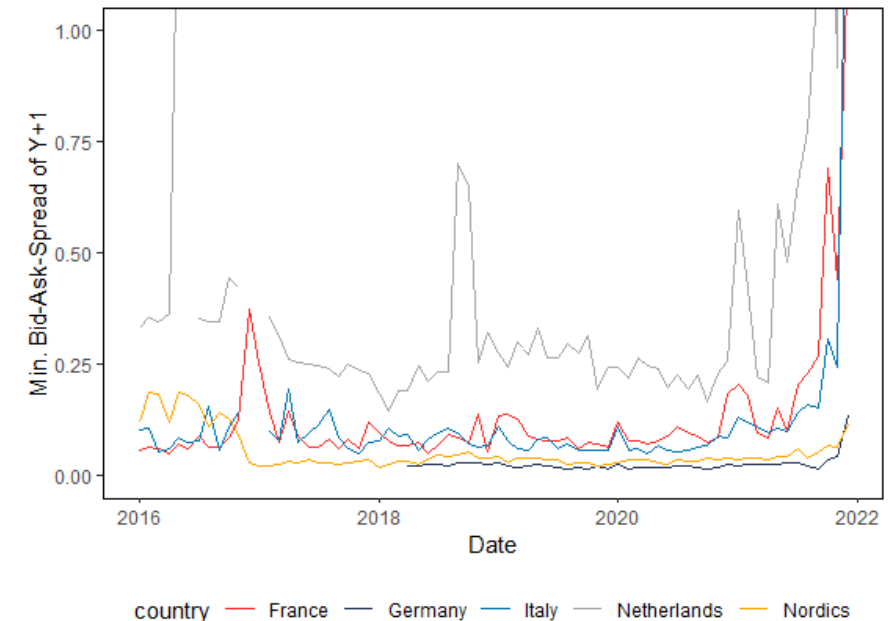
Long-term products for the German BZ are the most traded in Europe. The bid-ask-spread metric points towards a high level of liquidity for Nordic system price futures as well.

- Germany is the largest futures market, with turnover about 8 times higher than the next largest market area
- In line with turnover, Germany shows the lowest bid-ask spreads, closely followed by the Nordic Y+1 future, then France and Italy.
- Liquidity for long-term products has been fairly constant apart from monthly fluctuations and the effect from the recent price increase.
- Liquidity of the French market has been qualified as “low” by ESMA.¹

Long-term product traded volumes*
(monthly aggregate, TWh)

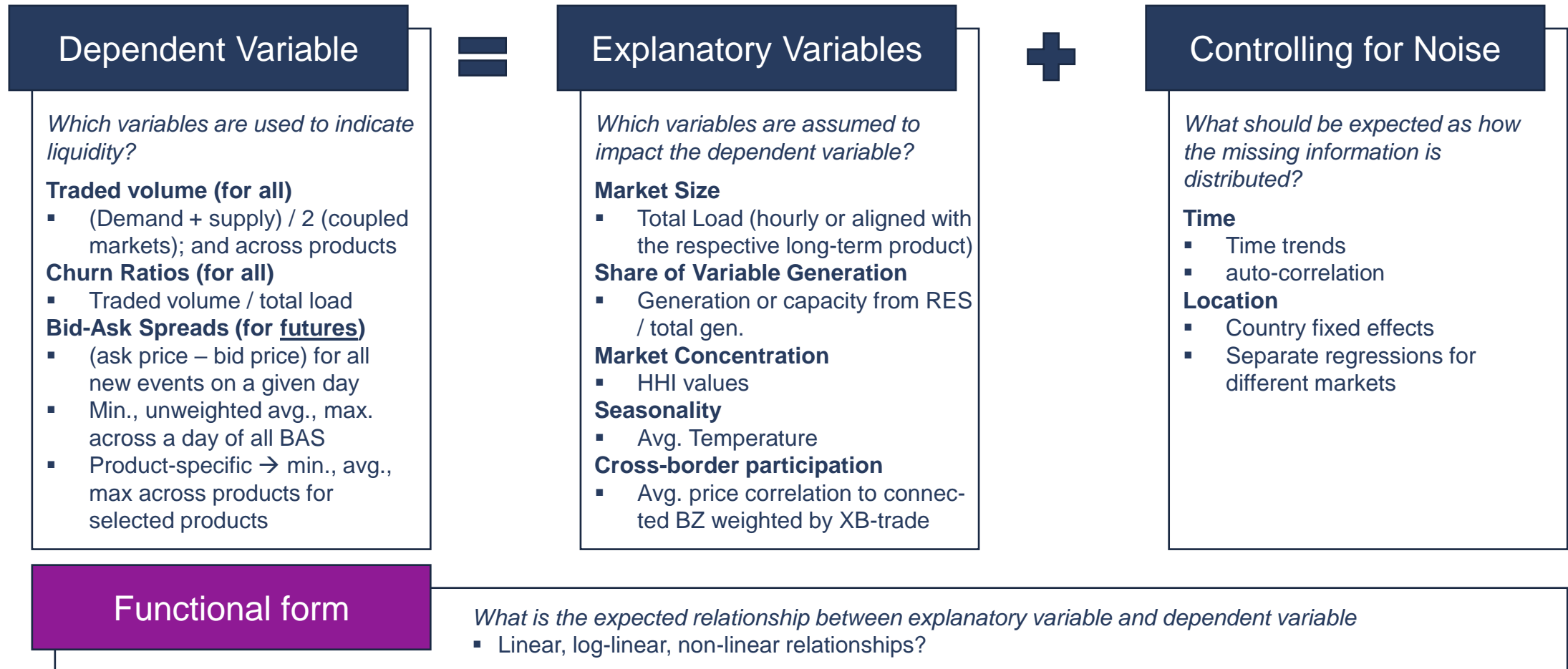


Min. Bid-ask-spreads of Y+1 futures**
(monthly average, EUR/contract)



General considerations for model determination

The relationship between liquidity and other market metrics shall be substantiated through regression analysis that identifies the presence of structural relationships in historic data.



