

# Analyzing Petroleum Product Supply at the Country Level

Case Studies: Argentina & South Korea

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# Presentation



## Observations from 2 Case Studies

Case Study 1: Argentina

Case Study 2: South Korea

## Conclusions

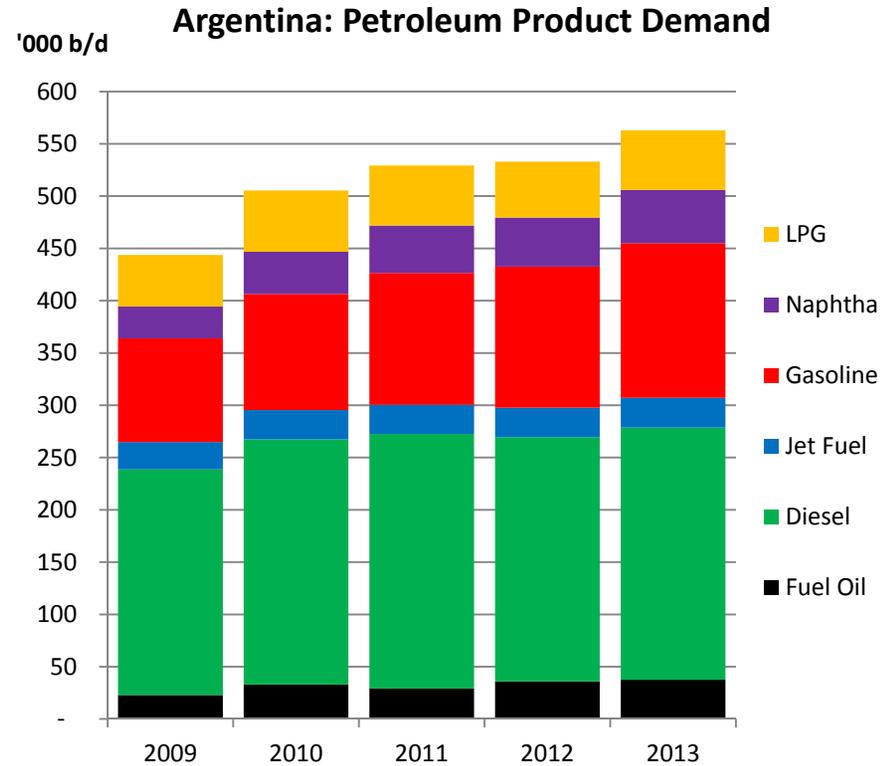
Highlight country-specific factors to forecasting petroleum product supply

Methodology, Benefits & Challenges

Forecasting U.S. petroleum product exports

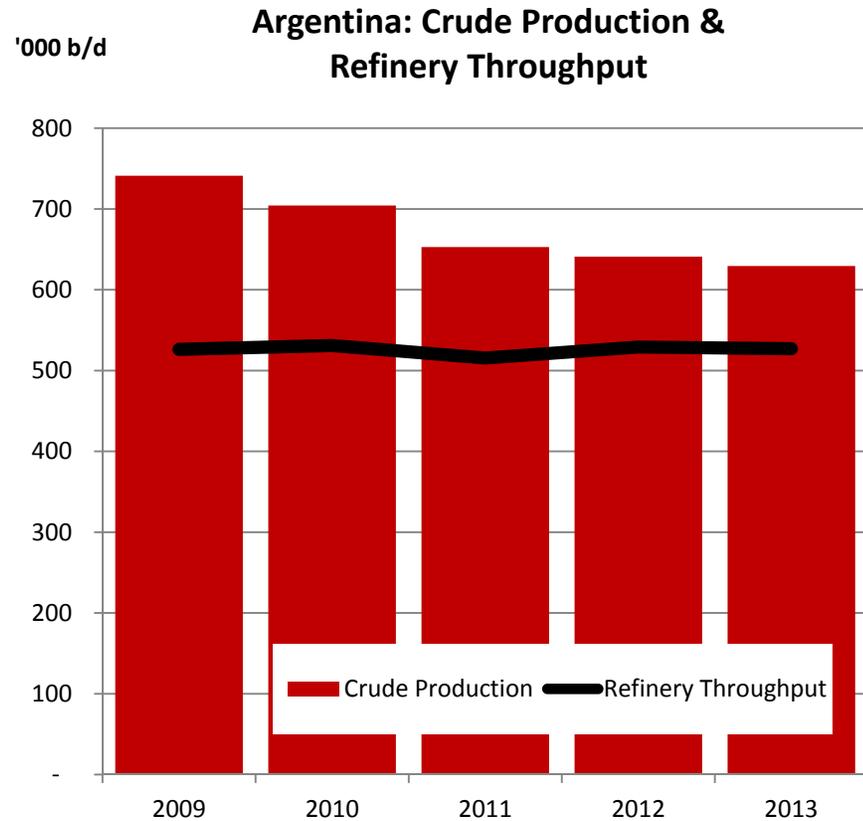
# Argentina: Product Demand

- 550,000 b/d product demand
- Mostly diesel & gasoline
- Strong demand growth  
Gasoline – 10% annual



