YANHAI ALUMINUM: REFLECTIONS

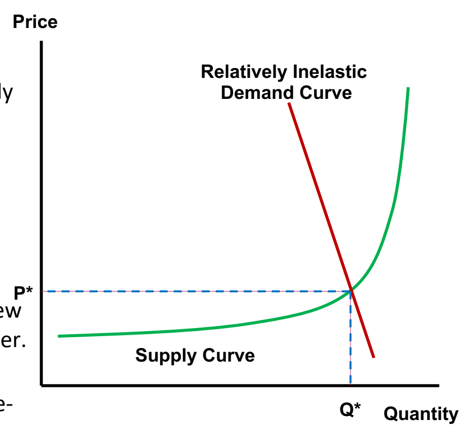
RC STRATEGY

SECTIONS B & C

FALL 2025

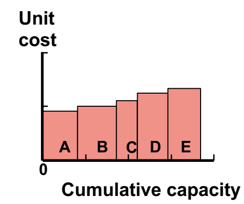
Commodity Markets

- In commodities markets:
  - Price is determined by where the demand curve intersects with the supply curve.
    (Note: In markets where products are differentiated, industry supply curves don't predict market prices, but they can still help assess strategic advantages/disadvantages.)
  - Firms will add capacity only if they are confident of generating an attractive ROI, accounting for their average total cost
  - However, firms that are already in the market will continue to produce so long as price exceeds their average non-sunk cost
  - Thus, new capacity will be added only if average total cost of the new plant is as low as the average non-sunk cost of the marginal producer.
  - If sunk cost is high, the gap between average total cost and the average non-sunk cost is large. Also, often, adding capacity is a time-intensive task.
  - These dynamics makes adding capacity in the short term in response to demand increase particularly challenging.
  - Significant addition of capacity moves the industry supply curve to the right, thereby depressing market price

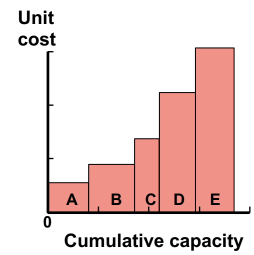


Flat vs. Steep Supply Curves

- A flat supply curve implies low profitability for most of the players.
  It usually exists when:
  - Technologies and production processes are common
  - Imitation of technical know-how is easy
  - Industry participants focus on continuous cost improvement



- A steep cost curve implies high profitability for more cost-efficient producers
  It usually exists when:
  - Technologies and production processes are differentiated across producers
  - Imitation of technical know-how is difficult
  - Industry participants focus on building and maintaining proprietary know-how



Price Fluctuations and Investment Decisions in Commodity Markets

- In commodity industries with high sunk cost:
  - The supply curve has a relatively steep section beyond the current capacity.
  - The demand curve tends to intersect with the supply curve near the kink.

  This leads to significant price fluctuations.
- If the demand curve is relatively inelastic in the short-run (demand does not change significantly with price), this leads to significant price fluctuations and, in the short run, an asymmetric impact on price, based on change in demand.
  - If demand declines, the new equilibrium is at a lower point on the supply curve, which is typically at a slightly lower price and lower overall quantity.
  - If demand increases, the new equilibrium is at a slightly higher quantity but a significantly higher price.
- When sunk costs are high and investments yield returns over long horizons, predicting how price will evolve becomes a key component of the investment decision
  - China Hongqiao Group (Yanhai) was astute, in retrospect, for investing in phase one and phase two expansions of the Yunnan plant, even though Aluminum price was at a historic low. Their bet that price would rise eventually paid off handsomely.
  - In contrast, Rio Tinto's $44 b acquisition of Alcan in 2007, at a time when Aluminum price was at a historic high, was an unmitigated disaster