Introduction to Market Monitoring and Mitigation in the US

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Topics

- Economic Foundations
  - Defining Market Power
  - Identifying Market Power
  - Mitigating Market Power
- Legal Foundations
- Practical Applications from the MISO Market
- Concluding Remarks

Defining Market Power

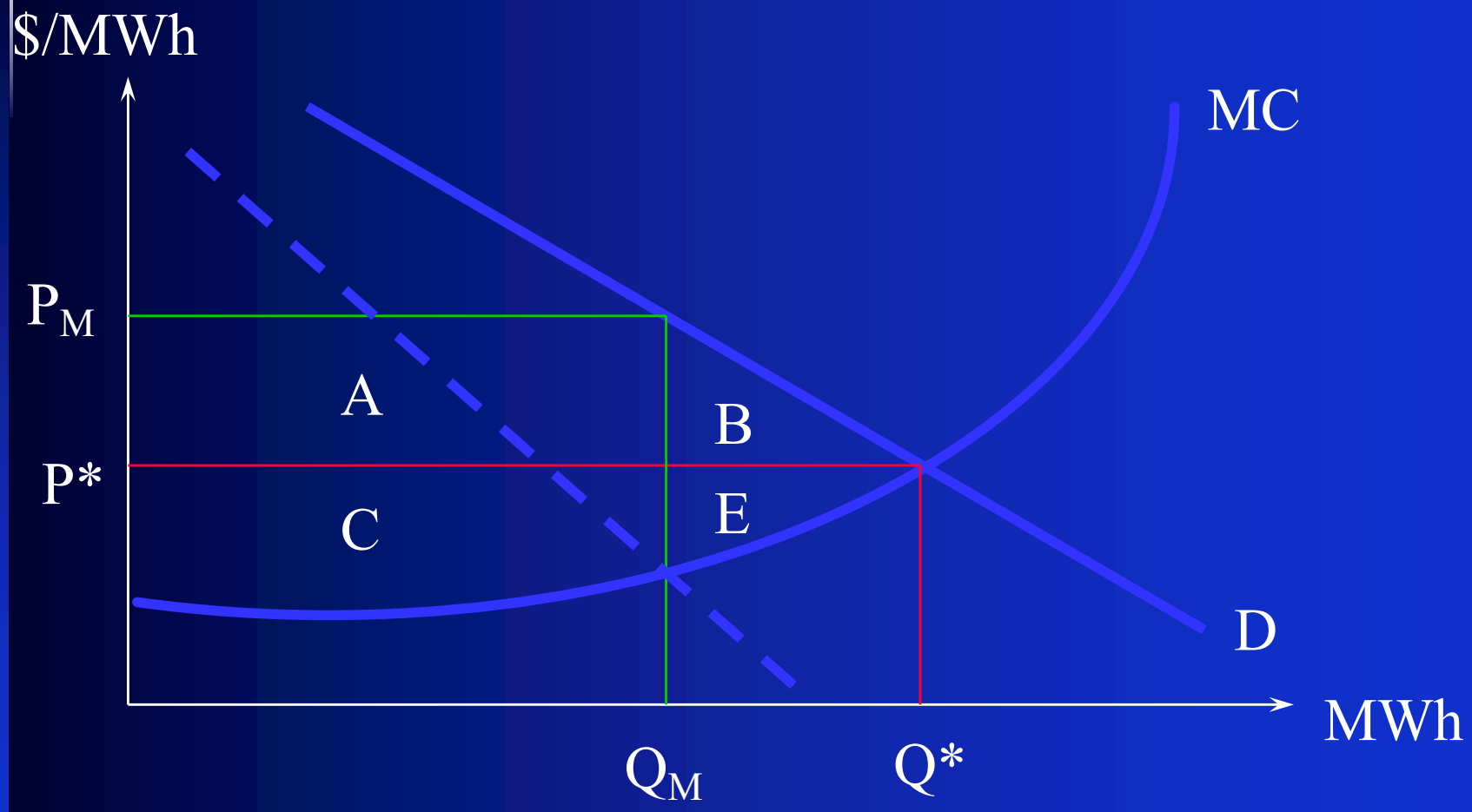
- Market power is:
  - Defined as the ability of a market seller to influence price.
  - Exercised by (typically) restricting supply and offering high.
  - Measured by:
    - Welfare losses to consumers
    - The amount by which price exceeds marginal cost