Liquidity relationships in the short-term markets

The relationship between traded volume and market size is most pronounced for smaller DA-markets.

Figure 3.11 Market size (daily load) and DA daily traded volume by country (in MWh)

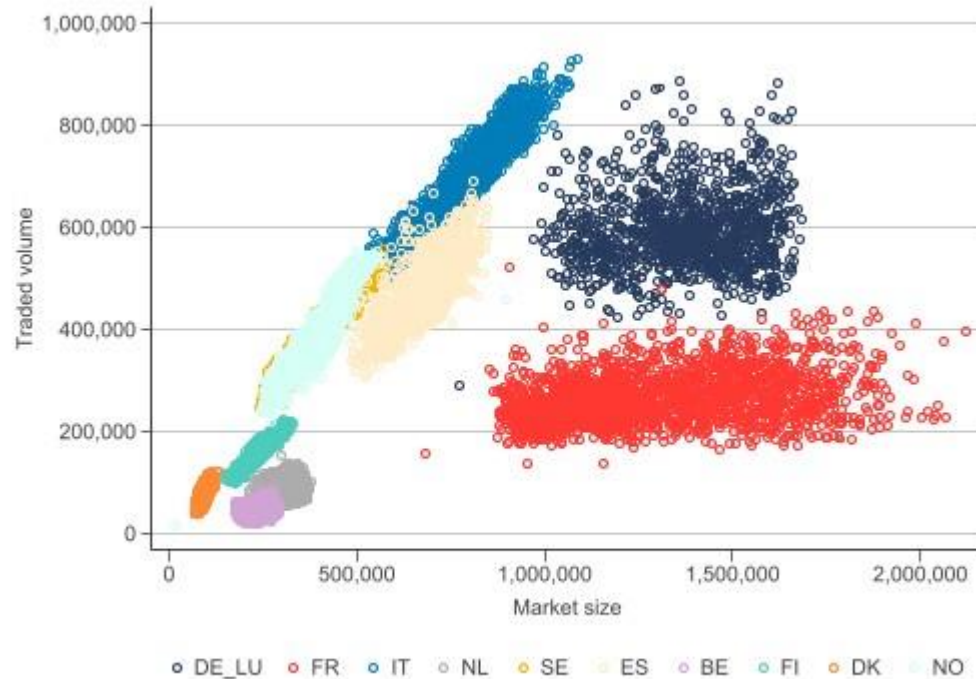
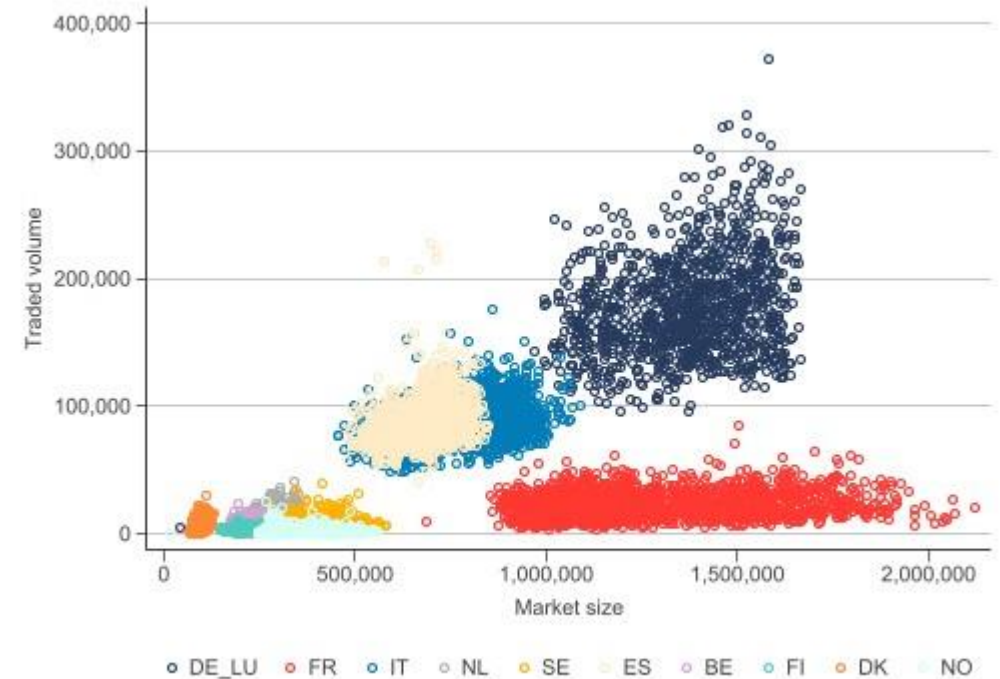
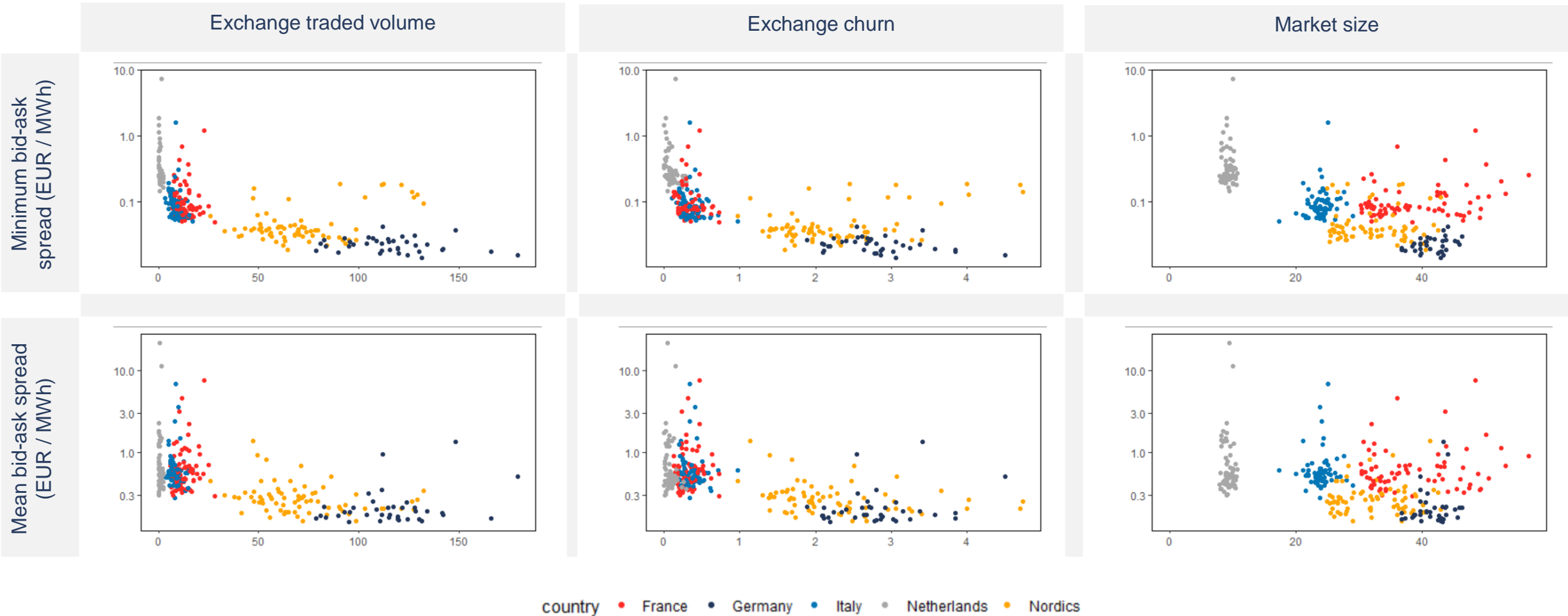


