Market Design in Electricity
The European mix of competition law and regulation

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Electricity restructuring: principles

A basic principle

Competition in electricity requires

- access to an essential infrastructure
  - Well understood: access to the grid
- access to essential services (less understood)
  - Congestion management
  - Balancing
  - Maintenance of the product quality
    - Frequency, voltage
    - reliability

The infrastructure and services require

- A transmission owner (TO)

  That builds lines and rents its services

- A system operator (SO)
  - That procures capacity and energy services from generators
  - And repackages them in network services

- TO and SO can be a single or two agents

  The debate TRANSCO vs ISO

A source of difficulties: the grid

- creates short term externalities
  - Transactions between two nodes influence the set of possible transactions between any other pair of nodes
  - The SO has to take care of these externalities

- creates long term externalities
  - Investment between two nodes influences the transmission possibilities in the rest of the network (changes the PTDF of the whole grid)

These are difficult externalities

- Externalities are handled
  - By integration: this is the regulated, vertically integrated monopoly
  - By taxes: impractical here because of the always changing electricity flows
  - By property rights: one creates markets (e.g. compare with CO2 allowances)
    - In this case property rights on “capacities” (to be defined)

- But
  - Electricity markets cannot clear in real time and electricity is not storable
  - Which requires to maintain some regulated monopoly somewhere

The outcome

- All this requires a delicate mix between
  - What remains under monopoly
    - And how that monopoly is regulated
  - What is done through property rights (markets)
    - And how one defines these property rights

- That delicate mix has to be found for the EU
  - That is for 27 countries
  - That are not subject to a common energy policy
  - But operate under a “subsidiarity” principle

A broad view of EU instruments

Competition vs. Harmonization: Competition

Competition law (DG COMP):

- articles 81 to 89, in particular
  - 82: abuse of dominant position
    - e.g. long term contracts by dominant companies
  - 86: services of general economic interest and Commission Directives
- Merger Regulation 139/2004 EC
- Regulation 1/2003
  - And the Sector Inquiries

Competition vs. Harmonization: Harmonization

Article 95 ((47(2) and 55) and harmonization Directives (DG TREN)

- Directive 96/92
- Directive 2003/54 EC
- Regulation (EC) No 1228/2003 on cross border trade
- Directive 2005/89 on Electricity Security of Supply and Infrastructure
- Third package: proposals for
  - A Regulation on Network of TSOs and Agency of Regulators
  - A Directive on ownership unbundling
  - A Regulation updating Regulation 1228/2003

These are quite different instruments

- Competition law **domesticates an existing market** operating in normal conditions
- Competition law **is not designed to create markets**
  - Neither an energy market
  - Nor ancillary service markets
- Article 95 Directives **harmonize markets**
  - **In electricity they had also to create** (not only harmonize)
    - The energy market (we were aware!)
    - The ancillary markets (we may not have been aware!)
    - A regulation of the remaining monopolies (we were aware!)

These instruments give quite different powers

- Competition law gives considerable power to the European Commission
  - Competition law is primary law
  - The Commission and the European Court of Justice developed considerable jurisprudence
  - Regulation 1/2003 extended these powers by involving National Competition Authorities and Courts in a European Competition Network
- The Commission can initiate Article 95 Directives
  - **But the Council and the Parliament have the final say on these laws (the codecision process)**

The interesting question

- If electricity restructuring requires a market design that involves a careful mix of
  - Regulate some residual monopolies
  - Create markets and property rights to internalize externalities
- Can one achieve that market design through article 95 (harmonization) directives
- And if not, can one achieve that market design by competition law
- Or by a mix of both

In principle the answer is yes

- Invoke article 86(1)
  - TO and SO provide services of general economic interest
- Invoke article 86(2)
  - Delineates that exceptions to the application of competition law should not exceed what is necessary for the fulfillment of the services
- Invoke article 86(3) and issue Commission Directives
- And complete with article 95 directives

In practice, this was not pursued in energy

- This path was pursued in telecommunication
  - With a mix of article 95 and Commission Directives
- There was an initial attempt in the early 90
  - To also introduce a pair of Commission and article 95 directives
- It encountered considerable resistance
  - And the Commission withdrew its proposals

