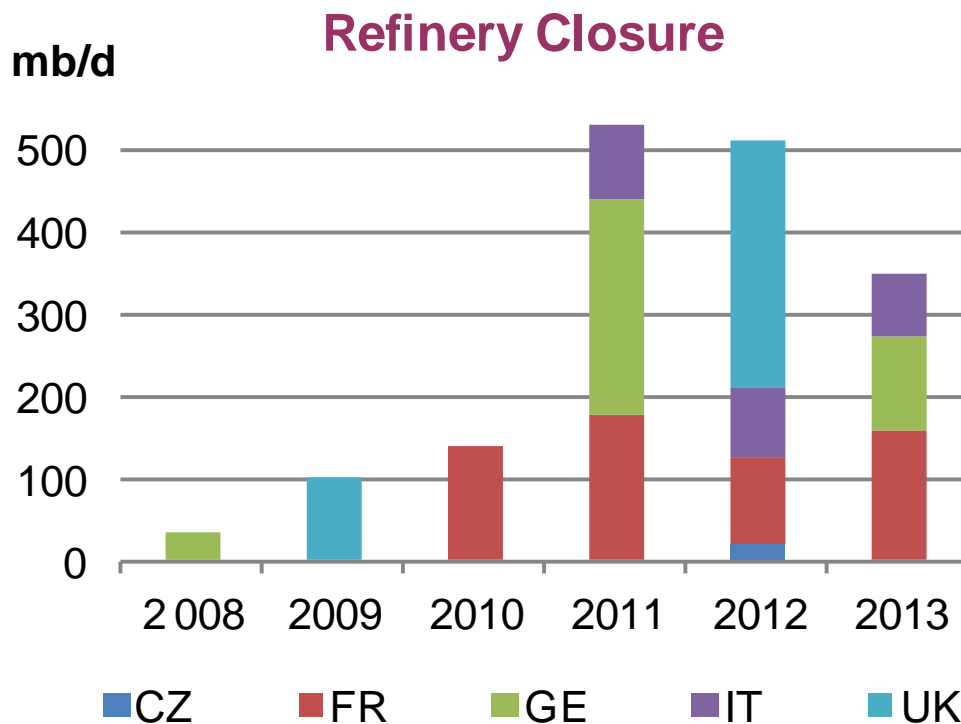


Recent Developments in EU Refining and Product Supply



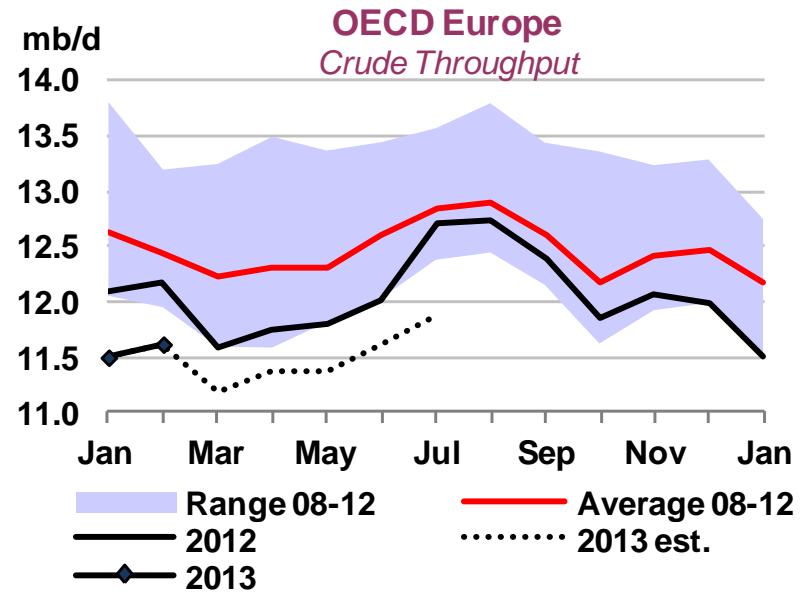
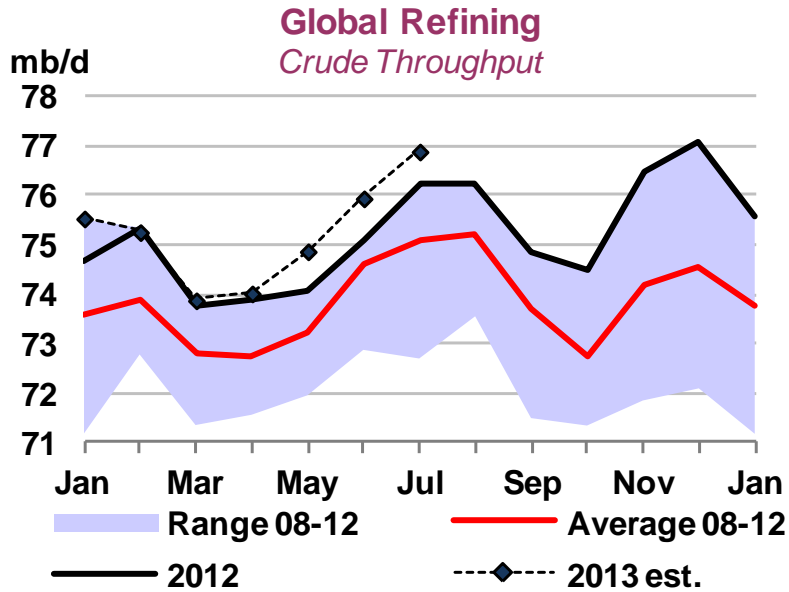
EU Refining Forum, 12 April 2013

EU refinery closures to date



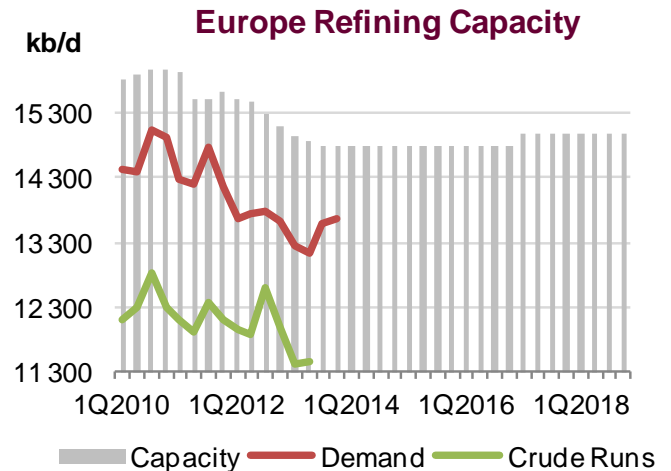
- **15 refineries shut-down 2008-13**
- **Combined idled capacity 1.7 mb/d**
- **Capacity declined by 8%**
- **Utilisation rates of many others significantly reduced**

EU throughputs at a new low in 1Q13

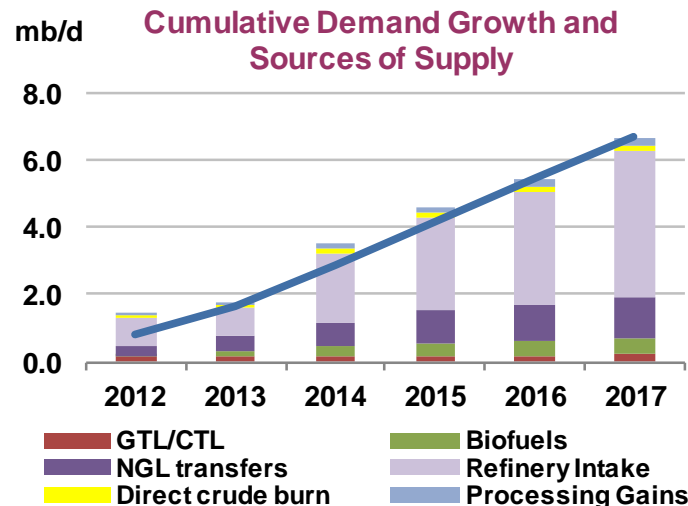
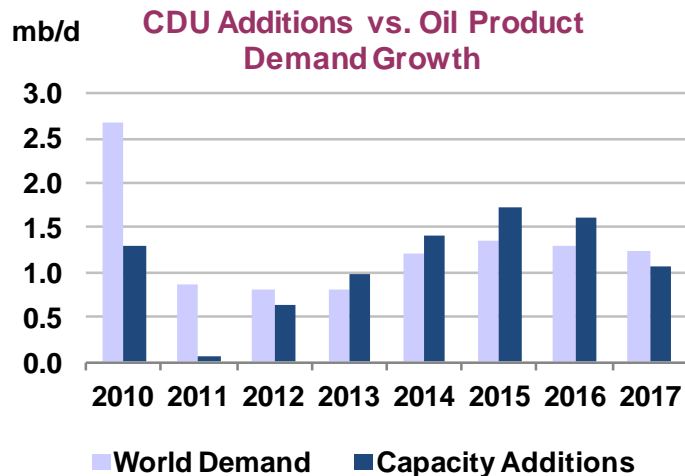


■ **OECD Europe runs hit long-time low of 11.4 mb/d in 1Q13.**

- **Planned maintenance**
- **Economically-driven shutdowns**



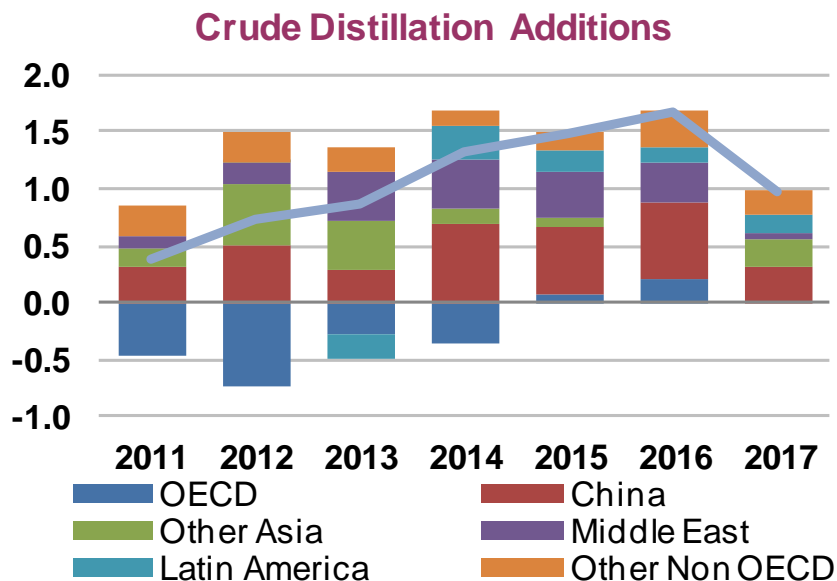
EU in context: capacity attrition bucks the global trend



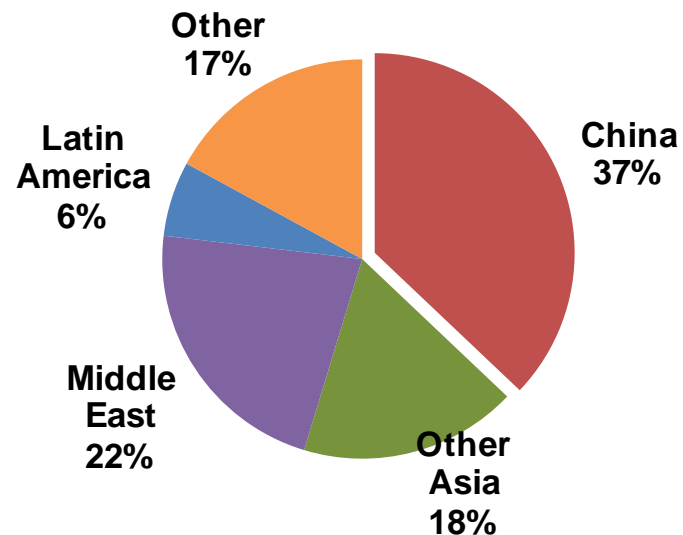
- From 2013 onwards, planned additions again surpass demand growth
- Reverses 3-year decline in refining capacity surplus
- More and more supply bypasses the refining process:
 - Biofuels
 - NGLs
 - GTLs
 - Direct crude burn
 - etc.

Non-OECD capacity in expansion spurt

accounting for all of global growth



Regional Share of CDU Expansions

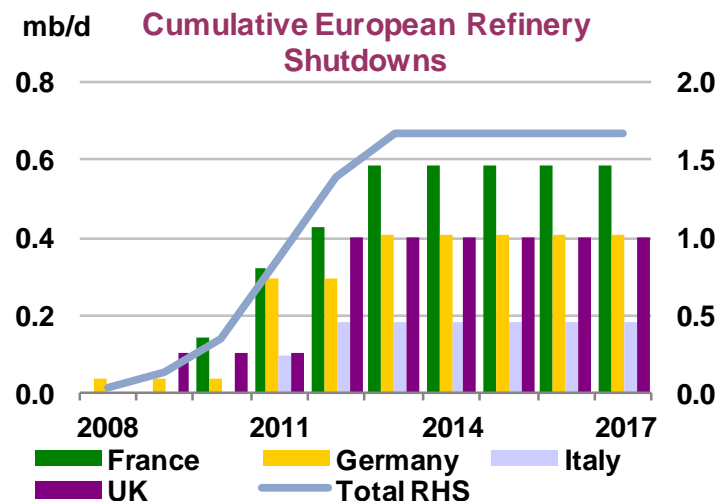
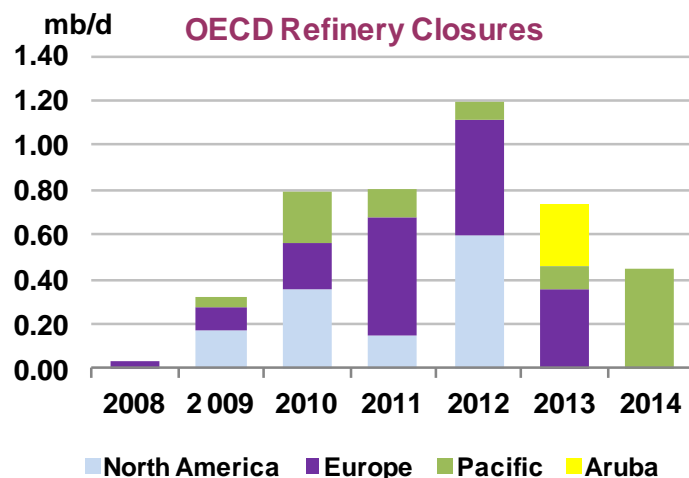


■ Investments set to add:

- 7.5 mb/d of net crude distillation capacity by 2017
- 5.9 mb/d of upgrading capacity
- 5.4 mb/d of de-sulphurisation capacity