Figure 3.12 Market size (daily load) and ID daily traded volume by country (in MWh)



Liquidity relationships in the long-term markets

Bid-ask spreads tend to have a log-linear relationship to volumetric indicators



Relationship of liquidity metrics with market characteristics: Short-term

The regression model analysis of liquidity metrics on market characteristics of the Day-Ahead and the Intraday market, shows that total load displays the highest level of correlation among the assessed characteristics.

	Variables	Relationship	Explanation and interpretation
Explanatory and confounding variables in focus	Total load	↗	<ul style="list-style-type: none"> Liquidity (in terms of traded volume) and market size (in terms of total load) go hand in hand. This relationship is more pronounced for DA than for ID. The relationship is also less pronounced for Germany and France on the DA market and for France on the ID market. This may be explained by the various design differences between the European countries, particularly considering the relevance of OTC trades of short term products. No clear relationship was identified between churn ratios and total load.
	RES share	↗	<ul style="list-style-type: none"> The share of RES and liquidity is positively correlated but the impact is limited.
	Average weighted correlation	↗	<ul style="list-style-type: none"> Products for countries that are highly correlated to its neighbours tend to have a higher liquidity (not across all metrics/products).
	HHI	↘	<ul style="list-style-type: none"> Market concentration shows a negative correlation with liquidity but the strength of the model result (due to annual data) is not high.
	Temperature	↗↘	<ul style="list-style-type: none"> The relationship is inconclusive. It may be that this is because much of the variation of traded volumes is due to total load changes that also follow temperature.
Others	Time trend	↗	<ul style="list-style-type: none"> The data shows that over time liquidity generally increases in Europe.

Legend for relationships: Direction of the arrow: direction of coefficient, if in both directions: Inconclusive direction among models. Size of arrow: Relative size of coefficient. Colour of coefficient: Significance (black = significant) of coefficient.

Note: The underlying regression models are based on monthly data (but for HHI) and use data from the NEMOs, ACER, ENTSO-E and EUROSTAT, ECAD

Relationship of liquidity metrics with market characteristics: Long-term

The analysis of the model results for traded volumes and bid-ask spreads shows that load and prices are the characteristics displaying the highest correlation.

