

Satisfaction or Shattered?

Comments on Competitive Dynamics in Wholesale Electricity Markets by S. Reynolds

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Market Power in Electricity Markets

- Demand for electricity is very inelastic
 - Load does not observe price
- Supply must equal demand
- Electricity is prohibitively expensive to store
- Outages and physical capacity limits affect competing supply
- Transmission constraints



Market Power Monitoring

- Structural Measures
 - Market Share and HHI
 - Pivotal Supplier/Residual Supply Index
 - Residual Demand Analysis
- Behavioural Measures
 - Profitable Withholding (Capacity not bid into merit that would have been profitable)
 - Simulation Models
 - Compare model to actual behaviour



Simulation Models

- Extent of Market Power
 - Actual prices to counterfactual prices
- Effect of the Exercise of Market Power
 - Transfers
 - Inefficiency
 - allocative
 - productive



Counterfactual

- Model of wholesale electricity market
 - Perfect Competition
 - Supply curve based on short-run marginal cost (SRMC)
 - Supply Curve
 - Fixed costs of start up
 - Minimum stable generation



Reynold's Model

- Price Takers (no market power)
- Costs
 - Different types of generators
 - Constant cost per unit of generation
 - Constant start up costs per unit of generation
 - Minimum generation rate per unit (MGR)

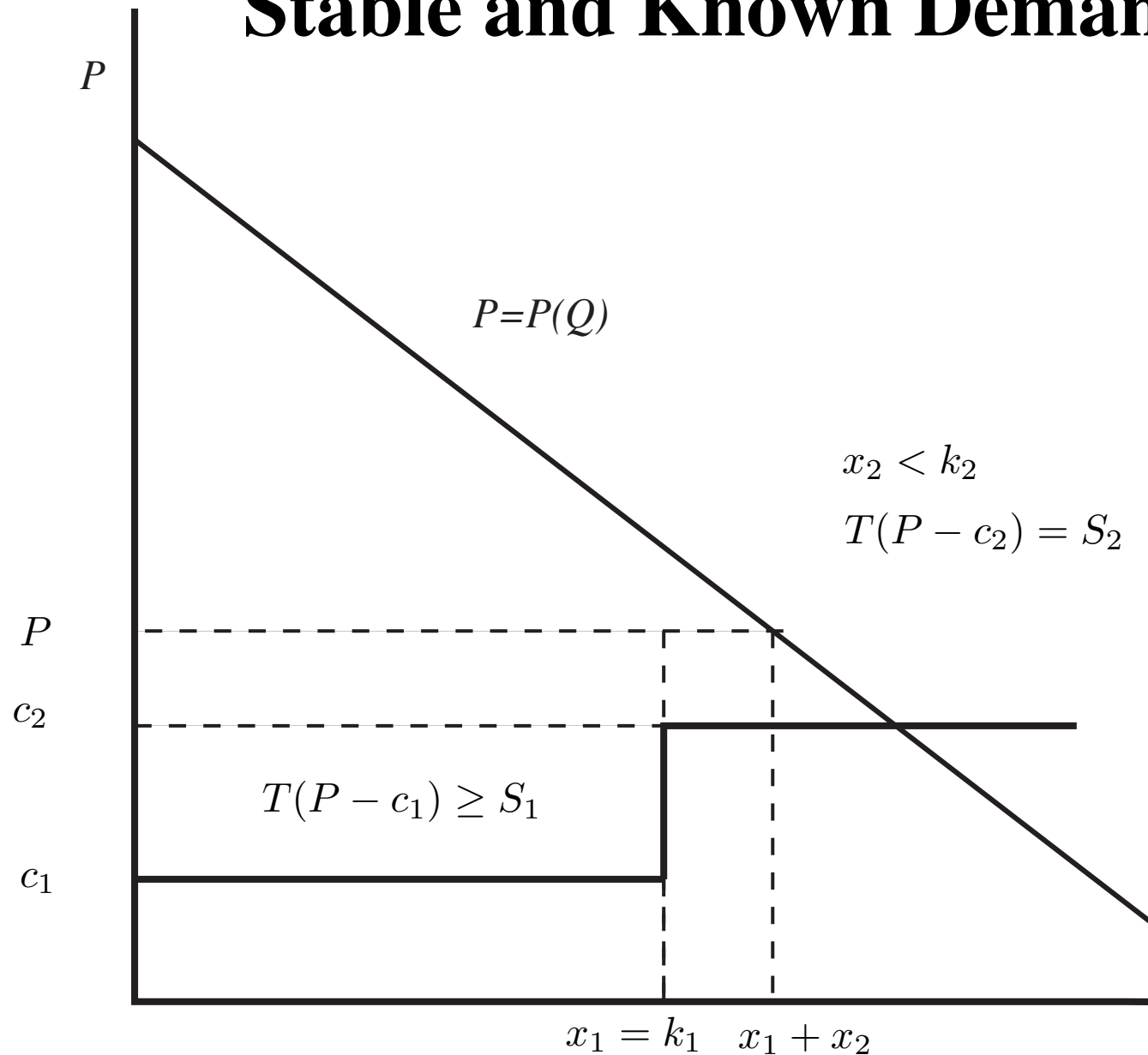


Price Takers

- Production Decision
 - Price greater than marginal cost
 - Produce full capacity
 - Price less than marginal cost
 - Produce MGR
- Ramp Up
 - Expected quasi-rents greater than fixed costs



Stable and Known Demand



Existence of Competitive Equilibrium

- Margin of adjustment
 - Number of units on
 - Reduce until price high enough to generate expected quasi-rents to cover fixed costs of start-up
 - MGR implies hours of negative quasi-rents
- Equivalence of Efficient Outcome with Competitive Equilibrium
 - Solve for Efficient Outcome
 - Planner's Problem [Black Boxed!]



ERCOT Application

- Simulation Models
 - Dynamic Model
 - Simple Competitive Benchmark
 - Simplified marginal cost as dynamic model
 - Competitive Benchmark
 - Computed marginal cost
- Dynamic Model
 - Higher Peak Prices, Lower 5th Percentile, and Lower Mark Ups



Market Power

- Average Mark Up of \$16/MWh instead of \$28.18/MWh
- Is it Market Power?
 - Recovery of investment costs
 - Quasi-rents to recover sunk capital costs
 - Variable costs exclude capital costs
 - ERCOT is energy only market
 - All differences attributed to market power
 - Market design and other constraints



MSA in Alberta: Effective Competition

- Limited Market Power
 - Structural Measures
 - Adjusted Residual Supply Index
 - Residual Demand Analysis
- Limited Static Efficiency Losses
 - \$0.72/MWh
- Efficient Investment
 - Prices average long run average cost?
 - Barriers to entry limited
 - Investment levels



It's Only Rock 'N' Roll, But I Like It!