Defining the Market

- Product Markets
  - Energy
    - Real-time markets
    - Forward markets
  - Ancillary or Reserve Services
  - Capacity
- Geographic Market
  - Regional area
    - North Luzon, Central Luzon, South Luzon
  - Transmission constrained load pocket

Exercising Market Power

The ability to raise price above marginal cost



Types of Withholding

- Physical Withholding:
  - The generator does not offer to sell services from capacity when the services have marginal costs less than price
- Economic Withholding:
  - By bidding above marginal opportunity cost, the generator does sell services with marginal costs less than price
- Uneconomic Production:
  - The generator sells into market at a price below marginal cost

Identifying Market Power

- Structural measures of market power
  - Primarily a reliance on concentration measures:
    - Number of competitors
    - HHI…share of revenue, output, capacity, profit, etc
      - The larger the number the more concentrated the industry is.
    - *But,* the HHI is a measure of market concentration/power on an *aggregate* basis.
      - *Use with caution! Electricity is different…demand varies by hour, generation outages occur, transmission constraints arise, and remember electricity cannot be stored…so market power can "rise and fall" very quickly and great damage can be done in a very short period of time.*

Behavioral or Direct Measures of Market Power

- Fortunately in markets where we have offers we don't need to rely on the structural measures. Instead we can use offers, prices and output along with heat rates (essentially marginal cost), generation capacity, the actual transmission system topology and market prices for input fuels.
- Direct *firm-level* measures of market power:
  - Pivotal bidder behavior
  - Properties of the residual demand curve, i.e. elasticity
- Direct *market-level* measures of market power:
  - Actual price minus competitive price (I.e. price minus marginal cost).
  - Value of payments over the amount that would have been paid

Difficulties Evaluating Market Power

- Defining relevant markets
  - Transmission constraints are key
- Accounting for interrelated markets
  - Substitution possibilities among services.
    - This is very important when you when ancillary services are added to the market.
  - Substitution possibilities over time
- Considering potential entry
  - What are the real barriers to entry - short and long term.
- Effects of input fuel contracts
  - Take or pay contracts.
- Effects of market rules and market operation

FERC's Market Power Tests

- In November 2001, FERC announced the Supply Margin Assessment (SMA) screen, but never implemented it.
- In April 2004, FERC replaced the SMA with new, interim market power tests.
- FERC Tech Conferences (Docket No. RM04-7-000)

Supply Margin Assessment

- Characteristics of the SMA:
  - SMA was a pivotal supplier screen.
  - If a supplier's capacity was essential to meet market load, the supplier was deemed to be "pivotal" and hence have market power.
- Complaints about the SMA:
  - Large utilities complained that the SMA ignored their native load commitments and therefore overestimated their incentives to exercise market power.
  - Hence, FERC's April 2004 market power tests consider native load.

The April 2004 Tests

- There are two screens:
  - The Uncommitted Pivotal Supplier Screen
  - The Uncommitted Market Share Screen
  - Failing either screen creates a rebuttable presumption of market power
- The Delivered Price Test
  - Any party that wishes to dispute the implications of the foregoing screens can perform an additional test

Uncommitted Pivotal Supplier Screen

- Each firm's uncommitted capacity is defined as:
  - Owned capacity;
  - Plus certain long-term purchases
  - Minus native load, operating reserves, and certain long-term sales
- Wholesale load is defined as the market's annual peak load minus all native loads
- A firm passes the screen if all other firms' uncommitted capacity is sufficient to serve wholesale load

Uncommitted Market Share Screen

- Each firm's uncommitted capacity is defined as with the pivotal supplier screen, except:
  - Native load varies seasonally; and
  - Planned outages are deducted from capacity.
- A firm passes the screen if, in all four seasons, it has less than 20% of all firms' uncommitted capacity

Delivered Price Test (1)

- There are three delivered price tests:
  - A pivotal economic capacity test
  - A concentration test for economic capacity (DPT HHI test)
  - A concentration test for available economic capacity (HHI available economic capacity test)
- "Economic capacity" is capacity that has an incremental cost no greater than 105% of the "prevailing" market price
- "Available economic capacity" is economic capacity minus native load

Delivered Price Test (2)

- A firm passes the pivotal economic capacity test if all other firms' economic capacity is sufficient to serve wholesale load
- A firm passes DPT HHI test if:
  - It has a market share less than 20%; or
  - The HHI for economic capacity is below 2,500
- A firm passes HHI available economic capacity test if:
  - It has a market share less than 20%; or
  - The HHI for available economic capacity is below 2,500