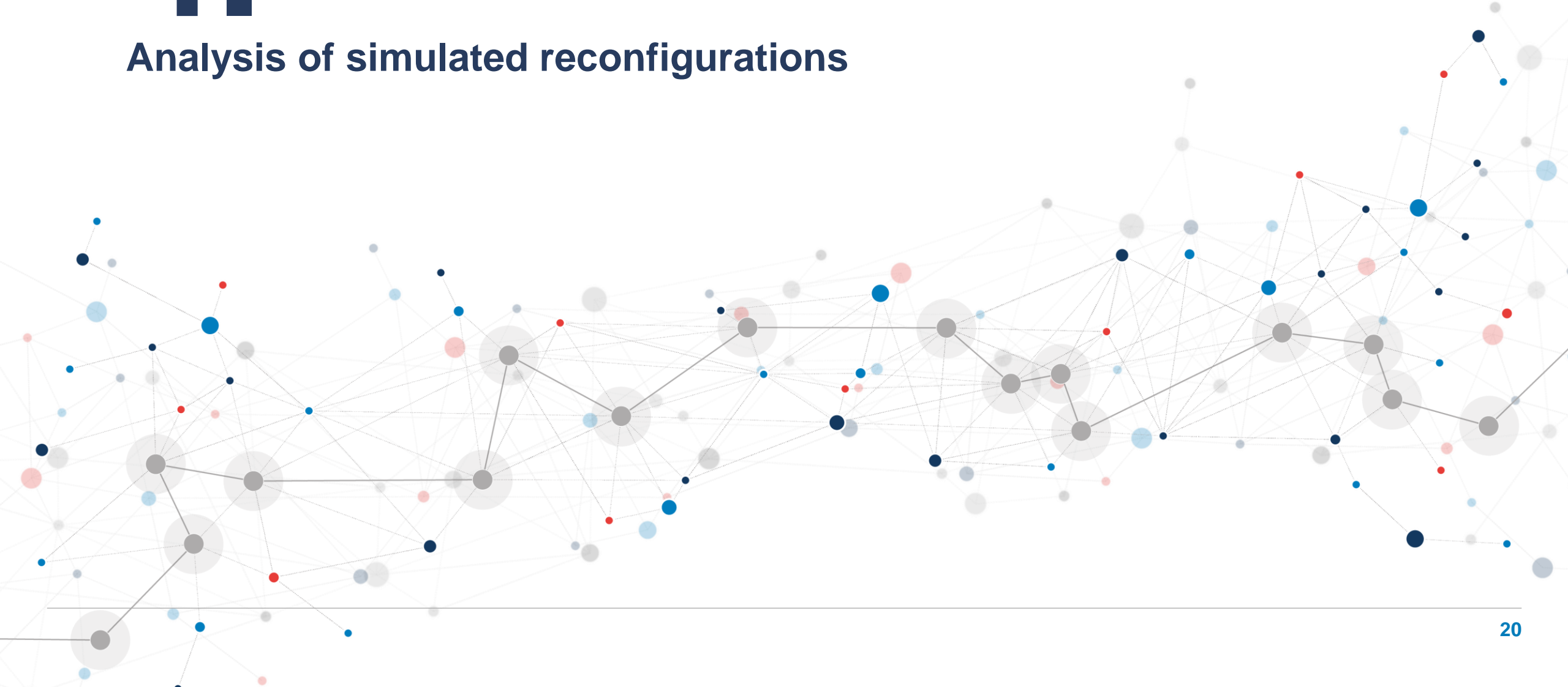
	Variables	Relationship	Explanation and interpretation
Explanatory and confounding variables in focus	Total load	↗	<ul style="list-style-type: none"> Larger countries (in terms of market size) show higher traded volumes for their long-term products and lower bid-ask spreads.
	RES share	↗	<ul style="list-style-type: none"> The share of RES and liquidity is positively correlated.
	Price spread and correlation to lead market	↗ & ↘	<ul style="list-style-type: none"> The relevance of proxy-hedging for liquidity is inconclusive. The relationship to correlation is only significant in one case – the price spread variable sometimes shows a positive or a negative relationship to liquidity metrics, depending on the model specification.
	HHI	↘ & ↗	<ul style="list-style-type: none"> Market concentration is negatively correlated with liquidity in terms of traded volumes but not bid-ask spreads. The strength of the model result (due to annual data) is not high.
	Price	↘	<ul style="list-style-type: none"> The price of the traded products and the traded volumes generally show a negative correlation. This relationship does not hold in all model specifications. This may require further analysis. For Bid-ask-spreads, the relationship of increasing prices and decreasing liquidity (increasing BAS) is significant across different models.
Others	Time trend	↘	<ul style="list-style-type: none"> Traded volume for exchanged traded and cleared product increased over time while the volume for bilateral contracts without clearing decreased. Bid-ask spreads did not show a time trend over the past 7 years.

Legend for relationships: Direction of the arrow: direction of coefficient, if in both directions: Inconclusive direction among models. If multiple relationships: different directions for different underlying parameters. Size of arrow: Relative size of coefficient. Colour of coefficient: Significance (black = significant) of coefficient.

Note: The underlying regression models are based on monthly data (but for HHI) and use data from EEX, NASDAQ, ICE, LEBA, ENTSO-E and EUROSTAT

4.

Analysis of simulated reconfigurations



Methodological approach

The analysis of the state of liquidity in the proposed alternative BZ configurations is based on simulated market parameters that have shown a correlation to liquidity metrics in historical data.

1. First, we **analyse the simulated data** provided to us by the TSOs and identify specifications of the market characteristics.
2. Then, we assess the identified **implications for the alternative configurations** in light of the likely relationship between liquidity metrics and the parameters as provided by the TSOs.
3. We derive, where possible, **expectations on changes to liquidity metrics** from the proposed alternative configurations.

Market size

- Approximated by the parameters generation and load volume as provided by the TSOs
- Based on the results of the historical analysis, we consider **increases in market size** as, ceteris paribus, **increases of liquidity metrics** both for the short- and long-term markets

Market concentration

- Portrayed by HHI values for the Nordics and RSI and PSI^[1] values for Central Europe
- An **increase in the HHI** and a **decrease in RSI or PSI** indicates an **increase in market concentration**, which tends to imply a **decreased level of liquidity metrics** both for short- and long-term markets

Price correlation

- Calculated as the market size-weighted average of price correlation across directly connected BZ to the BZ in question^[2] and can take values between -1 and 1.
- Based on the results of the historical analysis, we consider **increases in price correlation** are, ceteris paribus, **liquidity enhancements** for short-term markets.

Overall results and observations

We have assessed the likely effect on liquidity metrics for the alternative configurations based on identified historic relationship between market characteristics and liquidity metrics.

