Analyzing Petroleum Product Supply at the Country Level

Case Studies: Argentina & South Korea

EIA Global Hydrocarbon Supply Project
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www.esai.com
Observations from 2 Case Studies

Case Study 1: Argentina
Case Study 2: South Korea

Conclusions

Highlight country-specific factors to forecasting petroleum product supply

Methodology, Benefits & Challenges

Forecasting U.S. petroleum product exports
Argentina: Product Demand

- 550,000 b/d product demand

- Mostly diesel & gasoline

- Strong demand growth
  - Gasoline – 10% annual
Argentina: Crude Supply & Demand

- Crude Production: > 600,000 b/d
- Refinery Throughput: > 500,000 b/d
Argentina: Product Balances

- Gasoline & Diesel: Growing deficit
- Surplus of fuel oil & other low value products
Argentina: Refining Infrastructure

<table>
<thead>
<tr>
<th>Argentina Refining Capacity ('000 b/d)</th>
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<tr>
<td><strong>Company</strong></td>
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- Average refinery utilization a little more than 80%
- Capacity inadequate to meet gasoline and diesel demand
- Sector includes complex and simple refineries
- Ownership is split 50-50 between state-owned YPF and private companies
Argentina: Government Role & Objectives

- Goal of energy self-sufficiency – “Activist”
- Price Controls
- Nationalization of YPF
- Current account deficit and peso devaluation
Argentina: Forecasting Product Demand

• Complex set of pressures surround the future price policy

• Price issue has consequences for biodiesel supply to domestic market
Argentina: Forecasting Refinery Output of Products

- Domestic crude production provides predictable crude slate

- Price controls and state ownership encourage high utilization rates

- Decisions about refining investment must consider (a) government price-setting policy and (b) potential for political pressure

- State-owned YPF could be reluctant to invest in refining and divert funds from more attractive projects
South Korea: Product Demand

- 2.3 million b/d demand

- Naphtha dominates
  45% of demand
  5% annual growth

- Taxes on transport fuels
  High retail prices
  Diesel cheaper than gasoline
South Korea: Product Balances

- 900,000 b/d surplus of gasoline, diesel & jet fuel

- Imports low value products such as naphtha
South Korea: Refining Infrastructure

South Korean Refining Capacity ('000 b/d)

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- 2.8 million b/d of capacity, complex with petrochemical integration
- Process 2.5 million b/d of crude, mostly Mideast light-medium sour
- High utilization rates, close to 90%
- Private ownership, highly consolidated
South Korea: Refining Flexibility/Petchem Integration

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- Residual Fluid Catalytic Cracking (RFCC)
  Upgrading w/ flexibility to produce chemical products or transport fuels

- Aromatics Capacity
  Demand for naphtha as petchem feedstock increases

- Condensate Splitters
  Generate heavy naphtha for aromatics
  Different product yields than traditional refinery
South Korea: Forecasting Refinery Output of Products

- Profit Motivation
  Profit from clean product exports & chemical products

- Adjust output to market conditions
  Transport fuels
  Chemical products

- Export markets
  Demand in key export markets
  Specifications in export markets
  Competition from other exporters

- Access to export markets
  Government support: FTAs & tax rebate on exports
  Storage & retail assets in target markets

- Decisions about future investment based on international market conditions
South Korea: Forecasting Product Demand

Naphtha Demand Growth

• Utilization rates at petchem plants
• Naphtha or LPG
• Naphtha from oil refinery, condensate splitter or imports

Transport Fuels

• Taxes favor dieselization
• Biodiesel blending rate
Conclusions: Observations about 2 Countries

Range of factors influences supply

Factors vary by country

Global refining profitability & demand (South Korea)
  - Utilization rates
  - Product basket

Global market conditions not only influence on refinery output
  - Energy self-sufficiency objectives (Argentina)
  - Access to export markets (South Korea)
    - FTAs
    - Tax rebates on exports
    - Storage/retail assets
Conclusions: Methodology

Approach to country-level forecasting

- Data collection
- Collection and analysis of qualitative info by regional expert
- Predict changes in factors that influence supply
- Then use quantitative methods to forecast

Benefits & Challenges of country-level approach

- Benefit: Good approach for predicting changes in market
- Challenge: Symbiotic relationship between country supply and global market (refining margins, export opportunity, competition)
- Requires analytical handshake: refining margins, competitive advantage, balancing the market
Conclusions: Relevance to U.S.

Forecasting U.S. petroleum product exports

- Country-specific factor: Price-advantaged crude
  (simulates refiners to export products)

- Global market: How much U.S. product can the market absorb?

Market environment for U.S. diesel exports:
Again, a country approach...

- Country-level question: How much ULSD will Russia export?

- We calculated gross refining margins of 32 refineries to measure the profit incentive to complete investment projects

- The forecast that the model produces depends on the answer to one question: “Will Russia complete the oil export duty reform?”
Thank you

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