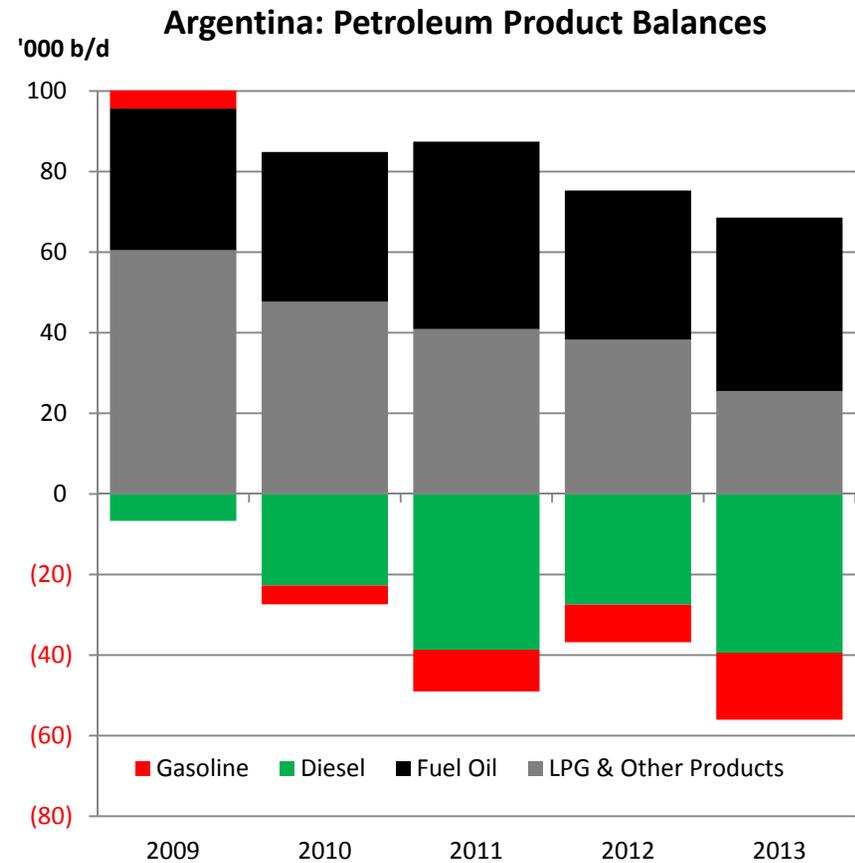
# Argentina: Crude Supply & Demand

- Crude Production: > 600,000 b/d
- Refinery Thruput: > 500,000 b/d



# Argentina: Product Balances

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



# Argentina: Refining Infrastructure



Argentina Refining Capacity ('000 b/d)											
Company	YPF	YPF	YPF	Shell	Axion	Petrobras	Refinor	Refineria S.L.	DAP	DAP	Total
Location	La Plata	Lujan de Cuyo	Plaza Huinca	Dock Sud	Campana	Bahia Blanca	Campo Duran	San Lorenzo	Dock Sud	Lomas de Zamora	
CDU	189	106	25	110	85	32	32	50	4	8	<b>640</b>
COK	13	36		7	24						<b>80</b>
HYCR		21									<b>20</b>
FCC	60	22		26	27	7					<b>140</b>
HYTR	66	31	3	26	32	8					<b>170</b>