Likely Results of the Tests

- Firms with large shares of capacity will generally fail:
  - The Uncommitted Market Share Screen;
  - The pivotal economic capacity test; and
  - The test for HHI for economic capacity
- Firms with large capacity shares may or may not pass:
  - The Uncommitted Pivotal Supplier Screen; and
  - The test for HHI for available economic capacity

Further Considerations

- The tests are indicative not definitive
  - Concern about false positives and false negatives
  - FERC regards the tests as important evidence of market power
  - But FERC is willing to consider any additional evidence presented by interested parties
- The tests are difficult to accurately calculate as data are not readily available
  - Data burdens have resulted in delay requests by applicants and other interveners
  - But we have nonetheless been able to calculate with confidence results for some regions

Properties of a Good Market Power Screening Program

- "Easy" to implement.
- Understandable so as to have credibility with all market participants.
- Minimal interference with competition.
- Detects most true market power situations (few false negatives).
- Passes most non-market power situations (few false positives).
- Adjusts to changing market conditions.

Legal Aspects of Electricity Markets Manipulation and Market Power Abuse in the U.S. – Basic Laws and Concepts

- FERC's authority to regulate energy markets is derived from the Federal Power Act (FPA).
- Under the FPA, FERC has the exclusive authority to approve all "rates, terms and conditions of service" and ensure that they are "just and reasonable." This is interpreted broadly.
- As a result, FERC approves (and may change) all market rules for jurisdictional entities and has the ultimate enforcement authority.

Continued…

- Market power review at FERC comes in three major contexts:
  - Review of utility mergers, acquisitions and consolidations
  - Market-based rate authorizations
  - **Monitoring of organized power markets (i.e., those administered by RTOs and ISOs)**

Antitrust

- Two federal legal regimes exist to address market power and manipulation issues in organized electricity markets:
- Antitrust law (e.g., Sherman Act) – non-industry specific, applies to everyone
- Federal Power Act – specific to the electricity industry

Antitrust Continued

- Basic antitrust law:
  - Sherman Act – prohibits unreasonable combinations or agreements in restraint of trade (section 1) and makes it unlawful for a company to "monopolize, or attempt to monopolize," trade or commerce (section 2). (But: It is not necessarily illegal for a company to have a monopoly or to try to achieve a monopoly position; the law is violated only if the company tries to maintain or acquire a monopoly position through unreasonable methods, i.e. has no "legitimate business justification"). Some practices, such as price fixing, are "per se violations."
- Section 5 of the FTC Act outlaws "unfair methods of competition" but does not define "unfair."
- Clayton Act – merger review.

Federal Power Act

- Federal Power Act (FPA):
- Prohibits "unjust and unreasonable" rates, terms and conditions of service
- Prohibits energy market manipulation (i.e., use any manipulative or deceptive device in contravention of FERC regulations)
- Prohibits violations of FERC rules and filed tariffs
- Provides for civil and criminal penalties for violations

FERC and the FPA

- FERC has used primarily FPA (not the antirust statutes) to address energy markets manipulation and market power abuse in organized markets.
- The principal tool is to require market administrators (i.e., RTOs and ISOs) to have a FERC-approved market monitoring plan. The market monitoring plan is a "tariff" and it can be enforced or modified by FERC.
- Another tool is the imposition of market behavior rules prohibiting certain specific manipulative and market power abuse tactics by suppliers.

Independent Market Monitoring

IMM's major rights and duties:

- can obtain all needed data from market participants
- can enforce its data requests
- develops anti-competitive behavior indices and screens
- applies mitigation screens
- refers anti-competitive behavior to FERC

Mitigation

Major components of mitigation:

- conduct test (i.e. conduct subject to mitigation), including reference levels to perform it
- impact test (i.e. material price impacts)
- sanctions (e.g. default bids)

Legal Foundations - Conduct Test

Conduct test:

- In general, if conduct would not be in the economic interest of a market participant but for its market power
- Specific categories: physical withholding, economic withholding, uneconomic production or "other" (e.g. exploiting a market rule or software defect)

Legal Foundations - Physical Withholding

Physical withholding means not offering to sell from an electric facility capable of serving the market, including:

- falsely declared outages
- refusing to bid when it would be in the economic interest, absent of market power
- declining to operate a generator in accordance with the dispatcher's instructions

Legal Foundations - Economic Withholding

- Economic withholding means submitting bids that are unjustifiably high (relative to a generator's known operational characteristics or cost) so that the generator is not dispatched or the bids set the clearing prices

Legal Foundations - Uneconomic Production

- Uneconomic production means increasing the level of output of generating facility to levels that would be uneconomic in order to obtain benefits from a transmission constraint.