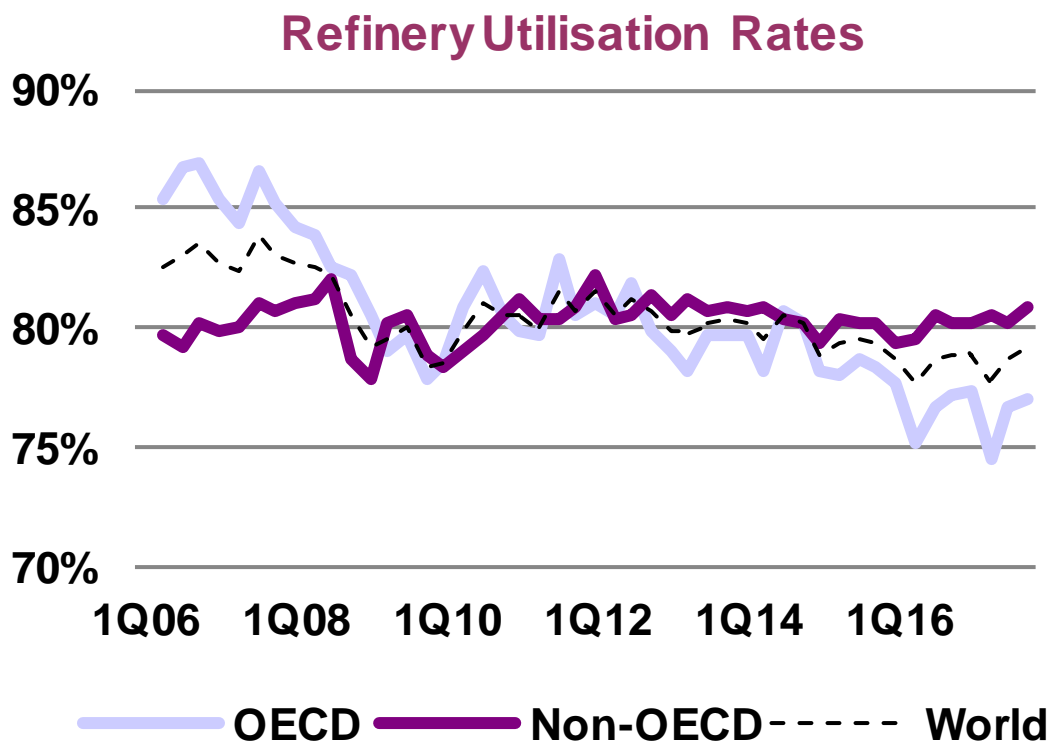
OECD capacity contracts

1.2 mb/d CDU capacity shut in 2012, 0.8 mb/d in 2011



- Since 2008, 4 mb/d of OECD capacity shut/committed to shut + 270 kb/d capacity closed in Aruba 2012.
- 1.7 mb/d in Europe (500 kb/d in 2011, 500 kb/d in 2012)
- N. American restructuring in US East Coast, VI.
- Additional 1.5 mb/d net shutdowns by 2017.
- Japanese consolidates further towards 2014 to comply with METI ordinance, Fukushima effect fades

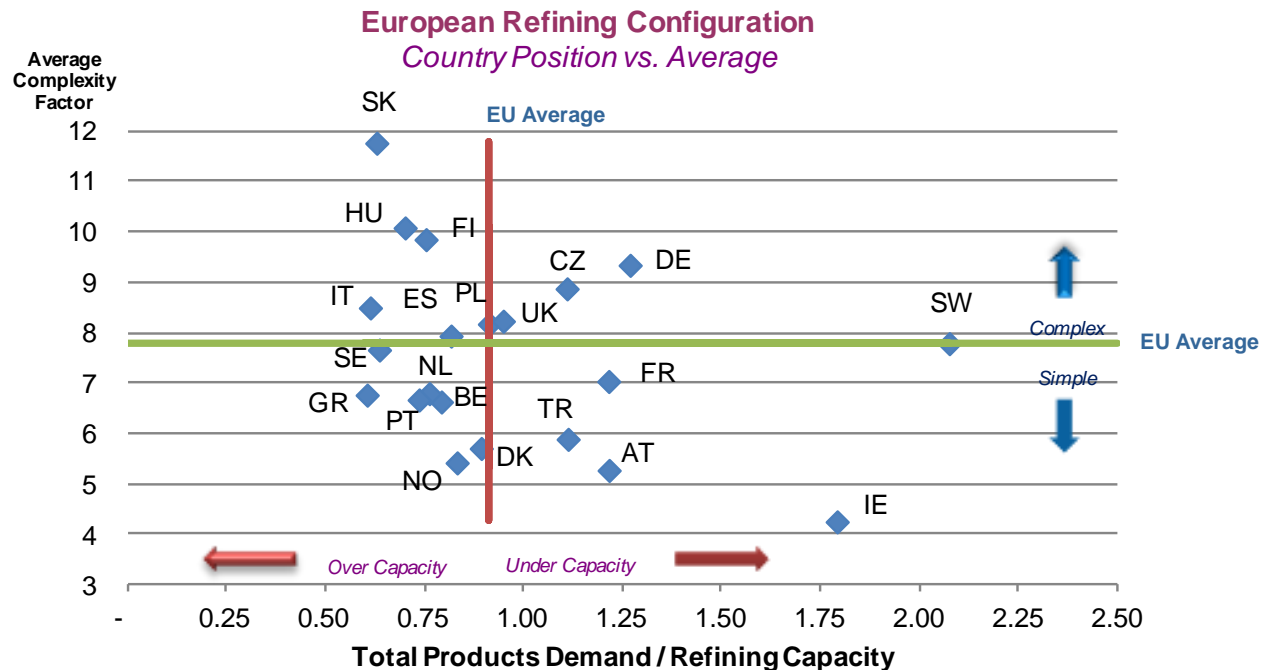
More EU refining capacity at risk



- **OECD utilisation rates to fall again in the absence of further shutdowns/delays/cancellations**
- **Incremental 4.4 mb/d crude capacity at risk to maintain pre-crisis utilisation rates**
- **Most at-risk capacity in Europe**

Europe's Refining Industry

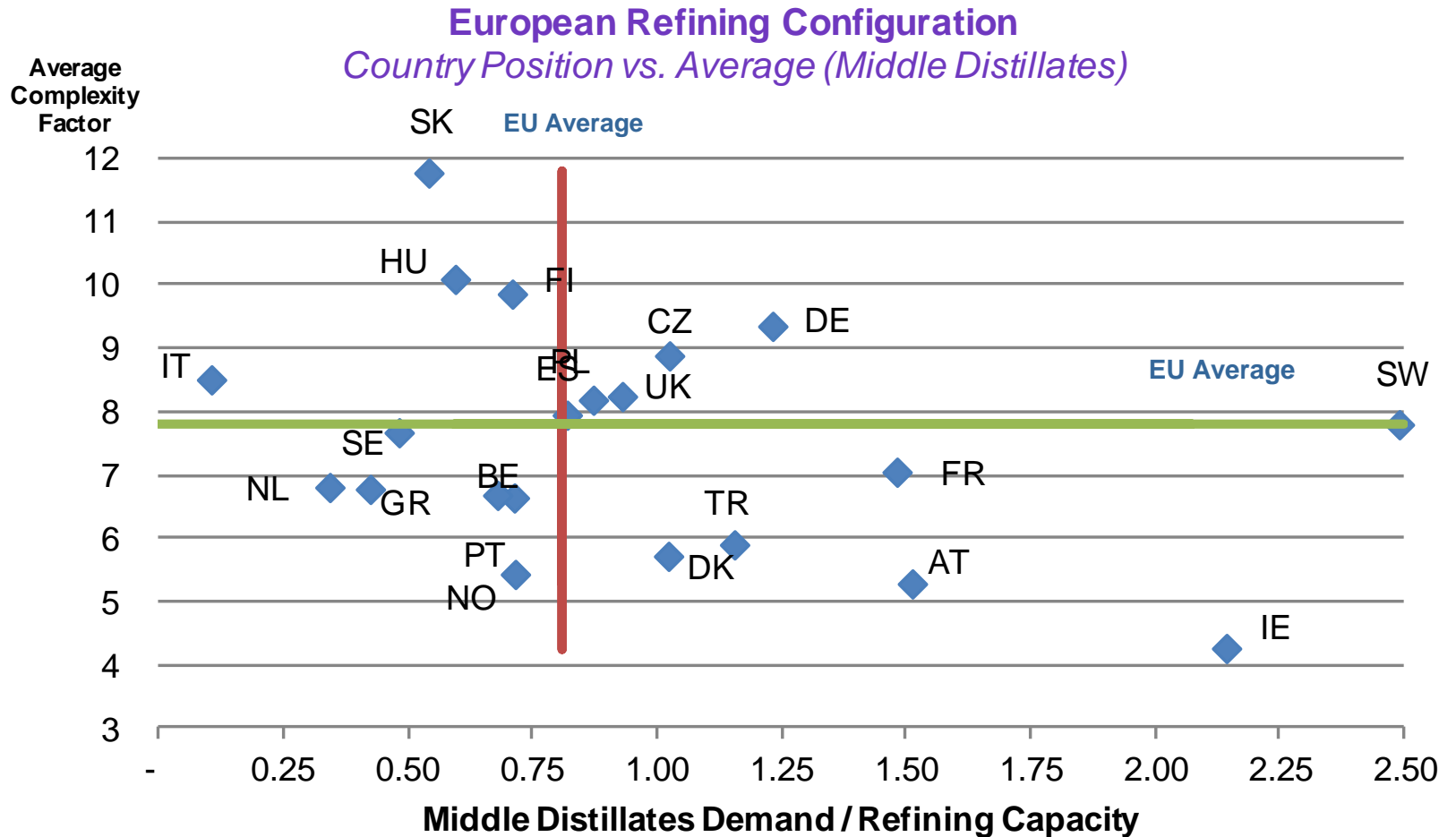
Country Positioning



- On Average Europe is in slight over capacity comparing with 2012 demand
- 2/3 of countries are in over capacity position compared with their local demand
- 1/3 of countries are both in over capacity position and have low complexity index

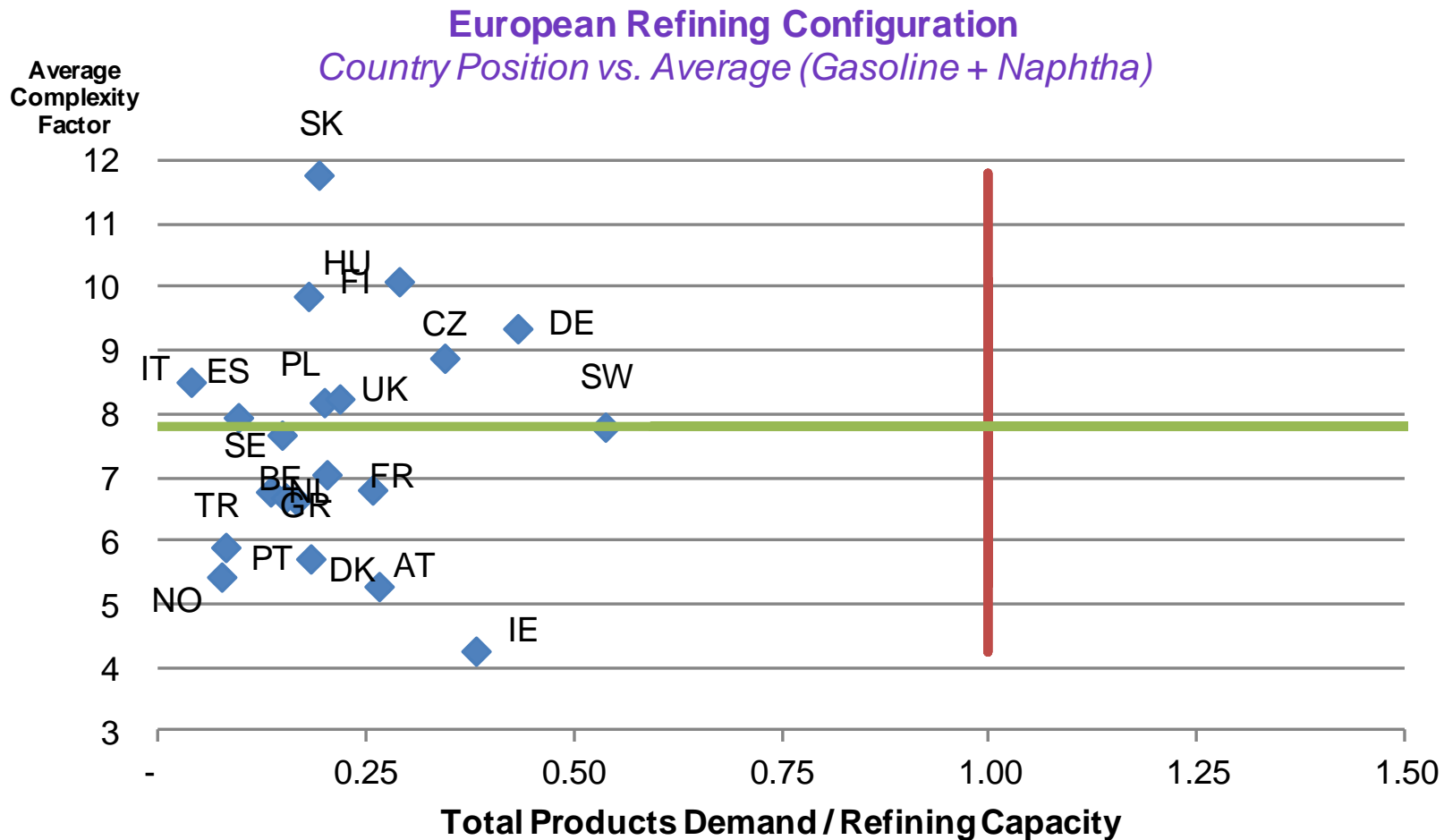
Europe's Refining Industry

Country Positioning Middle Distillates (Kero. + Diesel/Gasoil)



Europe's Refining Industry

Country Positioning Light Oils (gasoline + naphtha)



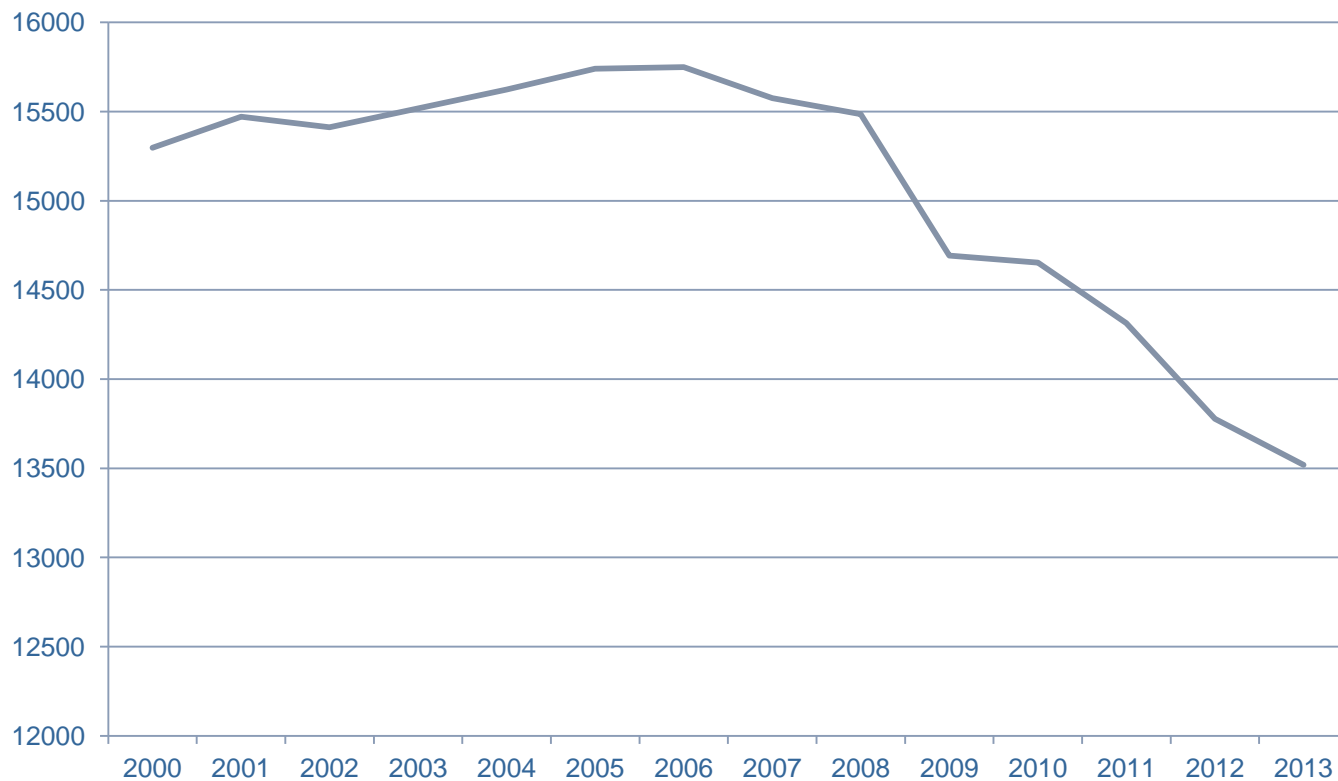
Europe in the eye of the storm

- **A 'perfect storm'?**
 - **Vanishing demand**
 - **In Europe itself**
 - **In its export markets**
 - **USEC**
 - **Latin America (USGC, India competition)**
 - **High crude prices**
 - **North Sea in decline**
 - **North Africa in turmoil**
 - **High energy costs**
 - **60% of refining costs v. 20% in N. America**
 - **Antiquated, uncompetitive plants**
 - **Rapid growth of merchant capacity elsewhere**
- **Rise of refining mega-hubs**
- **Vanishing VGO**
- **Europe capacity closing faster than demand**
- **Import dependence on the rise**