Application of the instruments: Chronology

Phase I

- Member States oppose restructuring through Competition Law
  - They are right; it is not the most appropriate instrument
  - The Commission agrees not to resort to Competition Law and goes through Article 95 Directives and Regulation

- Some Member States do not want restructuring at all
  - They try to jam the Article 95 process
    - The Council and the Parliament produce vague laws
      - The first directive segments the market instead of integrating it (an unintended consequence acknowledged by the Commission in 98)
      - The second directive strengthens national restructuring
        - But does nothing to integrate the markets
      - The regulation on cross border trade is very vague
        - With inconsistencies in important definitions
        - But it had unexpected positive consequences

Applications of the instruments: Chronology

Phase II

- **DG TREN**
  - Publishes benchmarking reports
    - Pointing out the numerous shortcomings in the internal market

- **DG COMP comes in**
  - Finds reasons of concern with the existing market and attributes them to the market power of the incumbent generators
    - *It is not clear that this is correct. An alternative explanation (and the combination of both explanations would certainly do too) is that the lack of progress is due to an insufficient market design. But stakeholders have for a long time denied this explanation. Attributing the failures of the market to incumbent generators is thus logically consistent with the position that those who claimed that the harmonization law was sufficient.*
  - For some reason (see below) things have began to move: nobody today thinks that the existing legislation is sufficient

Applications of the instruments: Chronology

Phase III

- **The Commission proposes a third package**
  - Regulators asked for a European TSO
    - The package proposes a Network of TSOs that overviews the task of the different TSOs
  - The Commission had at some time argued for a European Regulator
    - The package proposes an Agency that overviews the task of the Regulators
  - The package also sketches the tasks of these new bodies. But these are always subject to unintended consequences: the real test will come after implementation
  - Regulators and the Commission had argued for ownership unbundling between supply and TSO
    - The package retains the proposal as the preferred option. It offers an alternative ISO organisation subject to several additional conditions (in order to favor ownership unbundling). France and Germany will fight ownership unbundling but all means. They are supported by 5 other countries
- **DG COMP remains in background**
  - probably ready to intervene
    - At least by threats
    - More probably by real actions such as the infringement procedures

The harmonization approach and the failed attempt to create the necessary market design

The harmonization path

- Article 95 Directives were supposed to
  - Create the conditions for
    - An energy (the electricity product) market
    - The ancillary markets
  - Subject to a minimal harmonization(subsidiarity principle) that would permit
    - The integration into an internal market
- These directives (first and second) did not attempt to harmonize
- And hence did not integrate

A recurrent question: does one need a strong harmonization? A formal proof is difficult but:

- One can invoke three ex ante reasons:
  - The real time externalities created by the grid require a strong degree of coordination between TSO and hence…
  - The coordination by quantities achieved by the security constrained dispatch will be difficult to replace by a pricing mechanism without the energy and transmission products being rigorously harmonized (and this is only a necessary condition)
  - Market for ancillary products are extremely delicate to design and benefit from economies of scale and hence integration

- And one ex post reason:
  - Experience shows that the higher the harmonization the better the performance

The first directive (1996)

- **Underlying principles**
  - Opened production and removed exclusive rights
  - Introduced third party access (but did not impose its regulation)
  - Introduced accounting and management unbundling
  - Did not require a regulator

- **Results**
  - Opened the door to almost everything
  - Led to a wide variety of implementations that could in no case be subsequently integrated into a single market

- **In 1998, the Commission created the Florence Forum to harmonize what its Article 95 directive had not harmonized**

The second directive (2003)

- **Underlying principles**
  - Modified the access to production
  - Restated the creation of a TSO and stated its duties
    - Congestion management, taking care of relations with neighbors
    - Balancing
    - Development of the grid
    - Publication of tariffs for accessing the grids
    - Management unbundling
  - Created Regulators (NRA) and placed them in charge of competition objectives
    - Which can be pursued ex ante
    - **with a much lighter burden of proof than general competition law**
- **Results**
  - impose some common constraints on the national market design like having a regulator but this remains very far from a common market design