- 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

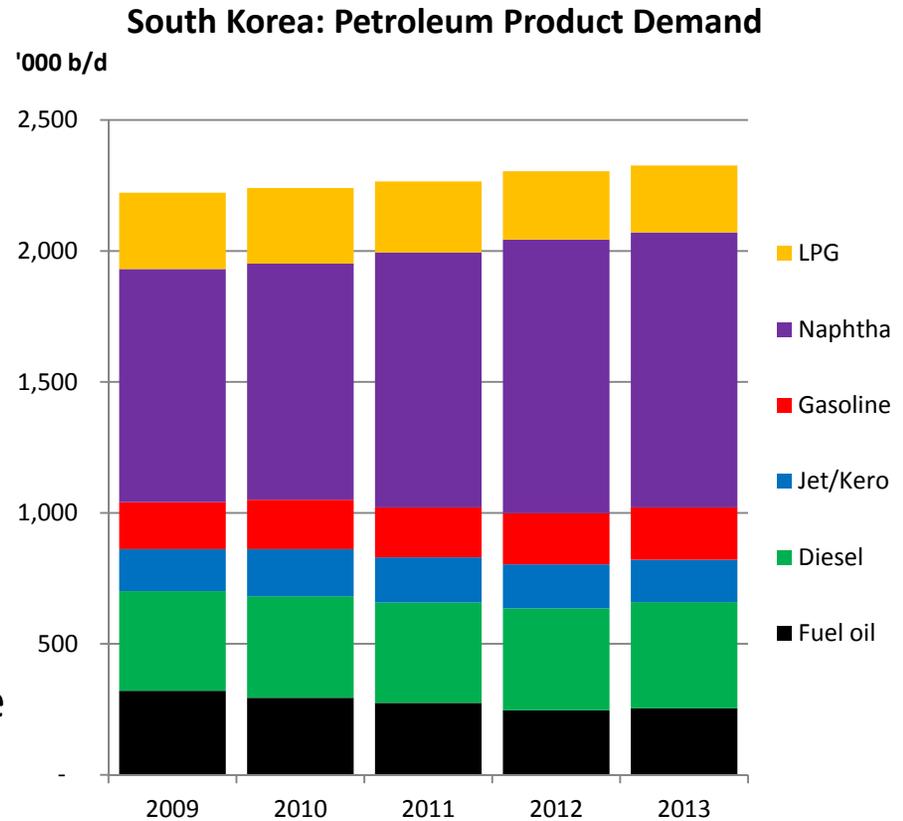
# Argentina: Forecasting Refinery Output of Products



- 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

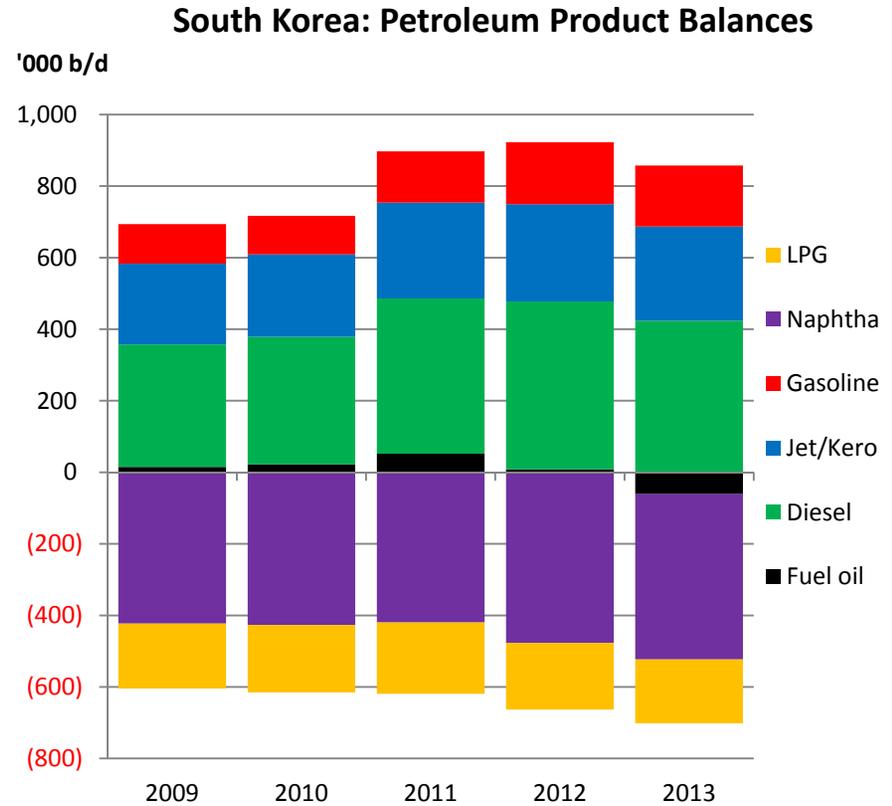
# South Korea: Product Demand

- 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

<b>South Korean Refining Capacity ('000 b/d)</b>							
<i>Company</i>	Hyundai	Hyundai	SK Corp.	GS-Caltex	SK Corp.	S-Oil Corp.	<b>Total</b>
<i>Location</i>	Pusan	Daesan	Inchon	Yosu	Ulsan	Onsan	
<i>CDU</i>	9.5	380	275	700	840	630	<b>2,835</b>
<i>Condensate</i>			100			50	<b>150</b>
<i>VDU</i>	6.5	41	18	150	79	160	<b>455</b>
<i>RFCC</i>		52	117	94	162	73	<b>498</b>
<i>COK</i>		20					<b>20</b>
<i>HYCR</i>		22		60	27	71	<b>180</b>
<i>FCC</i>				82	105	60	<b>247</b>

- 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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