OECD Europe oil demand

Kb/d

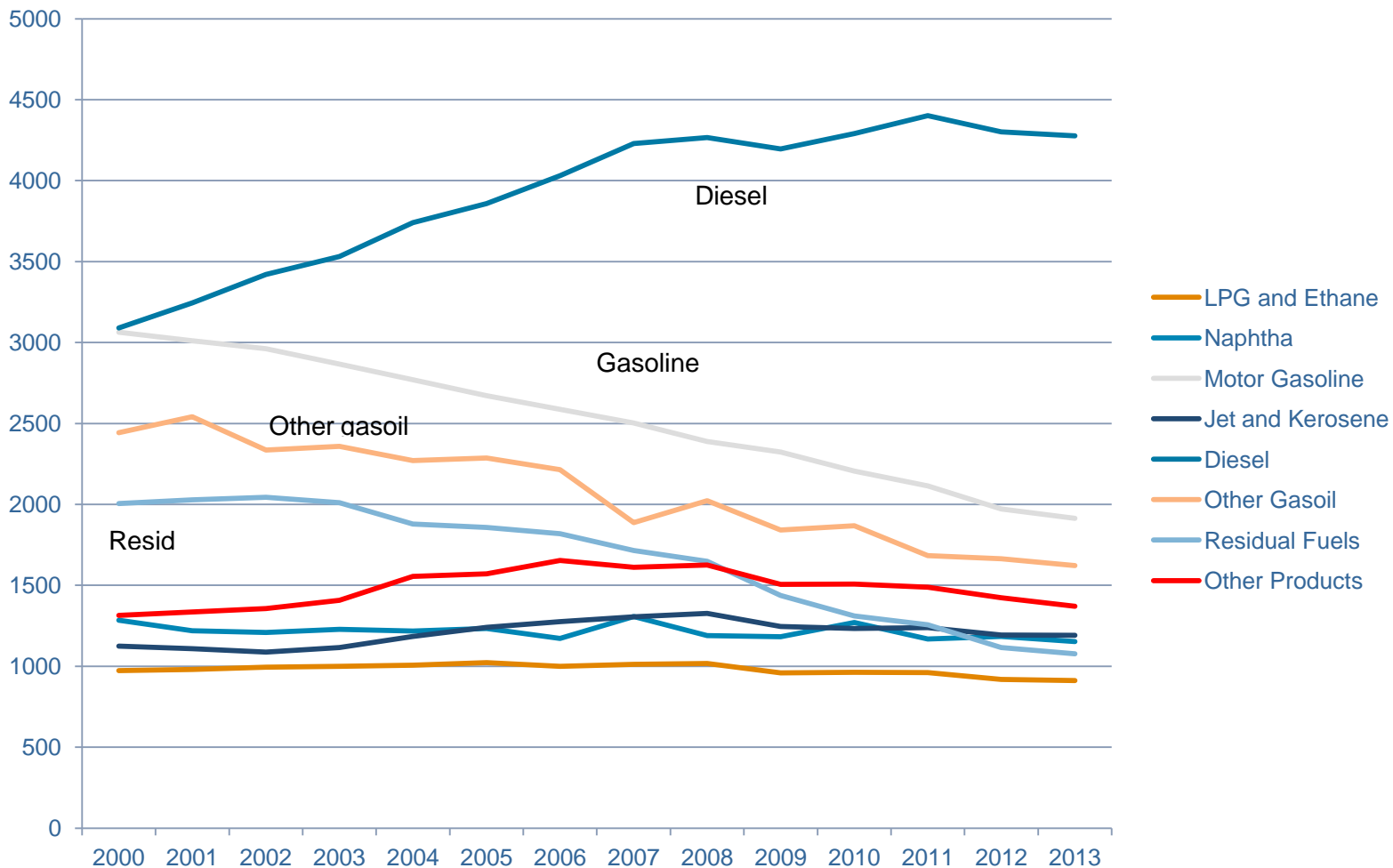
Total Products



OECD Europe oil demand by product

Kb/d

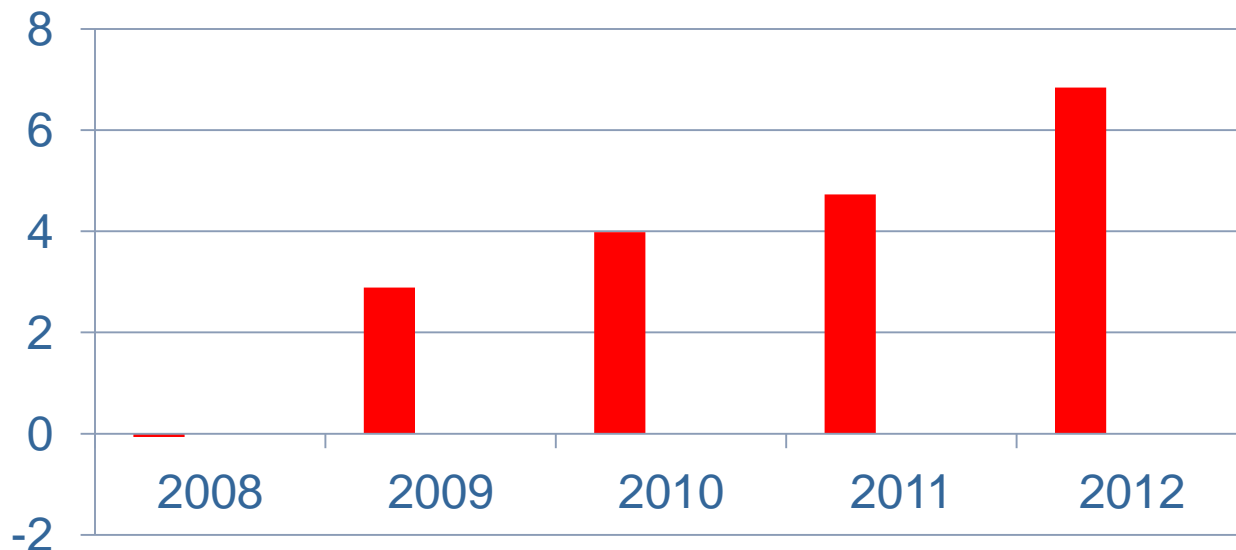
Import dependence varies greatly by product



Vanishing VGO

Premium VGO 0.5 % versus Brent

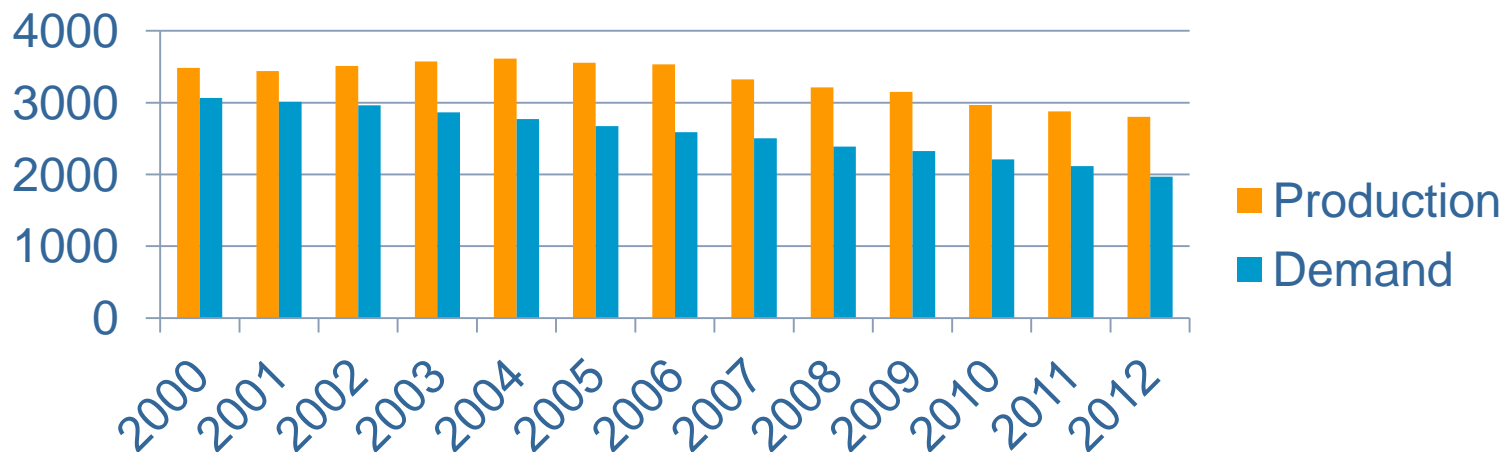
\$/bbl



- **VGO (feedstock for cracking capacity) getting more expensive due to:**
 - **Closure of European VDU capacities**
 - **Lower FSU VGO exports to Europe as FSU is embarking on large upgrading program**

Persistent European gasoline surplus

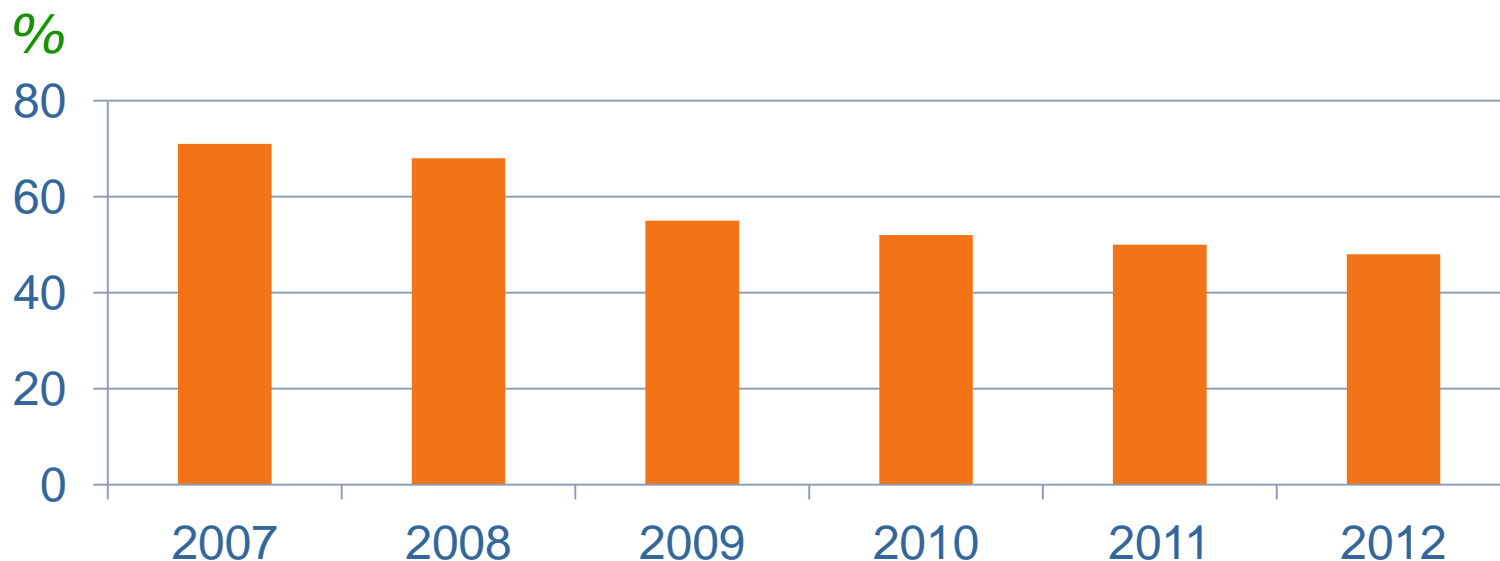
k/bd



- **Despite shut down of European refinery capacity, Europe continues to have a structural surplus in gasoline**
- **As European refineries need to produce domestic diesel, gasoline becomes a by-product**

Shrinking US outlet

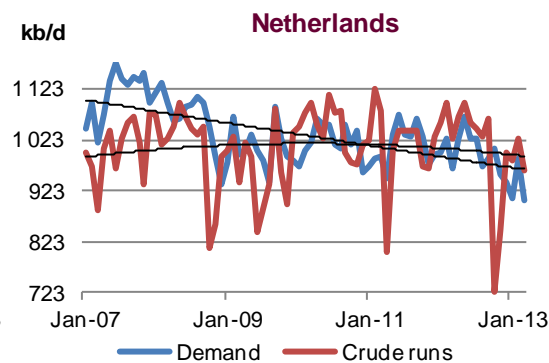
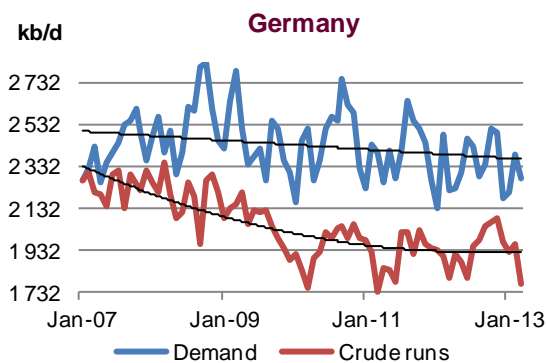
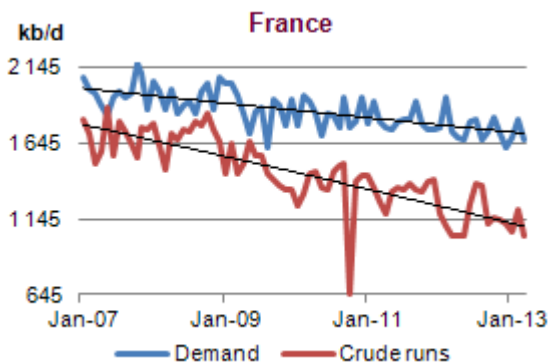
US imports as % of Europe gasoline surplus