The Regulation on Cross Border Trade

- **Underlying principles**
  - Tackle the diversity of national market architecture without imposing a common architecture (see the ”ETSO vision" papers of the time). This would be done by addressing two network externalities
    - The short term: the EU market is decomposed into zones separated by interconnections. Managing the interconnections will solve the short term externalities
    - Some longer term issues
      - Hamonizing access to infrastructure at least to some extent
        - G and L
      - Creating some compensation for loop low induced costs
        - Inter TSO compensation (has a flavour of invesment costs)
- **Results**
  - A rather negative report of Regulators
  - My more positive view: practice showed that words are not enough, internal technical consistency is necessary

More details: the development of the competition approach

Large consumers complain that the market does not work well

- They are right, but do not necesarily invoke the good reason
  - **In general large consumers have been very primitive in their analysis of questions of market design (same in CO2)**

- Competition authorities intervene when the market does not work well. DG COMP launched
  - **a sector Inquiry pursuant article 17 of Regulation 1/2003**
    - which resulted in different "findings" and infringement procedures against companies e.g.
      - market sharing (article 81)
      - abuse of dominant position (article 82)

- We concentrate on the "findings"

Finding 1: The market is too concentrated

- DG COMP proceeds according to its jurisprudence: it first defines the relevant market
  - Product market: wholesale = production and imports
    - Imports depend on infrastructure (in the jurisprudence) and congestion management (not in the jurisprudence)
    - Therefore and in market design terms, the product market involves energy (in the jurisprudence) and congestion management (not in the jurisprudence)
  - Geographic market: no wider than national
    - In market design terms: congestion management and transmission infrastructure geographically segment the market

- DG COMP computes several indices and (*non surprisingly given the story of the industry*) finds that the wholesale market is concentrated!
  - This is important for companies. The relevant market is an important factor for determining dominance (and hence possible violations of article 82)

Finding 2: There is vertical foreclosure

- DG COMP wonders whether a supplier can enter without generation capacity: the need for generation capacity increases the cost of entry
  - It computes the sum of the net (short and long) positions in each country both in absolute term and in % of national load
  - It reasons that the smaller this net position, the higher the foreclosure of the market (the difficulty of entering without generation capacity)

- In market design terms:
  - Entering without generation requires a liquid power exchange and associated financial markets; this makes it possible to dispense with long term contracts. Conversely, long term contracts prevent the development of the liquid PX.
  - This can only be developed in a market that simultaneously trades energy in different locations

Finding 3: There is lack of market integration

- The Sector Inquiry finds a set of defaults that are all of the market design type
  - Insufficient interconnecting infrastructure (incentive to invest supposed to come in third package with ownership unbundling)
  - Insufficient incentives to improve cross border infrastructure: this is part of the regulators' claim that there is "regulatory gap" (also for third package)
  - Insufficient allocation of existing capacity: implicit vs. explicit auction of transmission capacities
  - Incompatible market designs: these are due to obvious lack of harmonization (e.g. differences between balancing regimes, nomination procedures, opening hours of power exchanges, TSO's and/or spot market operators)

Finding 4: There are barriers to entry

- DG COMP finds that balancing is often a barrier to entry
  - Balancing market is a separate product market (different from energy)
    - It requires machines of different characteristics
  - Geographic market is no wider than national
  - Given the above, one expectedly concludes that balancing is still more concentrated than energy
  - Its pricing is punitive (at least at the time of the inquiry, balancing is in flux); there is an incentive to remain in balance
- In market design terms
  - Energy, congestion management and balancing are just one product and it can be wider than national

Lessons from DG COMP

- Most of DG COMP's findings can be traced to
  - Obvious issues of harmonization: e.g. different opening hours of markets)
  - Inadequate market design (implicit and explicit auctions of TC)
  - Lack of harmonization with a consequent insufficient integration: e.g. fragmented balancing
  - Insufficient centralization of some decisions and computations: e.g. insufficient interconnection capacity

- That restrict the geographic market of companies
  - And hence increase concentration
    - And pave the way to infringements of competition law

Bringing hamonization and competition law together: DG COMP and market design

- The product market: wholesale is production and import
  - Should one treat energy and congestion management simultaneously in the market design?
- Entering without generation is too risky
  - Can one expand the geographic wholesale market to increase liquidity ?
  - Can one expand the geographic balancing market to increase liquidity and hence ease suppliers entry?
- The market is not integrated
  - Suppose one can harmonize the obvious (opening hours, product definition...), can one also harmonize the organization of the market
- Balancing is more concentrated than energy; it is a barrier to entry
  - Can one make energy and balancing two segments of a single product market?