Countries	ACER identifier	Market concentration	Price correlation	Market size	Overall assessment on liquidity metrics w/o mitigation measures
Sweden	8	Mostly decreasing	Decreasing, but only to a small extent	Mostly increasing	Tendency to improvement for short- and long-term markets
Sweden	9	Mostly decreasing	Decreasing, but only to a small extent	Mostly increasing	Tendency to improvement for short- and long-term markets
Sweden	10	Mostly decreasing	Mostly decreasing, but only to small extent	Decreasing	Tendency to impairment for short- and long-term markets
Sweden	11	Limited change	Decreasing, but only to small extent	Two-sided	Inconclusive due to limited changes in market characteristics for both short- and long-term markets
Germany; Luxembourg	2	Mostly decreasing	Mostly increasing, but only to a small extent	Decreasing	Tendency to impairment for short- and long-term markets
Germany; Luxembourg	12	Mostly decreasing	Mostly increasing, but partially to a small extent	Decreasing	Tendency to impairment with potential exceptions at least for short-term markets
Germany; Luxembourg	13	Mostly decreasing	Mostly increasing	Decreasing	Tendency to impairment with potential exceptions at least for short-term markets
Germany; Luxembourg	14	Mostly decreasing	Mostly increasing	Decreasing	Tendency to impairment with potential exceptions at least for short-term markets
France	5	Mostly decreasing	Increasing	Decreasing	Inconclusive due to potentially offsetting changes for the short-term markets , and tendency to impairment for long-term markets in line with market size changes
Northern Italy	6	Mostly decreasing	Two-sided	Decreasing	Tendency to impairment for short- and long-term markets
Netherlands	7	Decreasing	Increasing, but only to a small extent	Decreasing	Tendency to impairment for short- and long-term markets

- Market size **decreases** for most BZs reconfigurations.
- Market concentration as measured by the simulated HHI and RSI is **decreasing** in most cases or at least remains below critical levels such as RSI values below 1.
- Price correlation tends to **increase** for the reconfigured BZs.

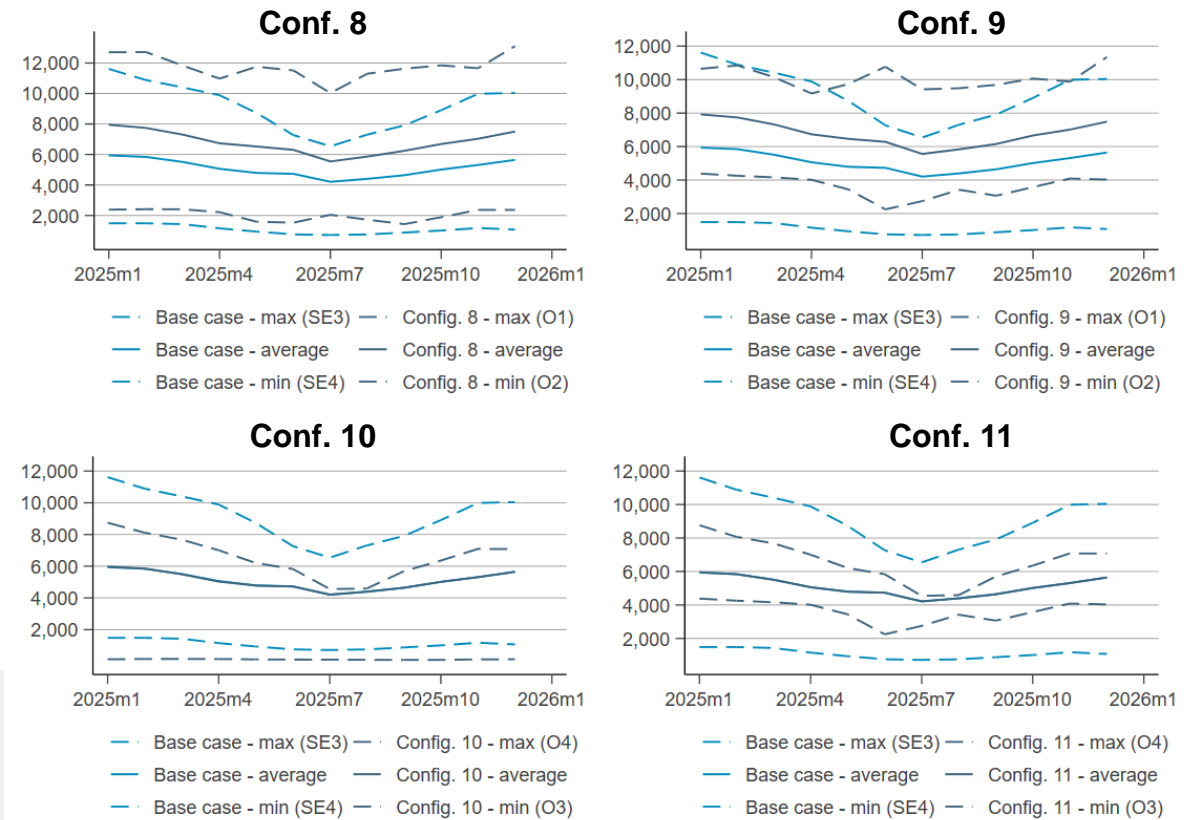
Key observations: Nordics

Our analysis suggests potential slight liquidity metric improvements for reconfigurations 8 and 9, and an impairment for alternative configuration 10. The analysis of configuration 11 has been inconclusive.

Case	Descriptive statistic	Market concentration		Price correlation		Market size	
		HHI				Generation	Demand
Base case	Max	SE1: 0.12	SE4: 0.97	SE3: 11,614	SE3: 12,620		
	Average	0.07	0.78	5,094	4,250		
	Min	SE4: 0.04	SE2: 0.53	SE4: 722	SE2: 1,608		
Conf. 8	Max	↓ O2: 0.09	↓ O2: 0.88	↑ O1: 13,110	↓ O3: 11,628		
	Average	0.07	↓ 0.72	↑ 6,789	↑ 5,667		
	Min	↓ O3: 0.03	↓ O1: 0.49	↑ O2: 1,432	↑ O2: 1,721		
Conf. 9	Max	↓ O2: 0.1	↓ O2: 0.92	↓ O1: 11,344	↓ O3: 11,623		
	Average	0.07	↓ 0.72	↑ 6,767	↑ 5,667		
	Min	↓ O3: 0.03	↓ O1: 0.48	↑ O2: 2,252	↑ O2: 2,641		
Conf. 10	Max	↓ O1: 0.11	↓ O3: 0.94	↓ O4: 8,741	↓ O4: 11,623		
	Average	0.07	↓ 0.77	↓ 5,092	4,250		
	Min	↓ O4: 0.03	↑ O1: 0.61	↓ O3: 98	↓ O3: 1,238		
Conf. 11	Max	O1: 0.12	↓ O3: 0.94	↓ O4: 8,762	↓ O4: 11,623		
	Average	0.07	↓ 0.75	↑ 5,095	4,250		
	Min	↓ O4: 0.03	↓ O2: 0.52	↑ O3: 2,252	O2: 1,608		