- **US gasoline pull from Europe is weakening**
- **It will be difficult for Europe to find other gasoline export outlets.**

EU refining response to demand drop

Heterogeneity prevails



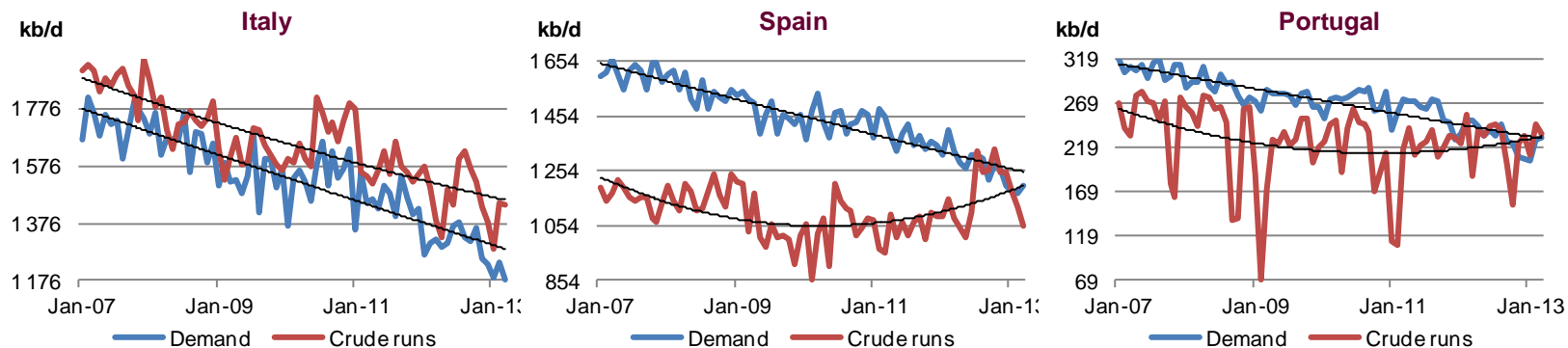
As domestic demand decline, refining sector reaction is different from one country to another

■ Northern Europe

- **France, UK** are still on a declining trend reducing crude runs with demand
- **Germany**, crude runs seem to have bottomed with demand still declining
- **Netherlands, Belgium**, crude runs almost unchanged

EU refining response to demand drop

Heterogeneity prevails

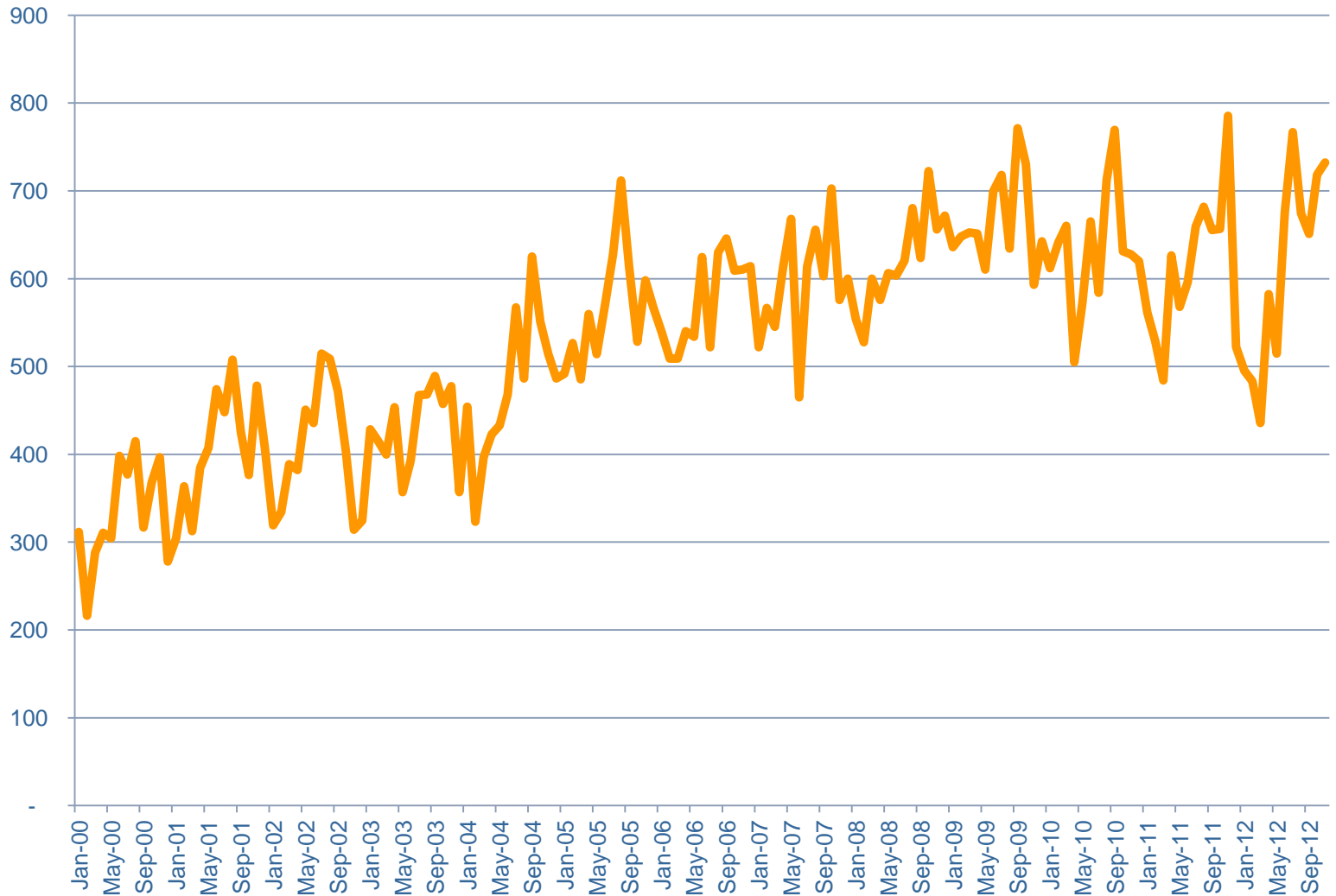


■ Southern Europe

- **Italy**, crude runs declining with demand but still running in surplus
- **Spain, Portugal** have increased their refinery runs, benefiting from export demand in the Mediterranean