In a possibly tense regulatory situation

- The Regulation on cross border trade
  - introduced a set of impossible obligations (this is the negative view) that
    - have to do with the national markets inherited from the first directive
    - are sometimes electrically and economically contradictory
    - may reflect the fact that stakeholders could not agree on any substantive market design or did not really understand!!!
  - But these obligations are nevertheless legal (this is the positive view) ,
    - They force stakeholders to think harder and to move
    - Specifically, TSO and National Regulators have to comply
- The institutions
  - DG COMP cannot directly act on MD; it checks whether the market structure (not market design) complies with primary law and applies its rules
  - Regulators have began insisting that TSO really comply with the law; this put some pressure on TSOs
  - DG TREN took it easy with compliance with the Regulation

Competition law and market design issues

I. Congestion management

Where we are

Market design requirements of the Regulation on CBT

- Congestion management at the interconnections and domestic congestion management are seen as separate problems.
  - The principle imposes a Nordpool like view of the grid: a set of zones separated by transmission capacities.
  - It requires TSO to compute these transmission capacities and maximize them.
  - But it does not impose a Nordpool like view of the energy market, it requires congestion methods to be market based but does not say more. This led led to two forms of congestion management at the interconnection: explicit and implicit auction. None of these recognizes loop flows
  - These are fundamental (over)simplifications. But
    - they probably enabled the Regulation.
    - Which in turn led to unexpected useful developments

Competition authorities intervene

- An insufficient result of hamonization:
  - The new guidelines of the Regulation (January 2007) recognize that implicit and explicit auctions are market based and hence the only congestion methods legally allowed. This is a political compromise
- A very positive outcome of the Sector Inquiry (January 2007)
  - It explains in detail that explicit auctions
    - Do not maximize the available TCs (a legal requirement in the Regulation 6(3))
    - Send the wrong price signals
- As a result? The third package (only a proposal) requires implicit auction
- In this case competition law could do what harmonization law could not
  - This is very insufficient (in terms of congestion management) but it still a major step

What can happen in the future?

- The harmonization approach:
  - Suppose implicit auction becomes law. We begin a very long path to implement the approach in a reasonable way
    - The current implementation called “market coupling” is limited to The Netherlands, Belgium and France. It assumes a drastic simplification of the grid (no loop flow)
  - Suppose implicit auction does not become law, then
- Competition authorities could rely on the Sector Inquiry and
  - Impose structural remedies for improving congestion manegement on the basis of Regulation 1/2003. Unlikely because DG COMP sees generators as the cause of the problem (a matter of choosing the target)
  - launch a judicial action against the relevant TSOs (they do not maximize TC and hence have a negative impact on trade between MSs)
  - Pass a Commission (Article 86(3)) Directive to impose implicit auction (against the opinion of certain MSs)
- In both cases, this would be very long

II. Congestion management and hedging

Where we are

- DG COMP explains that entering the supply market without generation is costly because of illiquid and volatile markets; it also argues about this illiquidity to oppose long-term contracts
  - **Principle**: financial markets require some underlying (here energy in different locations): the market of underlyings should function well for the financial markets to develop
- The obvious question: do implicit or explicit auctions (that is the current or foreseen market design) lead to an efficient market of underlyings?
- DG COMP explains that explicit auctions create arbitrages (which violates one of the basic assumption of financial markets)
- No trace of that problem in the stakeholder Discussion (the harmonization path)

This seems to be an extremely complex issue

- DG COMP argues
  - Long term contracts by dominants generators foreclose the market and infringe article 82
    - But organization of cross border trade today makes it very difficult for a industrial consumer to conclude a long-term contract with a non national non dominant generator
  - Because liquid PX and prices on these PX are the real economic signal that should drive competitive electricity systems and long term contracts prevent the development of liquid PX