- **Reconfigurations 8 and 9:** tend to show overall increased liquidity metrics
- **Reconfiguration 10:** impairment of liquidity metrics, primarily driven by decreases in market size (in particular for O3) without strong offsets by other market characteristics such as price correlation
- **Reconfiguration 11:** inconclusive picture as some market characteristics change in opposite directions or only to a limited extent

Market size – generation (in MWh)



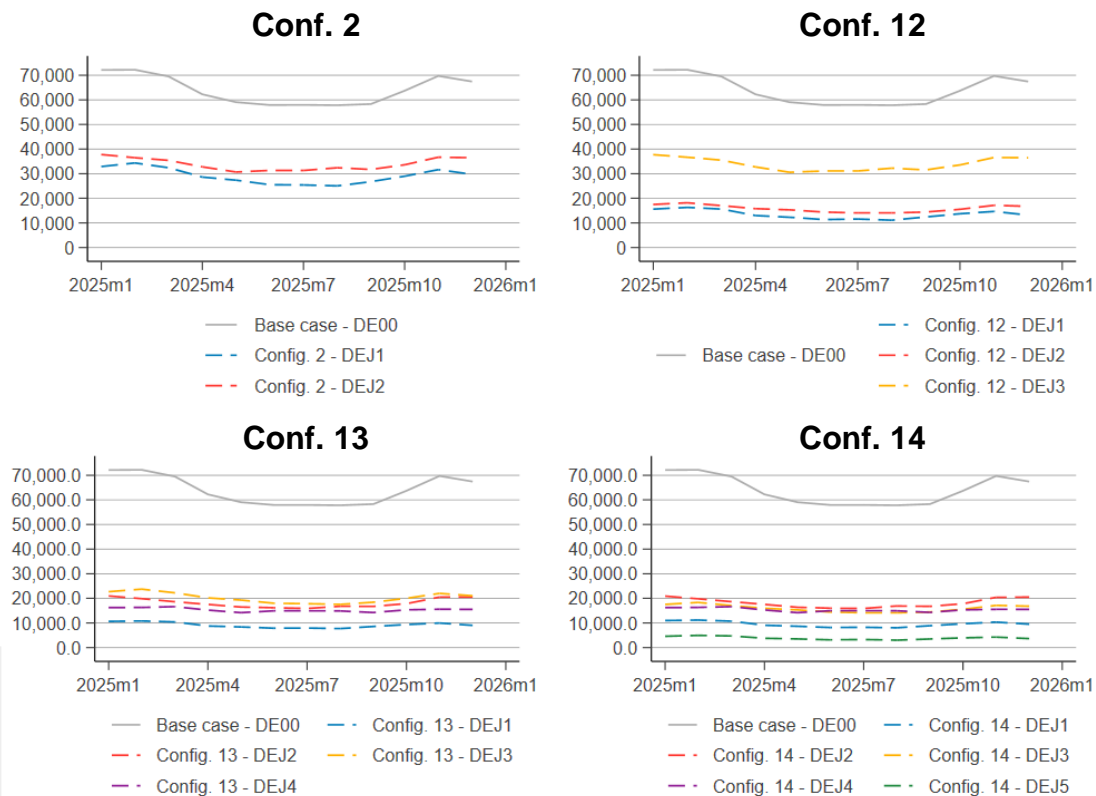
Key observations: Germany-Luxembourg

Our analysis shows a differentiated picture with improvements in the parameters market concentration and price correlation, but substantial decreases in market size. Ceteris paribus we would expect a decrease in liquidity metrics.

Case	Descriptive statistics	Market concentration			Price correlation	Market size	
		Rsi25	Rsi50	Rsi75		Generation	Demand
Base case		DE00: 1.71	DE00: 1.77	DE00: 1.84	DE00: 0.65	DE00: 64,018	DE00: 64,434
Con. 2	Max	↑ DEJ1: 2.47	↑ DEJ1: 2.62	↑ DEJ1: 2.77	↑ DEJ2: 0.7	↓ DEJ2: 33,919	↓ DEJ2: 44,808
	Average	↑ 1.89	↑ 2.04	↑ 2.18	↑ 0.68	↓ 31,504	↓ 32,256
	Min	↓ DEJ2: 1.32	↓ DEJ2: 1.45	↓ DEJ2: 1.58	↑ DEJ1: 0.67	↓ DEJ1: 29,089	↓ DEJ1: 19,704
Con. 12	Max	↑ DEJ2: 2.86	↑ DEJ2: 3.14	↑ DEJ2: 3.41	↑ DEJ1: 0.84	↓ DEJ3: 33,846	↓ DEJ3: 44,734
	Average	↑ 2.14	↑ 2.35	↑ 2.56	↑ 0.74	↓ 21,050	↓ 21,498
	Min	↓ DEJ3: 1.32	↓ DEJ3: 1.45	↓ DEJ3: 1.59	↑ DEJ2: 0.67	↓ DEJ1: 13,429	↓ DEJ2: 9,265
Con. 13	Max	↑ DEJ3: 2.97	↑ DEJ3: 3.18	↑ DEJ3: 3.39	↑ DEJ1: 0.85	↓ DEJ3: 20,273	↓ DEJ4: 22,830
	Average	↑ 1.88	↑ 2.12	↑ 2.37	↑ 0.73	↓ 15,740	↓ 16,124
	Min	↓ DEJ2: 1.19	↓ DEJ2: 1.39	↓ DEJ2: 1.58	↓ DEJ3: 0.6	↓ DEJ1: 9,145	↓ DEJ1: 7,308
Con. 14	Max	↑ DEJ5: 4.62	↑ DEJ5: 5.01	↑ DEJ5: 5.4	↑ DEJ5: 0.86	↓ DEJ2: 18,153	↓ DEJ4: 22,829
	Average	↑ 2.41	↑ 2.71	↑ 3.02	↑ 0.76	↓ 12,562	↓ 12,902
	Min	↓ DEJ2: 1.19	↓ DEJ2: 1.4	↓ DEJ2: 1.6	↓ DEJ3: 0.59	↓ DEJ5: 3,884	↓ DEJ5: 2,038

