

“Market Design Lessons from Electricity Industry Re-structuring in the United States”

Comments on Frank Wolak’s presentation

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Market Design Problem

- Maximize market designer's payoff function (which depends on market outcomes) by setting
 - Number and size of market participants
 - Rules for determining revenues each firm receives
 - Ownership structure of firms (private versus government)
- Subject to constraints that *all market participants will choose their strategies to maximize their payoff functions given rules set by market designer*
 - Individual rationality constraint

Comment

- Is this a problem
 - for DG COMP and national competition authorities?
 - For DG TREN and national regulatory authorities?
- Is it a problem that
 - One can still pose today at this stage of the restructuring process?

Optimal Market Design

- Proposed objective function for market designer
 - Lowest possible average annual delivered price consistent with financially viable industry
 - In economist's language--maximize consumer surplus subject to marginal firm in industry earning zero economic profit
- Minimum requirement for competitive market is lower average price than under government-owned, vertically-integrated monopoly regime
 - Otherwise it is hard to rationalize industry restructuring

Comment

Looks like the objective of Ramsey Boiteux pricing (with one more word marginal firm)

– And hence of a world quite different from competition.

- I would have expressed the objective as
 - Organizing (or not organizing) the market so as to bring as much competition as possible where competition is possible.

Necessity of Market Design

- Network required to deliver electricity
 - Despite Nikola Tesla's attempts, cannot beam electricity to final customers
 - Cost structure favors a single transmission network for a given geographic area
- How network access determined can have an enormous impact on profits of market participants
 - Without access to transmission network generation unit owners can only sell to local consumers
- This requires designing a regulatory mechanism
 - To ensure equal access to network for all market participants
 - To compensate entity that manages transmission network
 - To set prices charged for use of transmission network

Comment

- Yes
- And this has to be done very carefully
- And this is what Europeans have not done
 - Even though they have been working for almost 10 years on the subject
- And it is not even clear that Europeans realize that one needs a market design
 - DG COMP and regulators seem to reason in terms of
 - Removing barriers, not introducing a market design
 - ETSO reasons in terms of solving particular problems (cross border, balancing...) not organizing a global market

Major Market Design Challenge with Privately-Owned Firms = Market Power

- Electricity supply industry extremely susceptible to the exercise of unilateral market power in the spot market
 - Demand must equal supply at every instance of time at every location in the transmission network
 - All electricity must be delivered through transmission network
 - Non-storability of product
 - Demand varies throughout the day
 - Production subject to severe capacity constraints
 - How electricity is priced to final consumers makes real-time demand elasticity effectively equal to zero
- Implication--Firms can exercise enormous amounts of market power in a very short time
 - Periods when suppliers have exercised significant unilateral market power have occurred in virtually all wholesale markets

Comment

- In my opinion: overdone
- Because
 - We have not done our best (and by far) to facilitate competition
 - In fact we have facilitated the exercise (if any) of market power but not creating the market design
 - We may not understand very well how market power is exercised when there are different connected markets (energy, transmission, balancing..)
 - And because arguments of market power can easily be manipulated.

Market Design Challenge with Government-Owned Firms = Productive Efficiency

- How to cause producers to supply electricity in technically and allocatively efficient manner
 - Technically efficiency = produce the maximum amount of output for a given quantity of inputs—capital, labor, input energy, and materials
 - Allocative efficiency = produce fixed amount of output at least cost given input prices
- Can set prices to recover incurred cost of production
- Government-Owned firms have little incentive to raise prices above level necessary to cover average costs

Comment

- Not sure what we can say on that in EU
- European institutions are neutral on public/private ownership

Market Design Lessons from US

- Discuss market design lessons for four segments of industry and over regulatory oversight
 - Inter-related lessons that impact performance of multiple segments of the industry
- Four segments of electricity supply industry
 - Generation—Wholesale market
 - Transmission—Bulk transportation of energy
 - Distribution—Wires only
 - Supply—Retailing only
- Regulatory oversight
 - Regulator must be far more sophisticated in wholesale market regime versus vertically integrated regime

Lessons from US Experience

- Conclusion--Wholesale markets appear to reduce plant-level and other production costs
- Why production cost reductions may not be reflected in market prices
 - Exercise of unilateral market power by suppliers
- Market design lessons for limiting market power
- First step in process
 - Understand how firms bid to maximize profits under given set of market rules, $y(x)$
 - How do firms exercise their unilateral market power
- Defines constraint set market designer faces
 - Firms will maximize profits given market rules
 - Individual Rationality
 - Firm must be expected to earn return sufficient for it to participate in market
 - Participation Constraint

Comment

Competition can effectively bring benefits when it is at work

Provided the wholesale market is well designed

I believe that this is where we probably have to learn most from the US

We are much too slow on the development of the wholesale market e.g. market coupling

But even that lesson from the US is sometimes difficult to gather

Frank's list of open subjects which mentions zonal vs. nodal systems

Understanding bidding

- Our problem is much more complicated
 - We have to understand bidding in a multiarea market
 - Where PX in the areas are not harmonized
 - And where separate bidding for transmission causes additional difficulties
- This is where we are moving much too slowly
 - Where the cost of “non Europe” is much too high