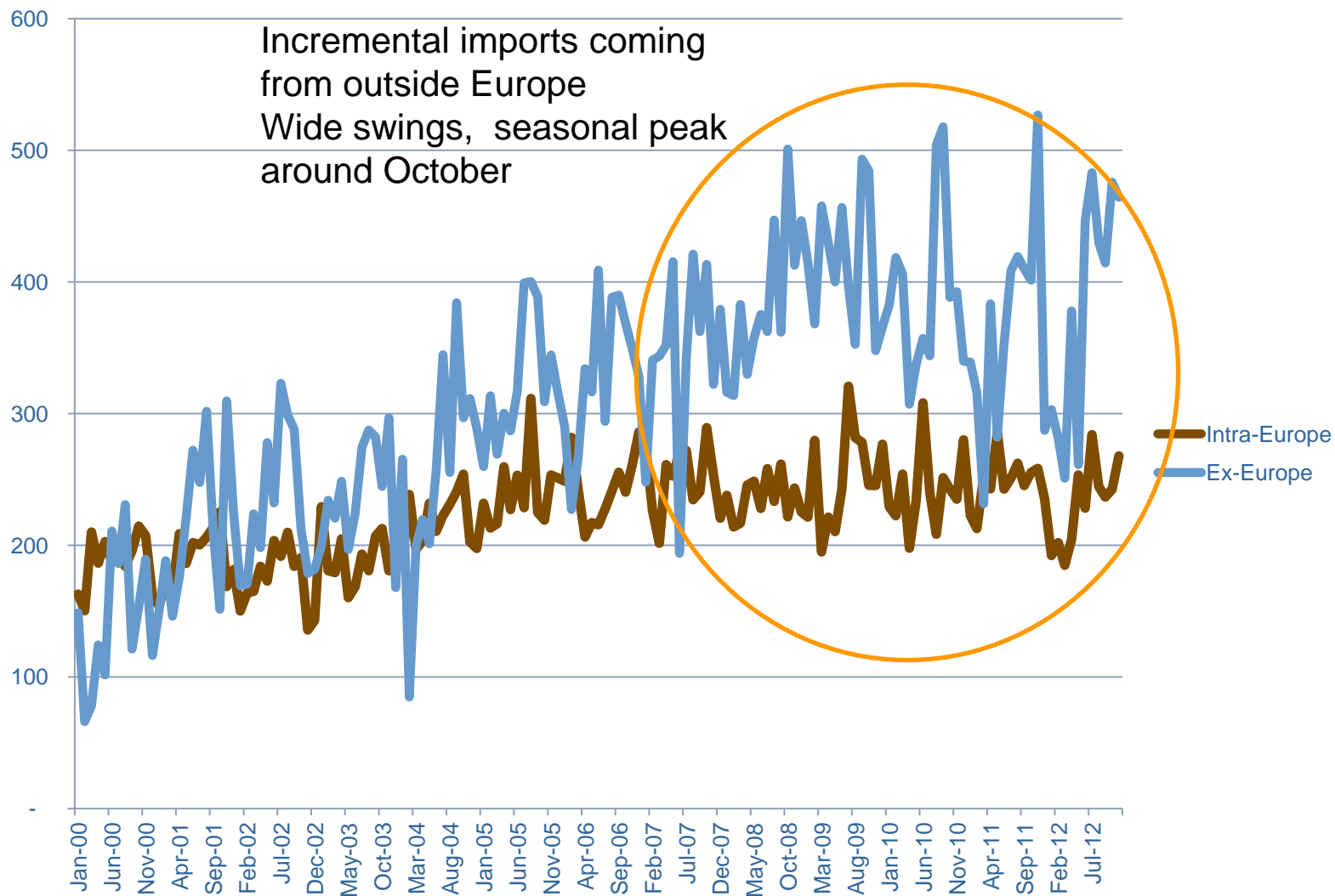
European kerojet imports

Kb/d – OECD Europe, incl. intra-Europe

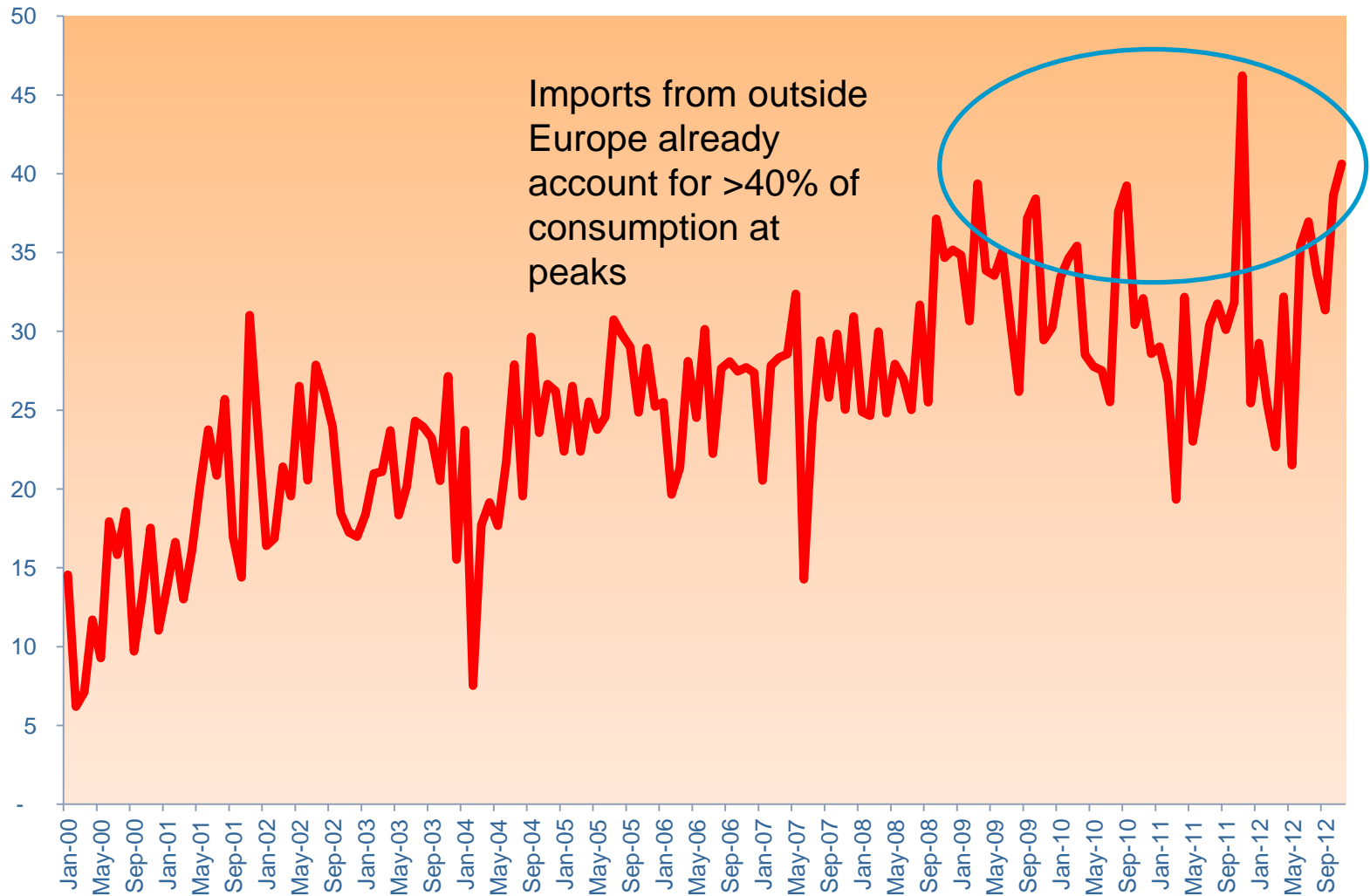


European kerojet imports by origin

Kb/d – OECD Europe, intra-Europe vs. ex-Europe

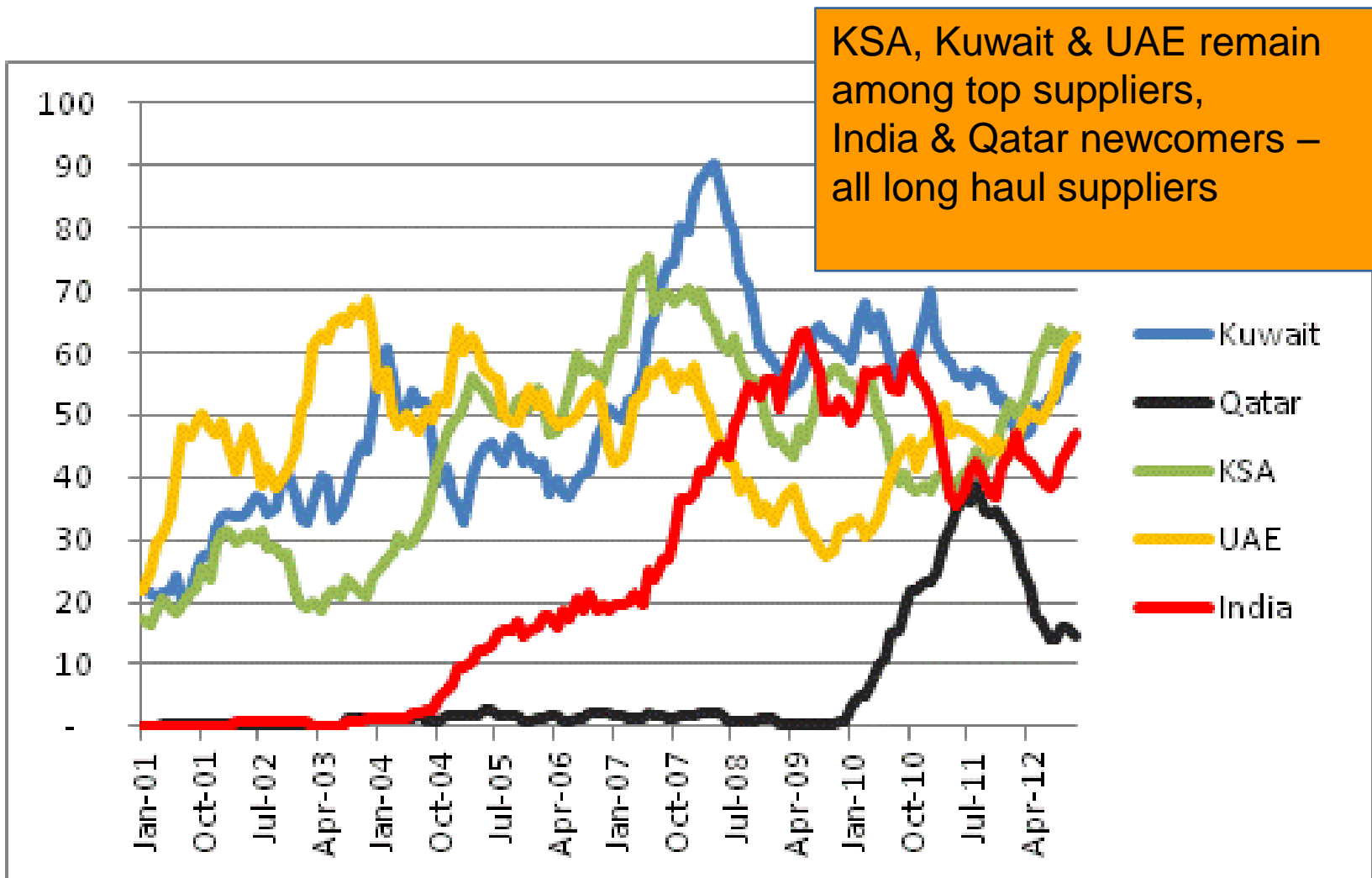


OECD Europe kerojet imports ex-Europe as a % of demand



OECD Europe kerojet imports, ex-Europe, main non-OECD suppliers

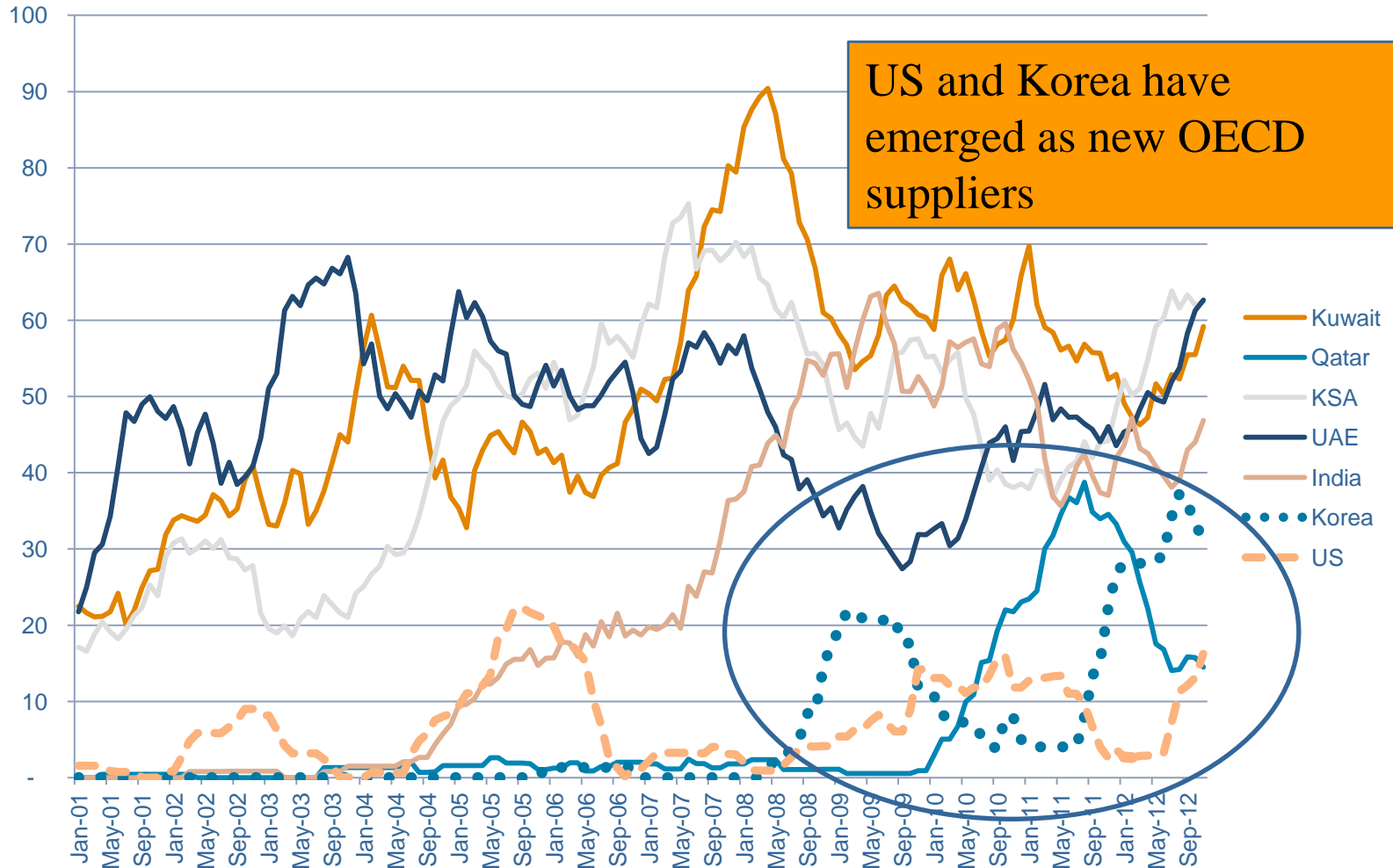
kb/d, 12-mo. rolling avg



KSA, Kuwait & UAE remain among top suppliers, India & Qatar newcomers – all long haul suppliers

OECD Europe kerojet imports, ex-Europe, main countries of origin

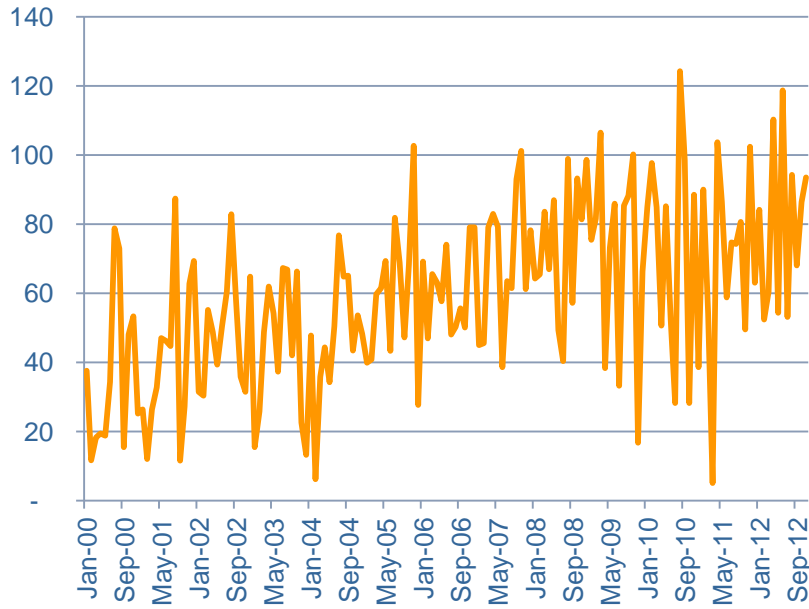
kb/d, 12-mo rolling avg



France kerojet imports vs demand

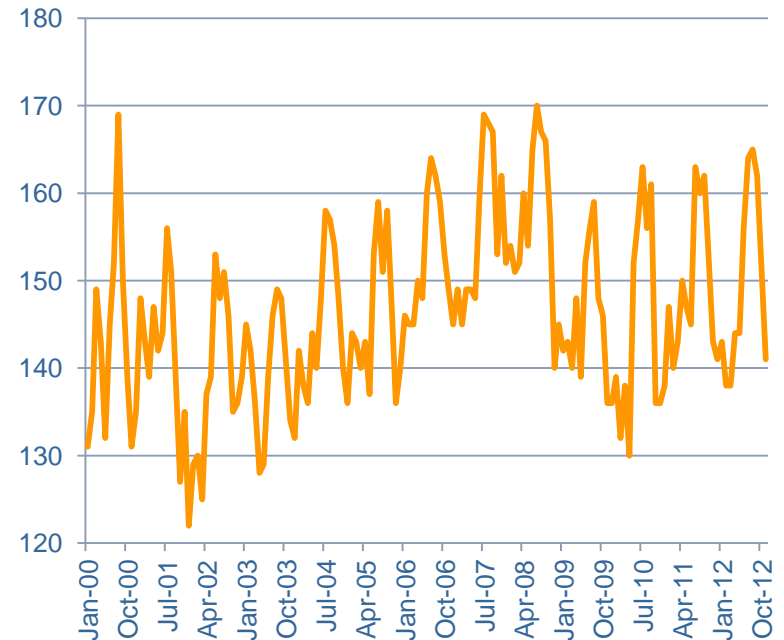
Kb/d

France Kerojet Imports ex Euro



- Demand dipped after 2008 but imports keep rising – wide swings in imports

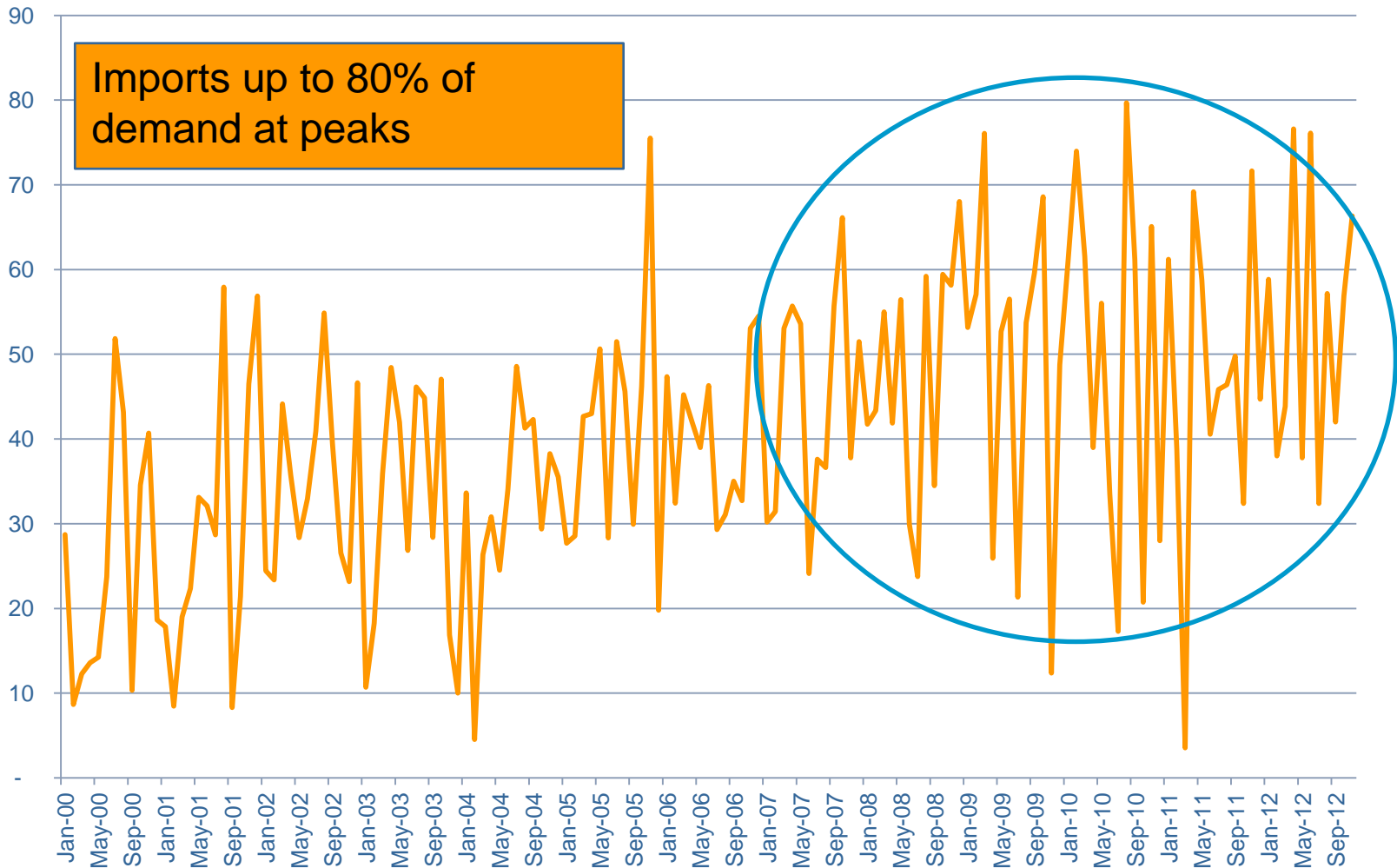
France Jet and Kerosene Demand



France kerojet import dependence

Kb/d, imports ex-Europe

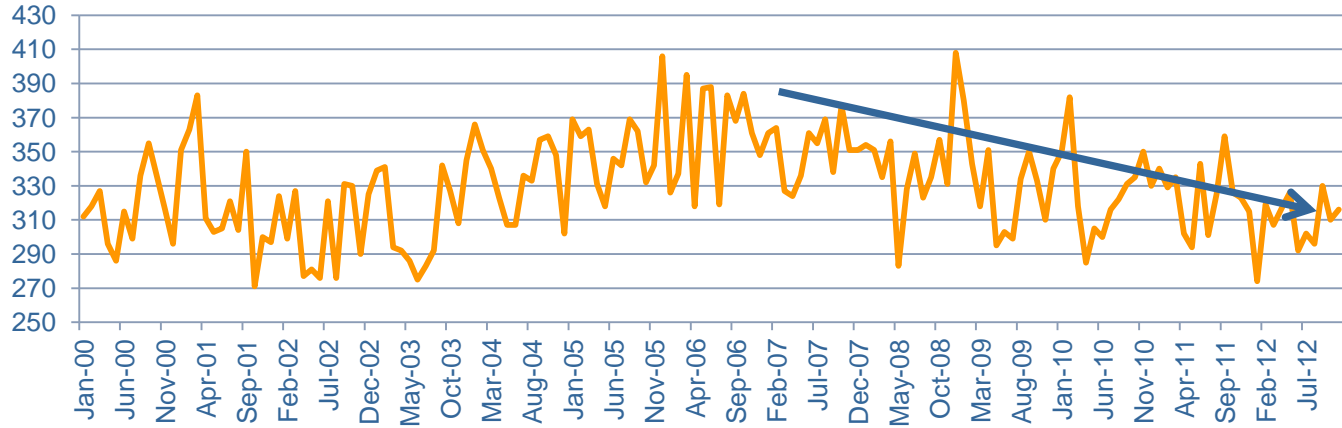
France jet imports ex-Europe as a % of demand



