ELECTRICITY RESTRUCTURING

- Electric sector has been last to undergo restructuring and regulatory reform
  - Despite policy preference for simple structural solutions, not possible in electricity
  - Reason is that electricity reforms more complex, difficult than other sectors

- Numerous distinctive challenges
  - Distribution and transmission largely remain natural monopolies
  - Difficulties in preserving strong competition in generation
  - Search for alternatives to vertical integration for coordination
  - Ambiguous role for competition in retail supply
EXPERIENCE WITH REFORMS

- Most developed countries have encountered difficulties in restructuring
  - UK was early, but problems with market power, pricing, investment coordination
    - now in 3rd generation of reforms

- US has patchwork of different and changing federal and state reforms
  - record includes some significant successes, but also major failures
  - reforms now stalled

- EU has had several successive electricity directives
  - attempted to open up national markets, create independent system operators, and develop retail competition
  - uneven progress among EU countries

- Developing countries face additional issues:
  - Public ownership, thin markets, barriers to entry, institutional weaknesses, development objectives
  - Experience even more varied
DISCUSSION TODAY

• Focus on difficulties faced by developed countries in restructuring
  • Those difficulties, plus more, faced by developing countries

• Specific questions:
  • How far can pure structural reforms go toward achieving liberalized electricity markets?
  • If more than structural reform is necessary, what is that “more”?
STRUCTURAL REFORMS

- Multiple dimensions of structural reform
  - Vertical separation of generation from transmission-distribution
  - Horizontal fragmentation of generation
  - Vertical separation of distribution from supply

- Ultimate purpose was/is to facilitate competition in generation
  - Also to ensure equal access to transmission grid
  - And to allow regulation better suited to residual parts of business
VERTICAL DEINTEGRATION

- Difficult to envision how generation competition can occur without vertical deintegration
  - Possible to have merchant generation arise
    - But routinely denied access to transmission grid by integrated utilities
  - For this reason UK and most counties have mandated divestiture of generation

- US experience different
  - Tried equal access rules, but those failed in face of integrated utilities with operating control of grid, ownership of grid, incentives to deny access
  - Next tried to modify control but not ownership by creating Regional Transmission Organizations to operate grid assets that were still owned by utilities
    - Six RTOs now exist but problems have emerged with respect to costs, governance, and effectiveness

- Some interest in transcos, which would own and operate grid in region
VERTICAL INTEGRATION

• If full vertical deintegration necessary, clear there are some costs
  • Integration confers real economies between generation and downstream stages
    • Information/risk
    • Transaction cost
    • Coordination

• To this extent, any benefits from generation competition must be weighed against
  • possible loss of vertical economies
  • Plus, any efficiency consequences (positive or negative) for divested distribution sector
THE EVIDENCE

- Some evidence in US and elsewhere that divested generation operating more efficiently
  - Fabrizio et al (2007) find 5% decline in labor and nonfuel expenses
  - Bushnell and Wolfram (2005) report 2% reduction in fuel usage
  - Newbury and Pollitt (2001) find 5% cost savings from UK reforms of generation, transmission stages

- Good evidence in US, elsewhere of vertical economies between generation and transmission and/or distribution
  - Michaels (2006) reports 11 of 12 studies find such vertical economies
  - Kwoka study (2002) has typical overall finding of substantial economies
    - Net effect is size-related: Tradeoff between extra fixed costs attributable to each function, vs. variable cost complementarities
    - Implies efficient operation by sufficiently small deintegrated utilities
    - Sources of economies largely in operations costs of both transmission and distribution, plus some savings overhead/ administration
Some evidence in US that divested distribution utilities performed less efficiently

- One study finds divestitures required by state PUCs result in significant efficiency losses by resulting distribution companies
- Potentially another cost to be weighed against benefits of deintegration

Numerous studies of overall effects of restructuring in US, but many are flawed

- Kwoka review (2006) of 12 studies finds “no reliable and convincing evidence that consumers are better off as a result of restructuring”

Hence, to extent there are benefits, they range widely in magnitude and certainty

- Studies highlight areas where reforms need careful attention
DETERMINANTS OF BENEFITS

- Benefits of restructuring are likely a function of the but-for world and the nature of reforms
- The but-for world differs from country to country
  - Depends on ownership, regulation, technology, history, institutions, incentives
- For example, US had largely private utilities, with relatively effective and efficient regulation
  - Regulation restrained market power, limited transfers from consumers to producers, ensured supply and quality
  - But little innovation, inefficient distribution of risk, distorted infrastructure
  - Still, this is case where efficiency gains in generation likely to be modest, at least in short to medium run
- By contrast, UK had inefficient publicly owned utilities, with high energy cost production
  - Potential benefits more straightforward, though still some debate as to exact magnitude
Several necessary elements for successful reform:

First, ownership unbundling/deintegration, rather than partial unbundling
- US, other countries have tried accounting unbundling, functional unbundling, legal unbundling

Ownership unbundling creates thicker markets (assuming necessary size of market), avoids distorted incentives

Alternatives leave distorted incentives, need for regulatory intervention
- Unlikely to create equal access
- Hence will fail to bring about competition in generation
• Second, competitive supply side in generation
  • If competition in generation is central purpose of reforms, crucial that it be structurally and behaviorally competitive

• Several aspects to this:
  • Initial conditions involving numerous generators/bidders
  • Reduce/eliminate barriers to new entry from siting, etc.
  • Control of mergers
  • Prevent collusive and anticompetitive behavior

• Requires careful restructuring policy at outset, plus
  • Attentive and capable competition policy
  • Independent and capable market monitors
• Third, well designed auction markets
  • Design defensively—that is, avoid rules subject to market manipulation
    • Experience of California, others

• Create Oversight and checks for anticompetitive behavior
  • Strategic withholding

• Limit cross-ownership/contracting among bidder
  • Needed to prevent common knowledge of all generators’ costs, etc.

• Data disclosure and transparency
  • Most US RTOs do not disclose much information
• Four, efficient and effective transmission organizations
  • Needed in order to perform functions previously done by integrated utilities
    • Coordinating dispatch
    • Investment planning
    • Congestion relief (which can be serious threat to reform)

• Very important since one study shows alternative institutions (like power pools, ISOs) can recover much of cost penalty from deintegration

• Best practice appears to be publicly owned and regulated transmission operator
  • Current alternatives in US–RTOs–have not performed well
Five, resolving the role for retail competition
- Clear that supply can be separated from wires/distribution
- Little empirical evidence concerning effects or benefits
- But if done, needs careful design (not like US)

Other aspect to retail is possibility of integrating supply with generation
- Both are potentially competitive segments
- Have potential economies that could be captured by joint ownership
  - internalize some information
  - handle risk of standalone generation
  - ensure supply
  - provide for investment
Six, residual regulation of monopoly segments

- Incentive regulation has high powered incentives for cost control
  - But design features are crucial to magnitude and distribution of benefits

Seems clear that incentive regulation may not protect service quality

- Nor provide adequate incentives for investment
- Studies of quality and investment underscore concerns

These issues require careful attention to prevent unintended effects
LESSON FROM PAST EXPERIENCE

• One simple lesson from experience, buttressed by studies:
  • Restructuring may be necessary, but it is not sufficient
    • Must be part of a reform package
    • Undertaking any single piece—certainly altering market structure—will not work
      • May even be counterproductive by itself

• Traditional structures may be “local maximum”

• Global maximum requires complementary reforms, supplementary institutions
  • Must also be attentive to initial conditions and capabilities of each country and jurisdiction
  • Even with all that, must be prepared to make real-time adjustments and corrections