Limiting Market Power

- Divestiture of Generation Capacity
- Forward Financial commitments make firms bid more aggressively in spot market
- Transmission upgrades to face all unit owners with more elastic residual demand curves
 - Economic reliability of transmission network versus Engineering reliability of transmission network
- Price Responsive Demand makes residual demand curves perceived by all unit owners more elastic
- Credible Regulatory Process
 - Firms must obey market rules

Comment on divestiture

- Divestiture is a delicate subject
 - Both institutionally
 - And economically (where it can be replaced by long term contracts) (Bushnell et al 2008)
- But one should decide to do it or not to do it
 - And not keep it as a threat
 - In a period where one needs new capacities

Comment on contracts

- Three problems
 - Regulated or spontaneous contracts?
 - Authors have ambiguous positions
 - Physical or financial contracts
 - Financial markets may not mean much when the physical underlying is not very liquid (again a problem of wholesale market)
 - In my opinion a lot of confusion on this problem in the Florence texts
 - Market power mitigations (economists) vs. foreclosure (other economists and DG COMP)

Comments on transmission

- Here is where we have to learn most from the US
 - At least for the short run problem
 - Less sure that the US is sufficiently advanced when it comes to lessons on investments
 - EU discussions on ownership unbundling are definitely not reassuring for investment
 - But Frank's comments at the end on zonal vs. nodal are also not reassuring

Comment on transmission (2)

- Reliability raises difficult questions
 - The engineering problem is complicated
 - Grid reliability has always been complicated
 - The economic problem is complicated
 - Because it is an externality problem
- I am not sure how we can handle it without geographically integrated TSOs
 - And I am not sure that we have started seriously discussing the problem in Europe

Credible Regulatory Process

- Regulator charged with protecting consumers “unjust and unreasonable prices”
 - For monopoly services this is primarily an accounting and legal exercise
 - Allow firm to recover prudently incurred costs
 - For competitively provided services this means setting “just and reasonable” market rules
 - Rules that yield “just and reasonable prices”
 - For privately-owned firms must be confident they will have opportunity to earn return on investment
 - Regulator protects against ex post opportunism of government
 - Non-discriminatory or preferential application of regulatory rules

Comment

- “just and reasonable” vs “non excessive” or “non discriminatory”
 - Are they the same?
 - Do we really understand what non excessive prices mean?
 - The future role of studies like London Economics’s (comparison of price to fuel costs)
 - And the old Hogan Wolak debate about California

Abuse of Market Rules versus Exercise of Market Power

- Exercise of market power is raising market price through actions that do not violate market rules
- Abuse of market rules is violating market rules to increase profits or otherwise benefit firm
- Factual nature of rules violation
 - Going 70 miles per hour in a 55 miles per hour zone
 - Violation of terms of a contractual obligation
 - Providing energy with capacity sold for reserve
- A rules violation typically has adverse system reliability consequences

Abuse of Market Rules versus Exercise of Market Power

- Penalties are necessary to enforce market rules
- Recall that firms respond to incentives
 - Unless the cost to violating rules exceeds benefits firms will not follow the market rules
- Not advisable to rely on good intentions of market participants when system reliability is at stake
- Contracts in all markets have penalties for non-performance
- In regulated world firm and regulator had common interest in high levels of system reliability
 - Under wholesale market regime this is not necessarily the case
- If market rules are obeyed, this will prevent many problems

Comments

- Yes on the principle
- We might have an additional problem of rule harmonization
- As well as a problem of finding the authority that will enforce rules with cross border dimension

Coordinating Regulatory Policies

- In US, FERC sets wholesale market policies
- State Public Utilities Commissions (PUCs) set retail market policies
- Wholesale and retail market policies must be coordinated or enormous consumer harm is possible
 - Designing a wholesale market assuming active participation by retail demand can be a disaster if retail market policies do not allow this
 - Designing retail market policies ignoring need of retailers to manage spot price risk can be a disaster wholesale market policies allow spot prices to fluctuate hourly or on a shorter time horizon

Comment

- In EU who sets wholesale market policies?
 - Can we set wholesale policies by competition law?
 - And what if not? Is the regional initiative enough? Can it deal with PX
- Speculative experiment
 - Suppose we lack coordination at the wholesale
 - What about managing risk at retail if wholesale remains relatively illiquid

Outstanding Issues from US Experience

- Long-term resources adequacy
 - Can energy market revenues ensure adequate generation capacity to meet future demand?
 - Are capacity payment mechanisms necessary?
- Congestion management
 - Is nodal pricing the only way to manage transmission network?
 - Can zonal pricing mechanism work over long-term?

Comment

- On investment
 - The lesson for Europe is simple: one has to work on it urgently: there is a market failure that, by definition, we shall not solve by competition law
- Locational pricing
 - This is a depressing message: I thought the short-term issue was settled and that most zonal systems had failed in the US
 - As to the long term, nodal will not help.

Questions or Comments