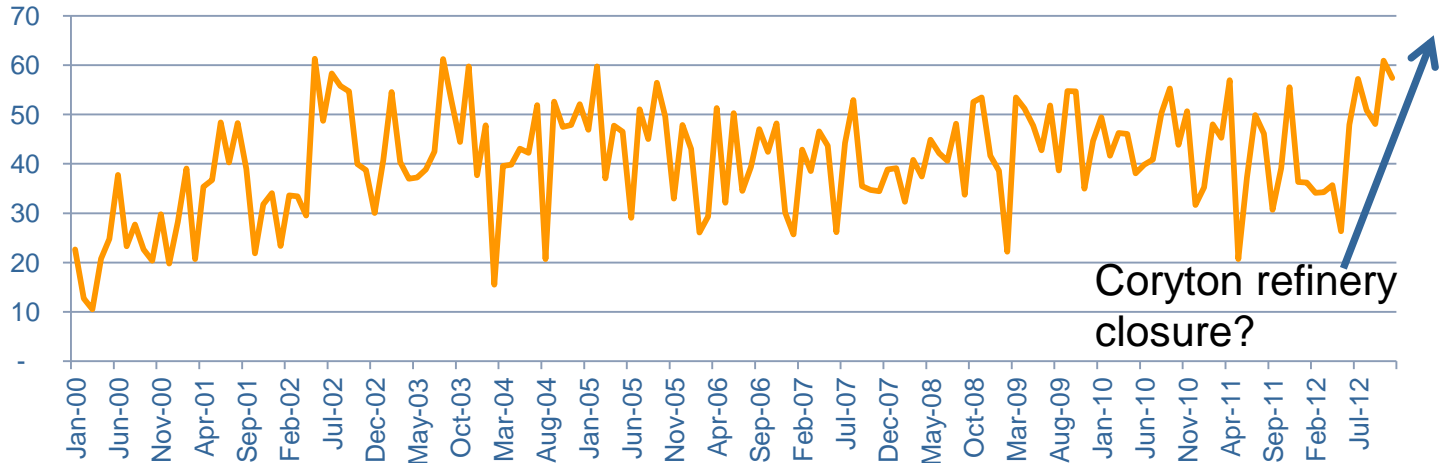
UK kerojet imports and demand

Kb/d

UK Jet and Kerosene Demand

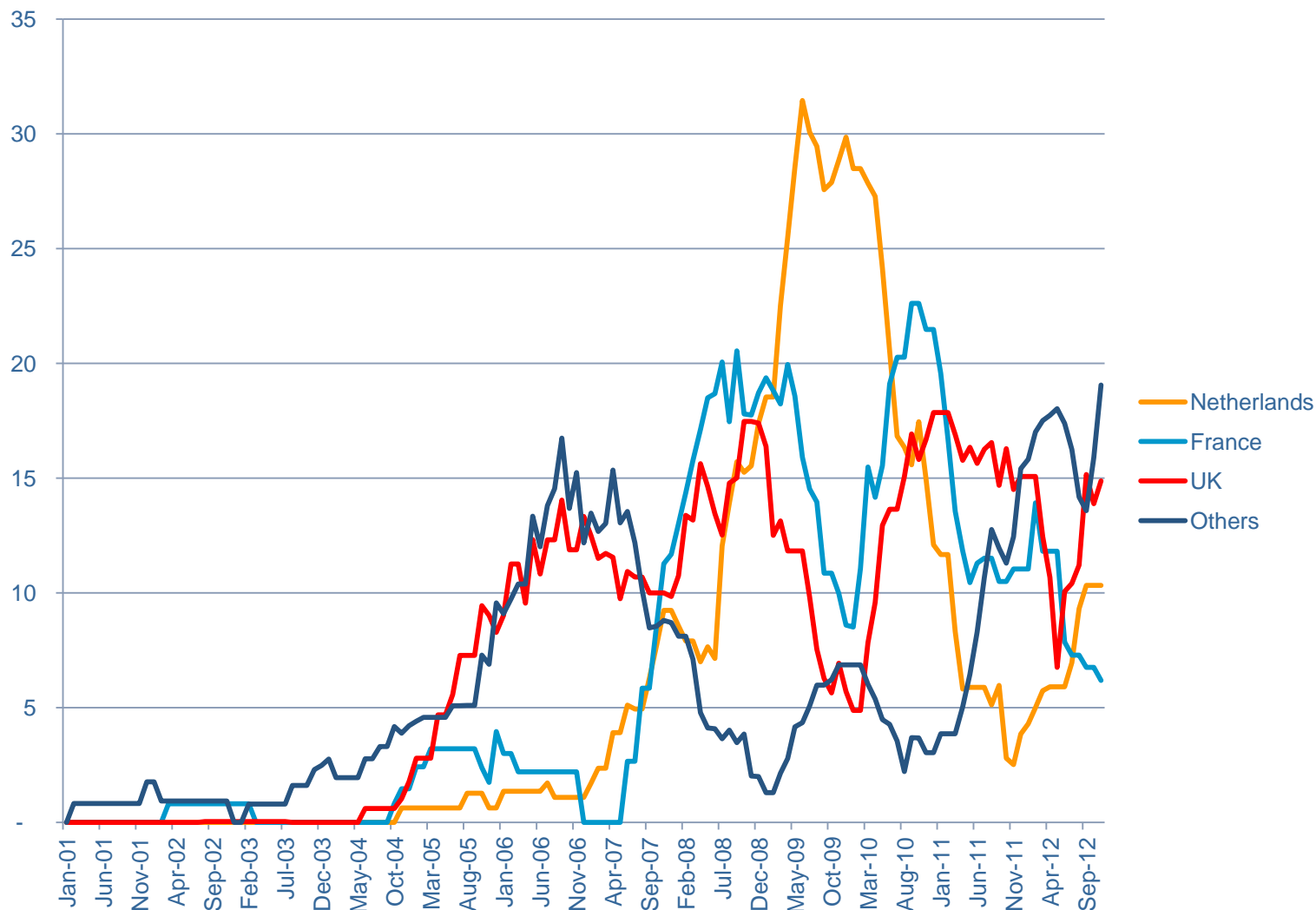


UK Jet Imp. ex-Euro as % of Demand



Indian jet exports: main European buyers

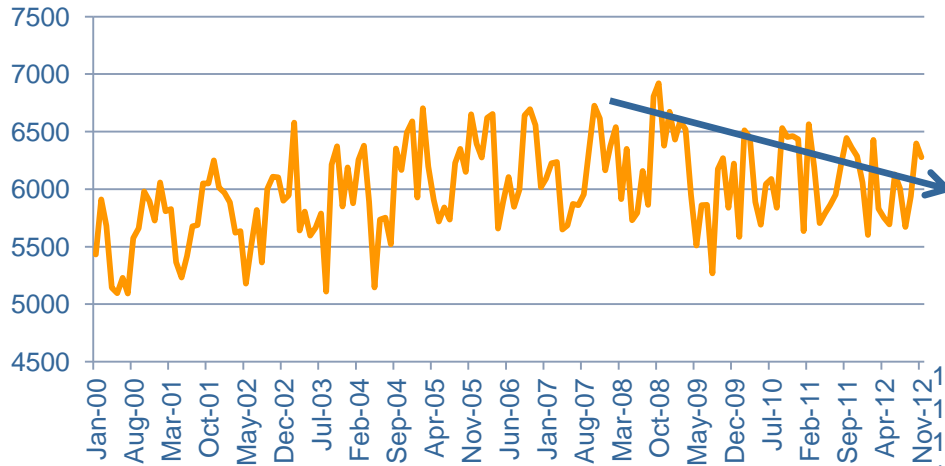
Kb/d, 12-mo rolling avg



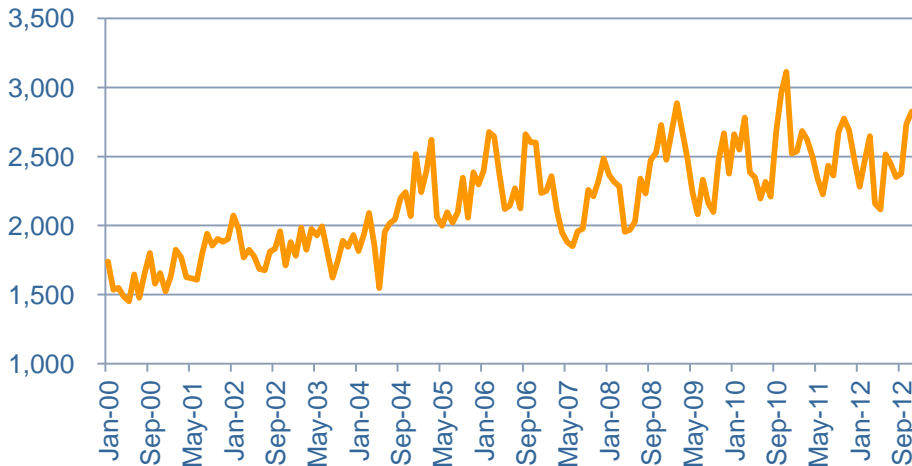
OECD European gasoil

Demand vs Imports

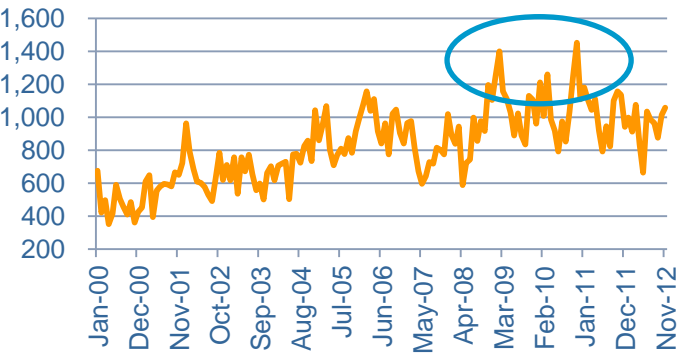
Demand



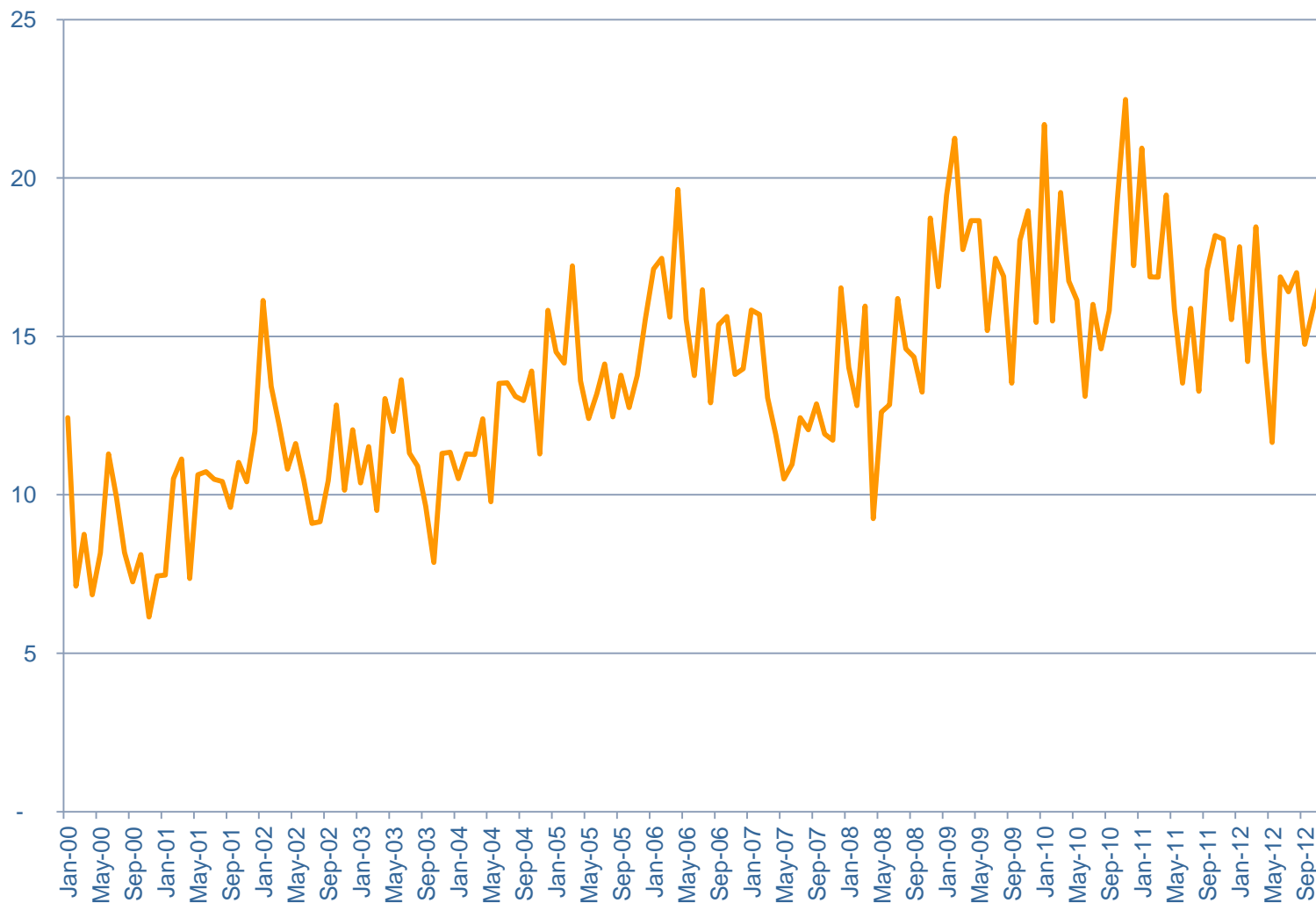
Total Imports



Total Imports ex-Europe



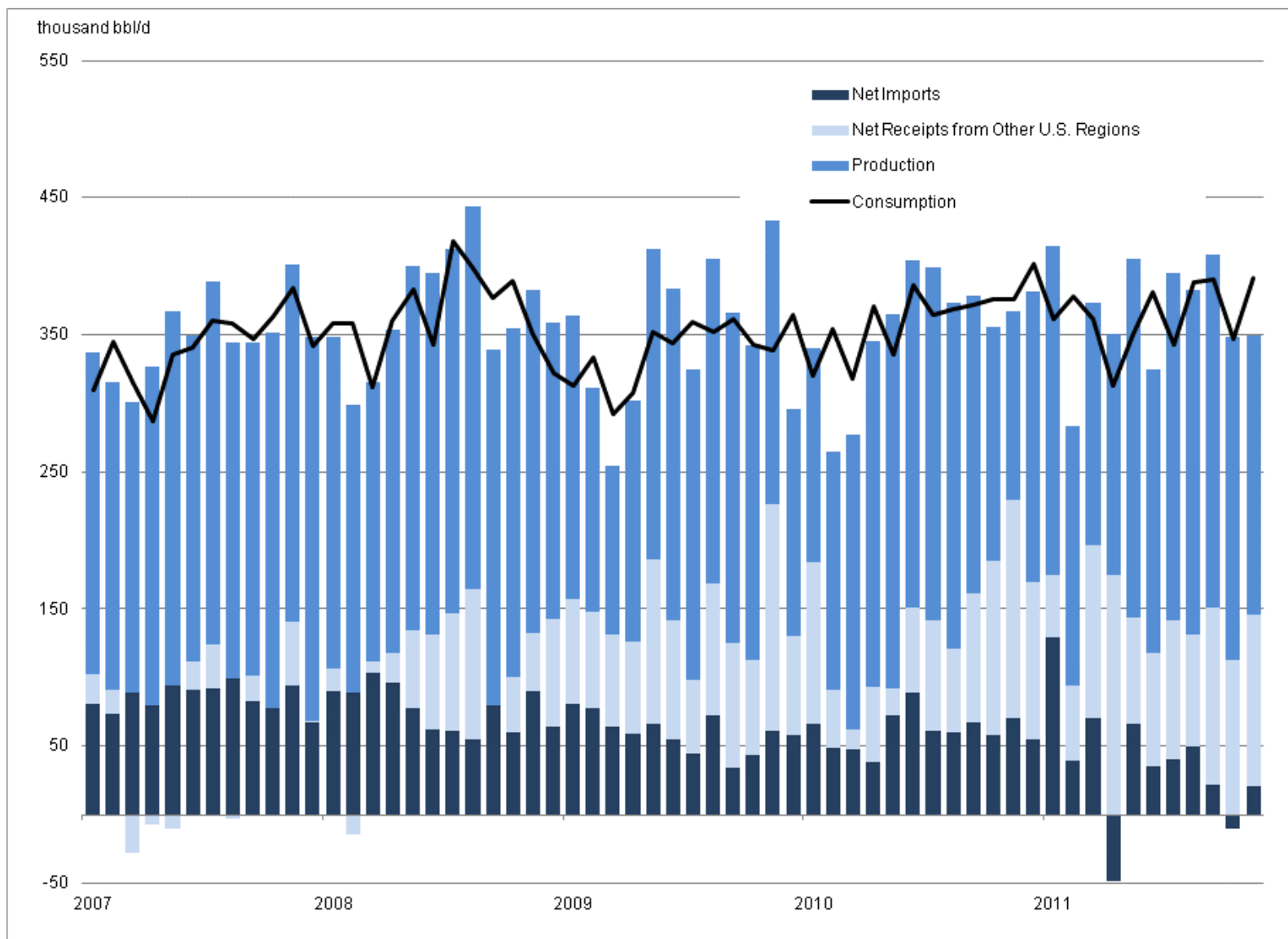
OECD Europe gasoil imports ex-Europe as a % of demand



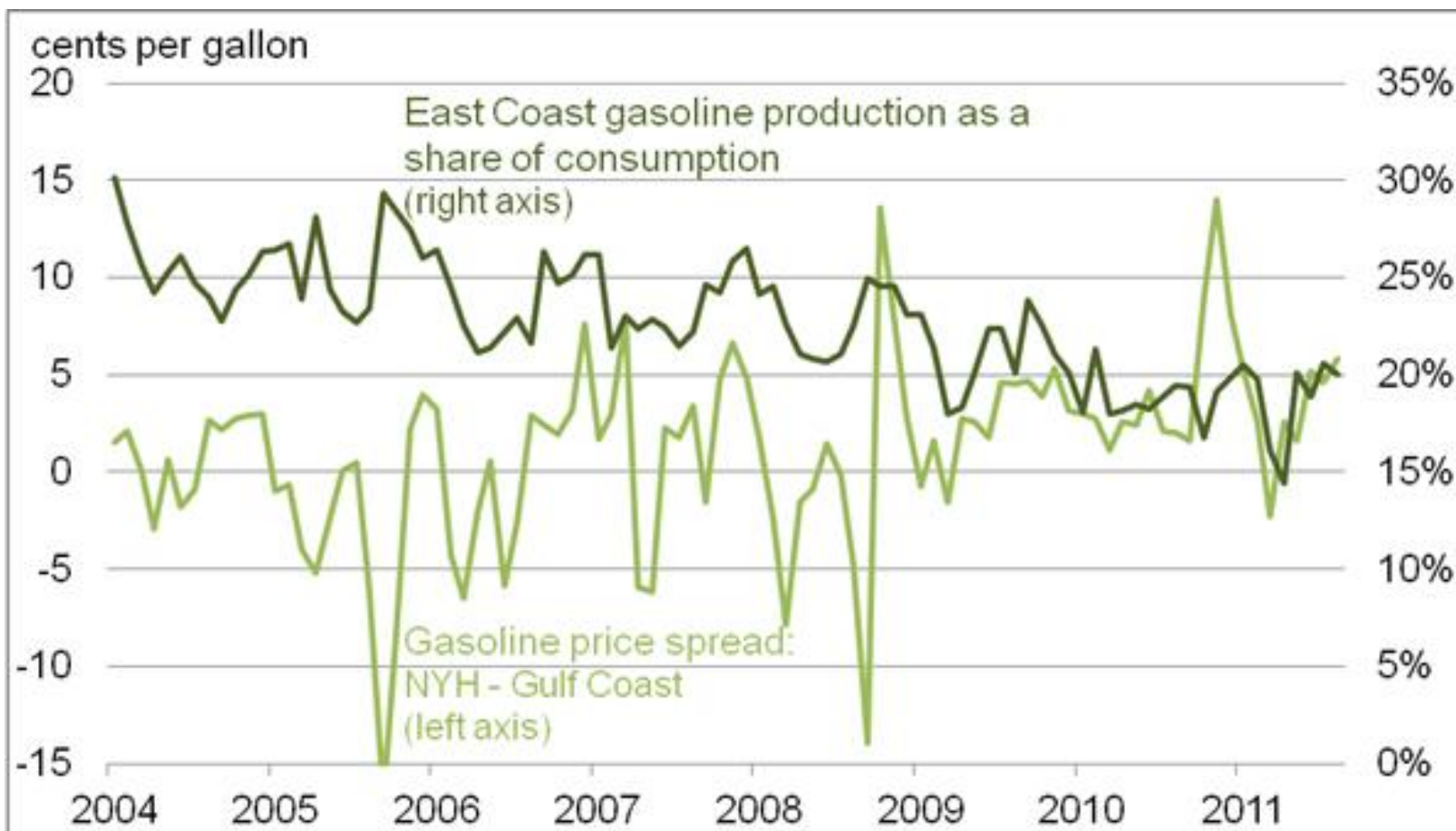
Implications of increased product import dependence

- **Import dependence likely on the rise in the event of further European refinery closures, even if demand keeps contracting**
- **Longer-haul supply**
- **Reduced flexibility to deal with short-term market swings or supply disruptions**