- DG COMP will continue fighting long term contracts with the view of developing PX

This looks like a problem of chicken and eggs

- Without a good organization of cross border trade (and hence market design), there will be
  - No cross border long-term (one year for DG COMP!!) contracts.... and hence
  - Insufficient PX liquidity (even though liquidity is remarkable given the current system).... and hence
  - Limited possibilities for entrants to hedge....
  - And thus few entrants..... and hence
  - A demand for long-term contracts with incumbents
  - That DG COMP does not want to see

The unintended (good) consequences of a (flawed) regulation

- *ETSO on firmness of cross border trade and transmission rights in Europe (July 2007):* TSOs are afraid of compensations computed on the value of transmission rights at curtailment time: **Why?**

- The Regulation mandates that
  - They maximize available transmission capacity (article 6(3))
  - They compensate for curtailment (article 6(2))
    - But the regulation does not specify the compensation method
    - And the compensation could become high were this based on energy price spread at time of curtailment
  - This is a subtle question of market design

The (indirectly) related problem of TSOs

- TSOs invoke an unusual argument: the ”simplistic adequacy analysis...” does not work
  - The “adequacy analysis”
    - has a name in well designed system: “revenue adequacy”
    - tells TSOs not to be afraid of compensations at spot value of transmission rights
    - works and is not simplistic in a well designed (nodal) system
- TSOs might thus have difficulties with the current market design for complying with the regulation (and we shall see that they have other difficulties)
  - The current European system is not sufficiently well designed: implicit auction is what comes closest to the nodal system but it is still quite far
- This is an interesting aspect of an inadequate market design: its contradictions may force revision

What can happen in the future

- Suppose we make progress on CBT
  - Then cross border long term contracts and liquidity can develop
    - How and to which extent is not clear: we need to wait the introduction of loop flows to see how implicit auctions will work
- The current law unexpectedldy put pressure on TSOs
    - The combination of two different obligations in two different paragraphs (2 and 3) of article 6 of the Regulation may give TSOs an incentive to go beyond current market coupling in congestion management
    - This could improve the situation on CBT
- But: suppose we make no progress on CBT, then DG COMP
  - Cannot solve the problem by infringment of Article 82
  - Has no other alternative than Commission Directives (article 86(3)) or structural remedies (regulation 1/2003). This is dangerous because DG COMP is unlikely to target TSOs and Regulators

III. Balancing

Where we are

- The second Directive requires TSOs to provide balancing services
- The Regulation on CBT barely mentions balancing
- DG COMP finds that balancing is a barrier to entry
  - But attributes the problem to
    - The dominance of the provider of balancing services
    - The relations (through ownership) betwee the grid and other parts

- ETSO and Regulators are working to integrate balancing
  - But find that there is still a lot to do
    - The obvious: (but time consuming) harmonize opening and closing hours of markets
    - The less obvious: harmonize the market design

Harmonization and competition

- Law makers simply overlooked balancing till September 2005 which developed independently in the different MS: there was no attempt to harmonize
- The new package demands harmonization and Regulators are putting pressure on it.
- But DG COMP sees balancing as a barrier to entry and could (bust is unlikely to) argue
  - Competition law does not only apply to generators.
    - Balancing is the sole responsibility of TSO's, which have thus a collective dominant position on the product market
    - National balancing geographically segments the market, increases the cost of the service and thus restricts trade among MSs. This looks like an infringement of Article 82
    - Does it mean that NRA (and hence public authorities) that approved the balancing system would also infringe Article 82? This is the problem

What can happen in the future

- We seem to be a long way from integration, both
  - Legally: current guidelines from the Regulators are loose
  - Technically: reports from TSOs suggest that it will take time
- DG COMP can put pressure
  - But it takes times to just redo what has been inappropriately done in the first place

IV. Two settlement systems and intraday trading

Where we are

- DG COMP jurisprudence:
  - Next year forward and day ahead are two segments of a single product market
  - Day ahead and balancing are two different product markets
- Why? Because of current market design and specifically, because balancing has for a long time been punitive in the EU to induce agents to be in balance in day ahead. But the current situation is in flux
- A **two settlement system** is a system where
  - Day ahead and balancing are two segments of a single product market
  - Day ahead is a forward market
  - Real time is the spot market