- Particularly impacted by decreases in BZ market size.
- Due to the positive relationship between market size and liquidity metrics, this suggests an impairment of liquidity metrics.
- However, the effect may be (partially) offset by increases in price correlation and decreases in market concentration at least for short-term markets.

Market size – generation (in MWh)



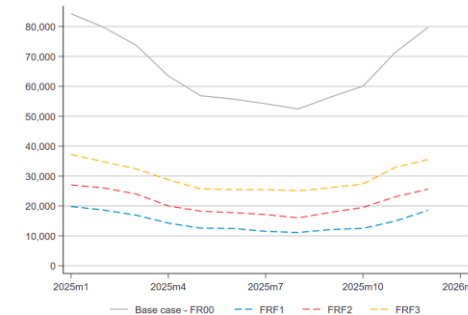
Key observations: France

As for Germany-Luxembourg, our analysis suggests two opposing effects: a substantial decrease of market size per BZ, but a decrease of market concentration and increase in price correlation.

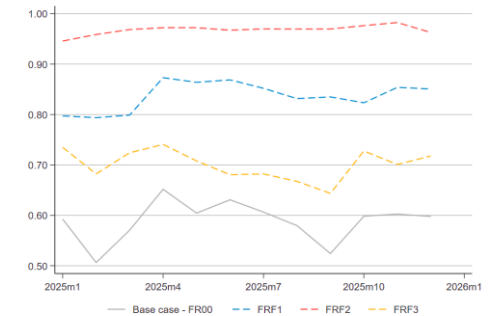
Case	Descriptive statistics	Market concentration			Price correlation	Market Size	
		Rsi25	Rsi50	Rsi75		Generation	Demand
Base case		FR00: 1.05	FR00: 1.1	FR00: 1.15	FR00: 0.59	FR00: 65,692	FR00: 55,430
Con. 5	Max	↑ FRF1: 1.64	↑ FRF1: 1.87	↑ FRF1: 2.11	↑ FRF2: 0.97	↓ FRF3: 29,748	↓ FRF3: 23,863
	Average	↑ 1.23	↑ 1.41	↑ 1.59	↑ 0.84	↓ 21,803	↓ 18,474
	Min	↓ FRF3: 0.97	↑ FRF3: 1.15	↑ FRF2: 1.33	↑ FRF3: 0.7	↓ FRF1: 14,625	↓ FRF1: 14,084

- Market size is decreasing but price correlation parameter increases significantly for all the BZ.
- Hence no clear indication regarding changes in liquidity metrics for the short-term market and a tendency towards impairments of liquidity metrics for long-term markets.
- Unique case in the analysis of historical data, because the relationship between market size and traded volume in the short-term markets has been relatively inelastic.

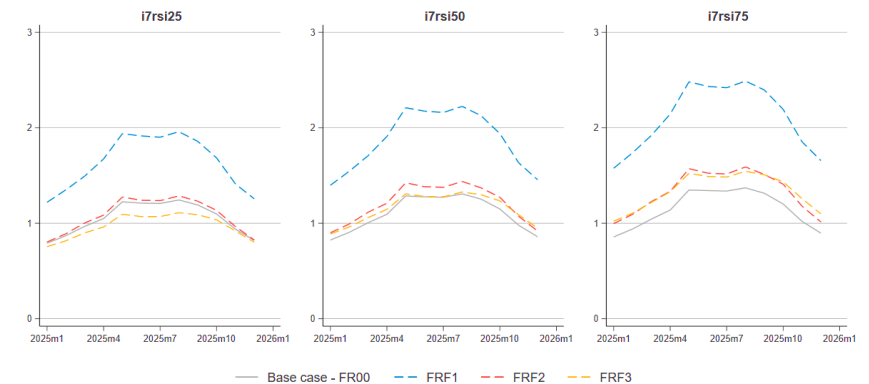
Market size – generation (in MWh)