Legal Foundations - Impact Test

- Impacts test: even if there is a conduct warranting mitigation, sanctions will be imposed only if there is a material impact on price
- what is a "material impact" may be defined differently depending on how severely an area is constrained

Legal Foundations - Sanctions

Sanctions:

- default offers
- penalties

FERC market behavior rules

- Issued after the California debacle and proscribe certain specific manipulative tactics
- Apply to everyone, separately from market mitigation programs
- Usually incorporated into monitoring plans

Continued

- MBR1: Sellers are required to operate, schedule and bid generating facilities in compliance with FERC-approved market rules.
- MBR2: Prohibits actions or transactions that are without legitimate business purpose that are intended to or foreseeably could manipulate market prices, conditions or rules.

Continued

- MBR2a: prohibits pre-arranged offsetting trades of the same product among the same parties which involve no economic risk and no net change in beneficial ownership (“wash trades”)
- MBR2b: prohibits transactions predicated on submission of false information
- MBR2c: prohibits transactions relating to creation of artificial congestion followed by “relief” of such artificial congestion
- MBR2d: prohibits collusion for purpose of manipulating market prices, conditions or rules

Continued

- MBR3: prohibits submission of false or misleading information
- MBR4: prohibits false reporting of transactions
- MBR5: requires to retain information for 3 years
- MBR6: prohibits violations of code of conduct

FERC's Investigations

- FERC has broad investigative authority
- Under Section 206 of the FPA, FERC can investigate justness and reasonableness of any rate, term and condition of service.
- When complicated factual and technical matters are involved, FERC may direct its staff to prepare a report setting out factual findings and conclusions
- The report is then submitted to FERC, which may set the matter for evidentiary hearing or address it directly.

The MISO Progam

- Market monitoring and mitigation plan is included in the Tariff
  - Hence it is accepted by the FERC and is Federal Law
  - The actual Independent Market Monitor is under contract to the Board and is contestable.

MISO IMM - Uneconomic Production

- How does the IMM determine uneconomic production?
  - Uneconomic production: IMM uses screening analysis to identify resources producing at LMPs << resources' reference levels (estimated production costs) and causing transmission congestion.
    - Uses GSF (generation shift factors), which can be either positive or negative.
    - Identifies resources that can produce less output and remain in their economic range.
      - Excludes resources that would have to shut down.
      - Excludes resources that have production inflexibility (e.g. nuclear).

The Effect of Uneconomic Production

- What have been the impacts of uneconomic production on market results?
  - Uneconomic production: significant LMP price differences at CpNodes inside & outside the constraint, in the Real-Time imbalance market.
  - More than 100 hours of significantly high negative LMP prices [-$500, -$100] outside the constraint.
    - Negative LMPs means generators pay to generate.
  - Endangers reliability: in many cases, constraints would not be binding without this uneconomic production.
    - Hard to resolve the congestion through redispatch, since these units are close to the constraint (high GSFs).

How does it happen?

- How are market participants engaged in this practice?
  - How? Raising units' EconMIn levels above levels where these units could produce economically .
  - Levels set, on average, at 150% of physical minimum, according to IMM, during these periods.

Why are they doing it?

- Why are market participants engaged in this practice?
  - Why? Midwest ISO & IMM have engaged in discussions with identified parties.
    - Midwest ISO has two-settlement system – resources operated according to cleared Day-Ahead schedules.
      - No net deviations means no settlement implications to negative prices in RT.
    - Old coal units have difficulty offering dispatch (RT) flexibility.
    - Concern about RT price volatility.
    - Concern about RT market settlement that is based on integrated hourly ex post prices.

NCA and BCA

- IMM establishes:
  - Narrowly Constrained Areas
    - Constraint binds for at least 500 hours in a 12 month period and at least one supplier is pivotal.
    - More scrutiny from IMM
  - Broadly Constrained Areas
    - Not static
  - Establishes reference prices for generating units

Concluding Remarks

- Light handed regulation:
  - Encourage new competition
    - Allow wider geographic participation in markets
    - Reduce barriers against new generating units and upgrades of existing units
    - Build more transmission
    - Encourage demand-side bidding
  - Make trading processes more flexible
  - Develop forward markets
- Heavy handed regulation:
  - Require forward contracting
  - Create administrative limitations on supplier bids
    - Set minimum MW requirements for bids
    - Set price caps on bids
    - Restrict changes in bidding parameters