- **Increased storage requirements pre-peak season**
- **Terminal costs for pre-positioning, bulk break/build**
- **Blending challenges to meet local specs**
- **Price volatility:**
 - **increased time spreads to offset storage costs**
 - **Increased location spreads to offset transport costs**
- **New set of incentives for market participants: refiners and traders have very different business models and strategies**

Case study: US NE ULSD balance



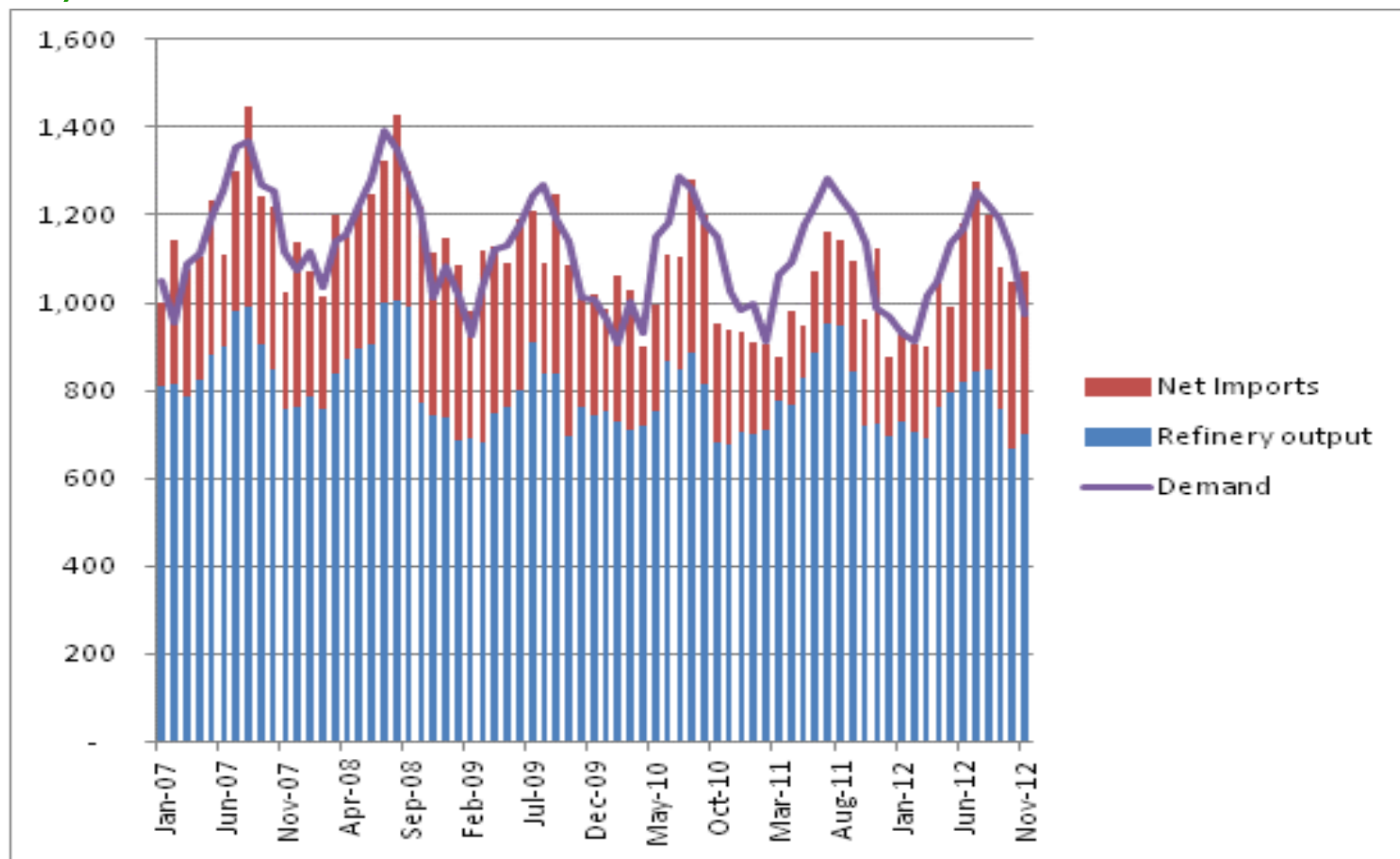
US gasoline spreads on the rise



- **2004: USEC refiners = 26% of USEC demand**
- **NYH prices on average 1c/gln > USGC.**
- **2011: USEC refiner market share = 19%**
- **NYH premium = 3c/gln.**

OECD Europe kerojet balances

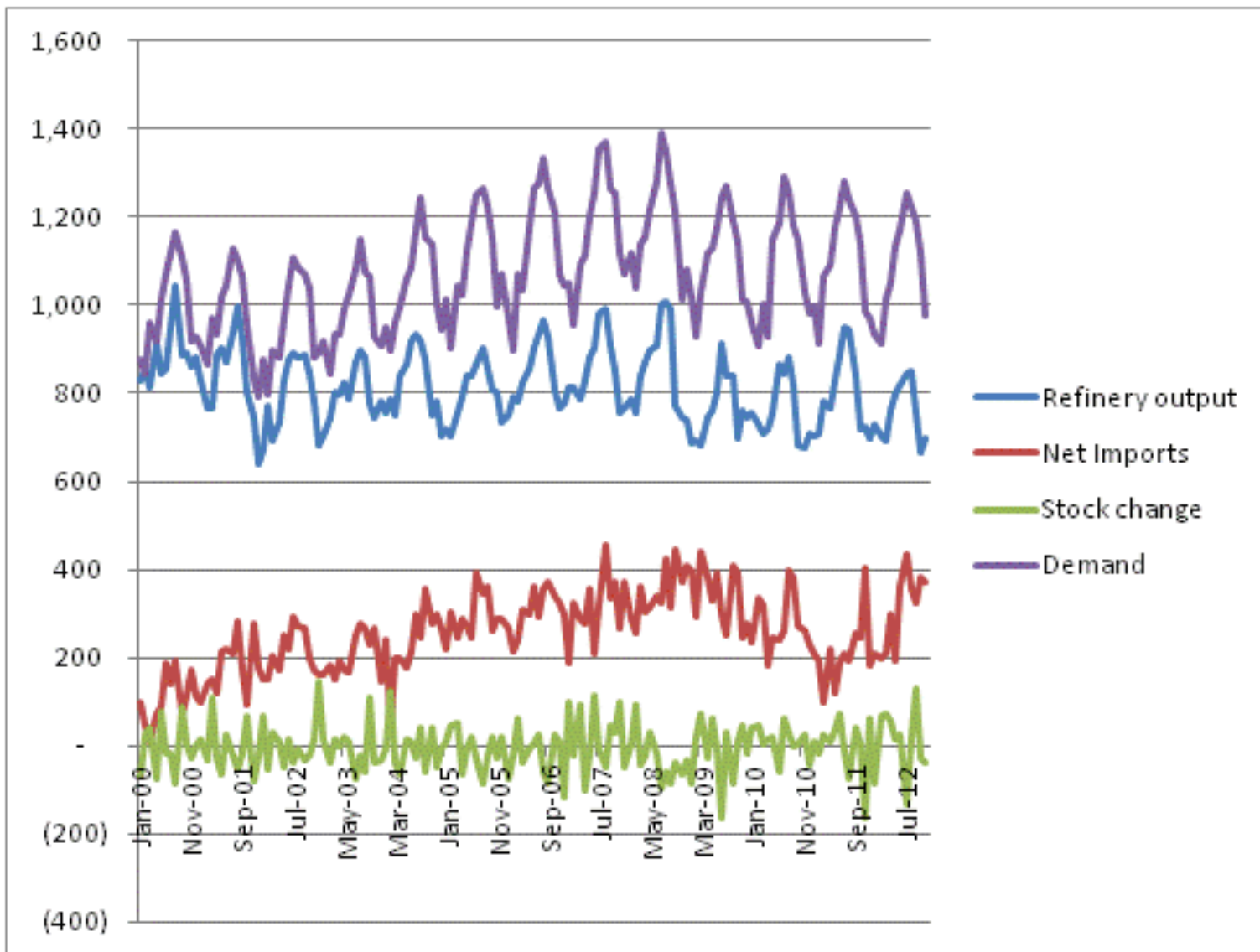
Kb/d



- **Notional supply gap widens but exports to unspecified locations from the Netherlands on the rise – could account for part of the gap**