Price correlation



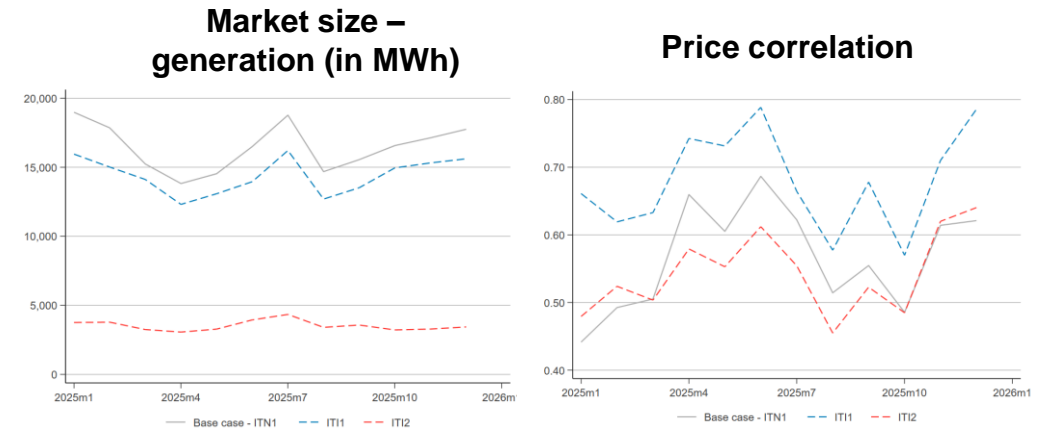
Market concentration – RSI



Key observations: Italy

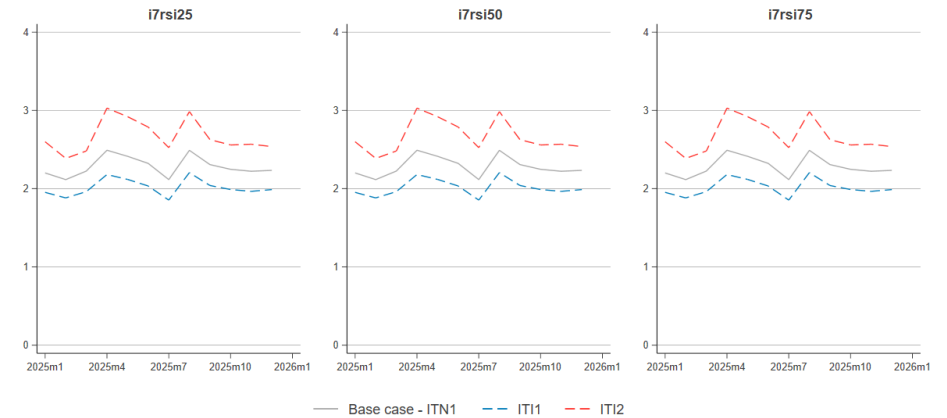
Our analysis suggests a limited impairment in market liquidity metrics in both BZs in Northern Italy for both the short- and long-term markets.

Case	Descriptive statistics	Market concentration			Price correlation	Market size	
		Rsi25	Rsi50	Rsi75		Generation	Demand
Base case		ITN1: 2.28	ITN1: 2.28	ITN1: 2.28	ITN1: 0.57	ITN1: 16,447	ITN1: 20,399
Con. 6	Max	↑ ITI2: 2.67	↑ ITI2: 2.67	↑ ITI2: 2.67	↑ ITI1: 0.68	↓ ITI1: 14,394	↓ ITI1: 17,150
	Average	↑ 2.34	↑ 2.34	↑ 2.34	↑ 0.61	↓ 8,962	↓ 10,196
	Min	↓ ITI1: 2.01	↓ ITI1: 2.01	↓ ITI1: 2.01	↓ ITI2: 0.54	↓ ITI2: 3,531	↓ ITI2: 3,243



- Alternative configuration suggests an impairment of liquidity metrics for short- and long-term markets at least in the north-western BZ.
- This may be derived from the observation of a significant decrease in market size without substantial changes in other parameters that may counter this effect.

Market concentration – RSI

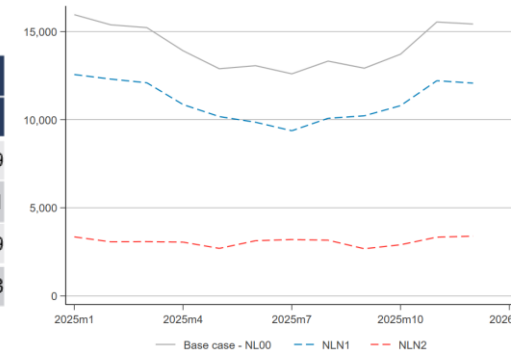


Key observations: Netherlands

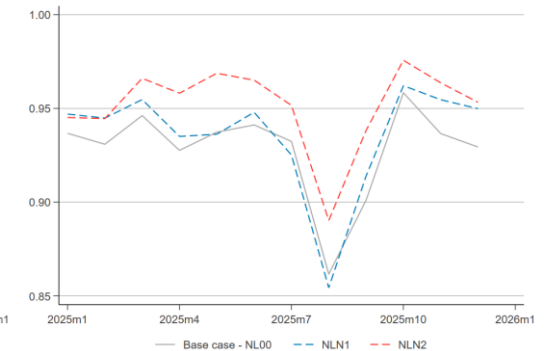
Our analysis suggests a decrease in liquidity metrics for both short- and long-term markets at least in the northern zone of the alternative configuration.

Case	Descriptive statistics	Market concentration			Price correlation	Market size	
		Rsi25	Rsi50	Rsi75		Generation	Demand
Base case		NL00: 1.75	NL00: 1.88	NL00: 2.02	NL00: 0.93	NL00: 14,165	NL00: 13,579
Con. 7	Max	↑ NLN2: 2.1	↑ NLN2: 2.5	↑ NLN2: 2.89	↑ NLN2: 0.95	↓ NLN1: 11,051	↓ NLN1: 11,011
	Average	↑ 1.94	↑ 2.22	↑ 2.51	↑ 0.94	↓ 7,070	↓ 6,789
	Min	↑ NLN1: 1.77	↑ NLN1: 1.95	↑ NLN1: 2.13	↑ NLN1: 0.94	↓ NLN2: 3,088	↓ NLN2: 2,568

Market size – generation (in MWh)



Price correlation



- Alternative configuration sees similar changes as the Northern Italian reconfiguration and equally suggests an impairment of liquidity metrics for short- and long-term markets at least in one BZ. However, correlation is notably higher than in Northern Italy.
- This follows particularly from the market size decreases and the limited increase in price correlation from an already high level.

Market concentration – RSI



Locations

Europe

Berlin
Brussels
Copenhagen
Düsseldorf
Helsinki
London
Madrid
Milan
Paris

North America

Boston
Chicago
Houston
Los Angeles
Miami
New York
Oakland
Washington, DC

Latin America

Buenos Aires
Santiago

Asia Pacific

Beijing
Singapore

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