About two settlements

- Two settlements is a very successful organisation
- But it requires a strong market design:
  - One first recognizes that the underlying market is the real time market, even though it is run by a monopoly (the SO in real time).
  - One then recognizes that the day had market is a forward market where most of the transactions take place
- This cannot be conceived without this strong market design
  - One cannot discuss and integrate forward and real time market if one has not foreseen this integration; one does not integrate ex post
- Intraday trading appears as a substitute for two settlements which cannot be implemented in today conditions in Europe. Intraday trading found its way in the guidelines of the Regulation; is a legal obligation from 1 January 2008
- There are more or less stringent ways to satisfy a legal obligation
  - The current guidelines require intraday congestion management but do not impose a particular market design (how could they? They did not impose it for day ahead)

Harmonization vs competition

- SO list the difficulties arising from the variety of situations inherited from the first directive (the usual story)
- The questions raised by intraday trading are deep (e.g. Update of transmission capacities) and could foster thinking
  - But moving from the current system to a two settlement system is just too big a step
- Regulators are putting pressure on Sos
- DG COMP can put additional pressure by infringment procedures on TSOs (but as usual, this is unlikely)
  - SOs control intraday trading
  - And they do so in a way that creates barriers to trade
- Structural remedies (regulation 1/2003) and Commissison directives (86(3)) seem ineffective here (require too much technical detail)

What could happen

- The pressure for harmonization will continue
  - This is a non contentious issue in the new package
- DG COMP can add to the pressure but is unlikely to introduce new ideas
- But the pressure could lead to new ideas.
  - Thinking about market coupling intraday trading and harmonized balancing could lead to the magic formula (the old and well tested nodal pricing)
- But this will take time

Overall conclusions

An “economic” finding

- It is counterproductive to try to bypass
  - What current theory of market design tells us
  - And what market experience confirms
  - when one does not have an alternative well reasoned model in mind
  - And opportunistic behaviours are possible

- It is expensive and time consuming to undo later what has been badly done first

An “organizational” finding

- The harmonization process has been opaque (all published documents are essentially trivial) probably driven by an initial intent not to construct the internal electricity market
  - The harmonization process systematically overlooked what is known and resorted to alleged simplifications ex ante that create real difficulties ex post
- This process could only fail but the failure seemed to backfire
- Expected: DG COMP comes in and threatens to act
  - The burden of proof on DG COMP is high and it can be challenged in Court (but this does not seem to be the mood today among generators)
  - DG COMP imposes a more rigorous way of thinking (one can argue that this is right or wrong) than the Florence literature

An “organizational” finding

- **Expected or Unexpected?** Regulators take their job seriously
  - They strengthens the guidelines
  - They lists ETSO (unavoidable in the current context) violations of the law and puts the TSOs possibly in need of a better market design

- Why “unavoidable”? Because ETSO has to do different things that are immensely difficult in the current market design if one takes these obligations seriously

- The role of DG TREN is unclear: it lacked rigor in its conduct of the hamonisation process

- The role of DG COMP: it is rigorous even if its methodology is sometimes weak (and that is the real danger: competition law can help but is no substitute market design; it is much too rough for designing a market)

The future

- The third package has some important welcome additions
  - An additional degree of concentration of TSO through a “network of TSO” but
    - Is it just an additional layer of bureaucracy?
  - An additional degree of concentration of regulation “the agency” but
    - Is it just an additional layer of bureaucracy?
      - Not clear: regulators seem to have done some good work

- But it also contains some highly contention issues: ownership unbundling
  - Which is far from proven (in contrast with the claims) in a multi-zone system

The future

- The interplay between harmonization and competition law will continue
  - The current Commissioner for Competition is very proactive
    - And more so since the Microsoft ruling by the Court
  - This does not mean that the positions of competition authorities are well argued
    - Intel: flawed logic (which is what I really believe)
  - Commission directives are unlikely (even though they could help the much needed market design)
  - Infringements procedures are likely
  - And structural remedies pursuant regulation 1/2003 are not to be excluded

- Can threat favor the emergence of the market design or just induce ad-hoc, possibly detrimental actions?