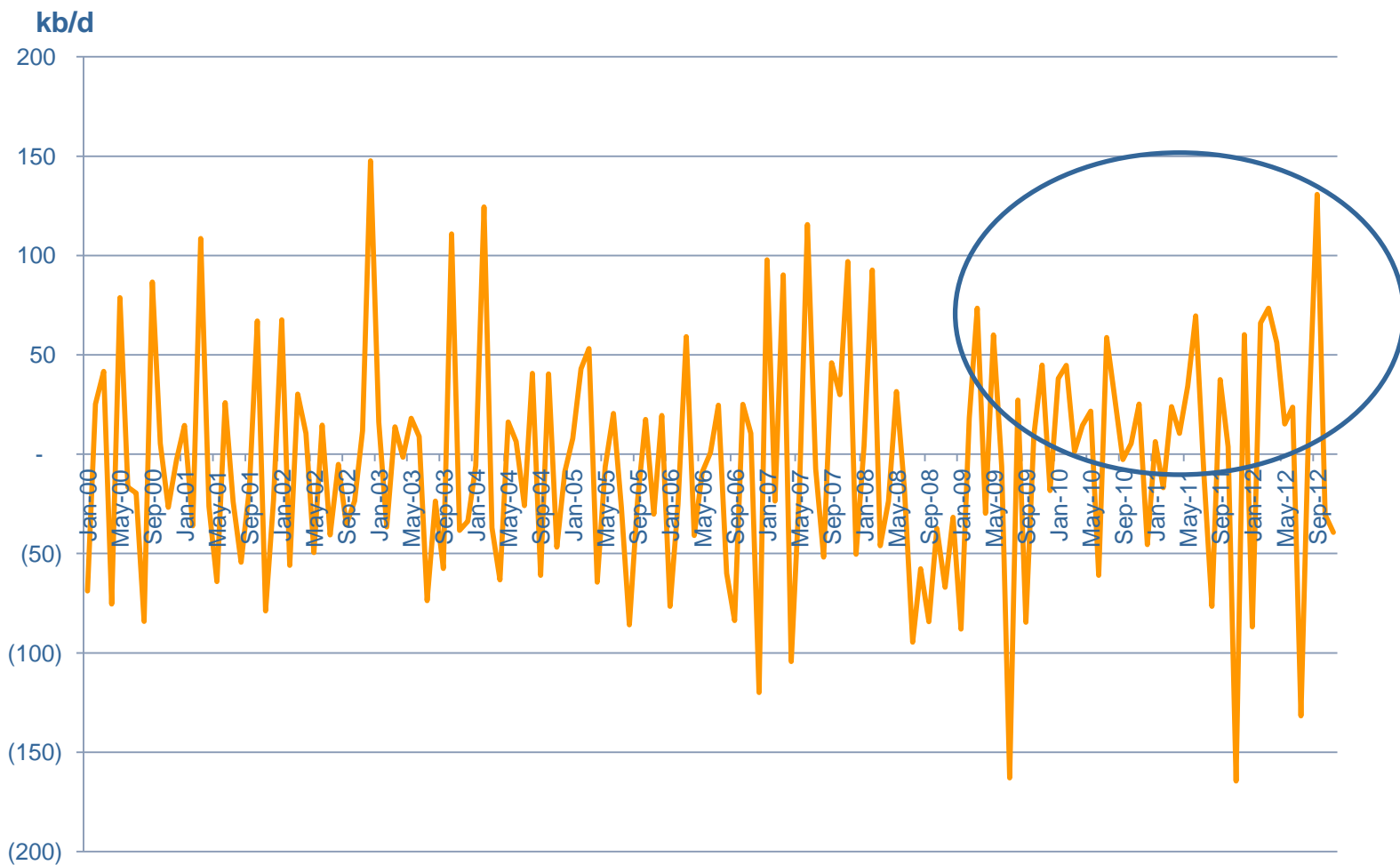
OECD Europe kerojet balances

Kb/d



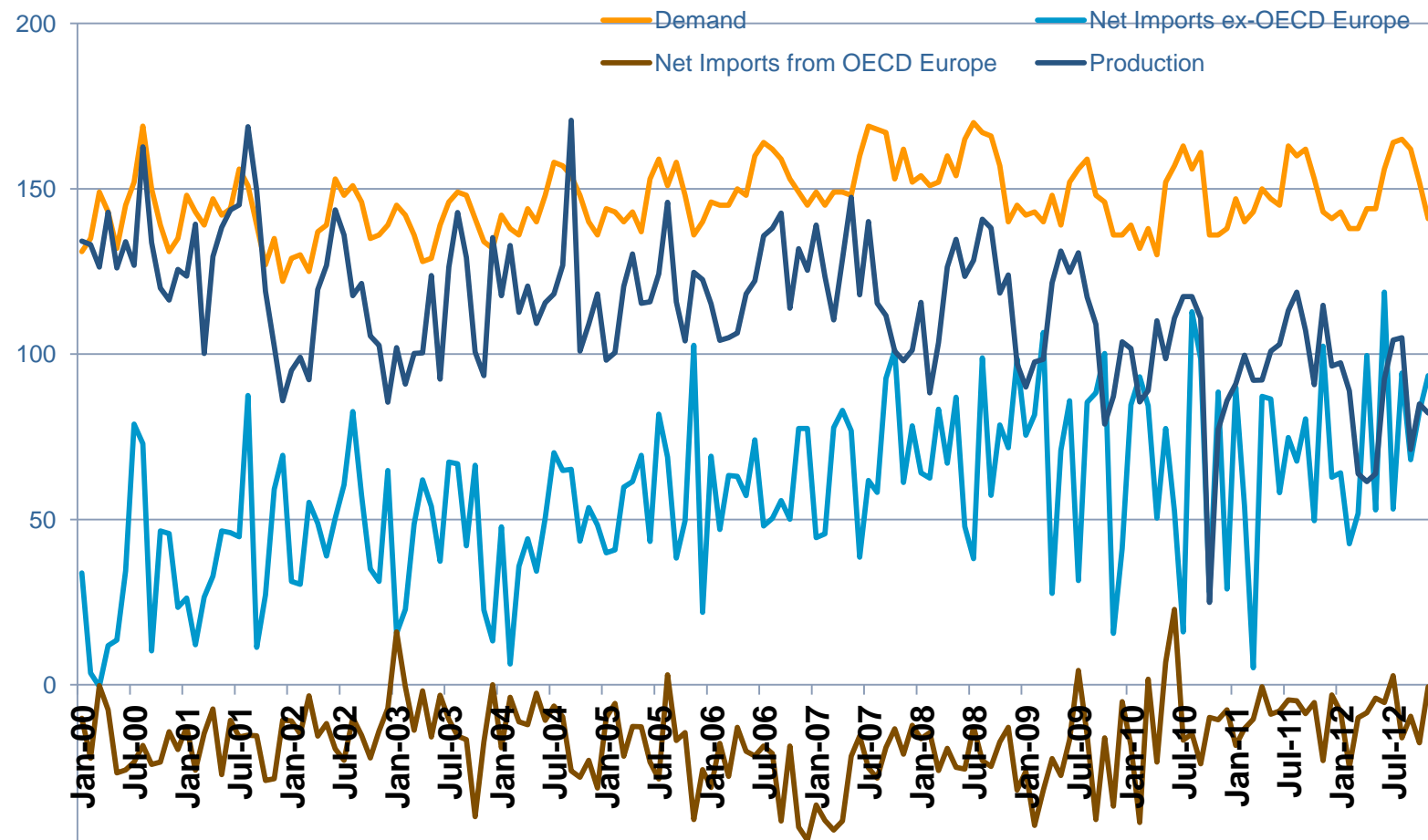
OECD Europe monthly jet stock draw

Higher for longer?



France kerojet balances

kbd

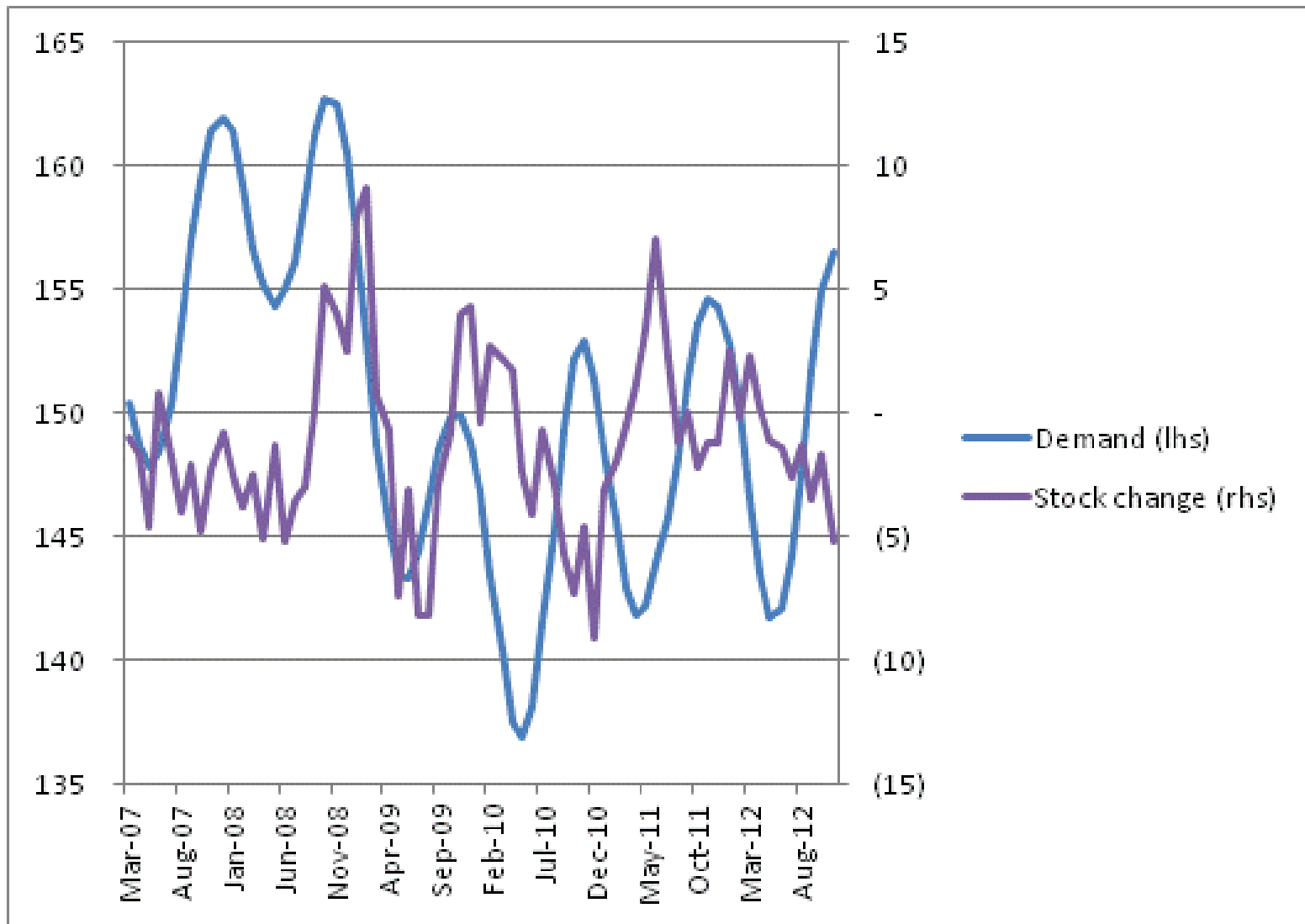


- Net imports from outside OECD region now roughly at parity with domestic production
- France is a marginal net exporter to OECD Europe

-100

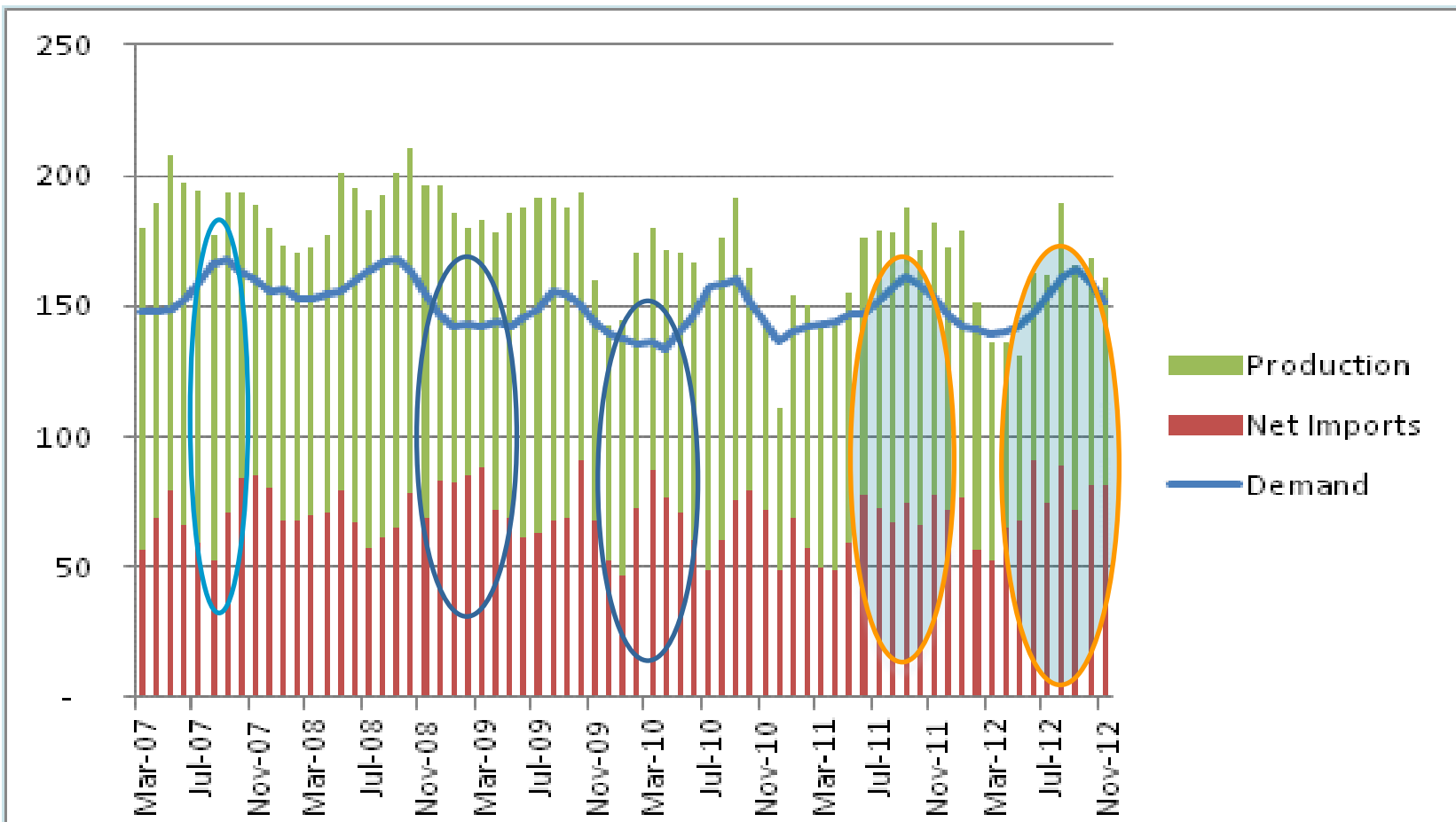
France jet balance: demand v stk chg

Kb/d



France kerojet balances

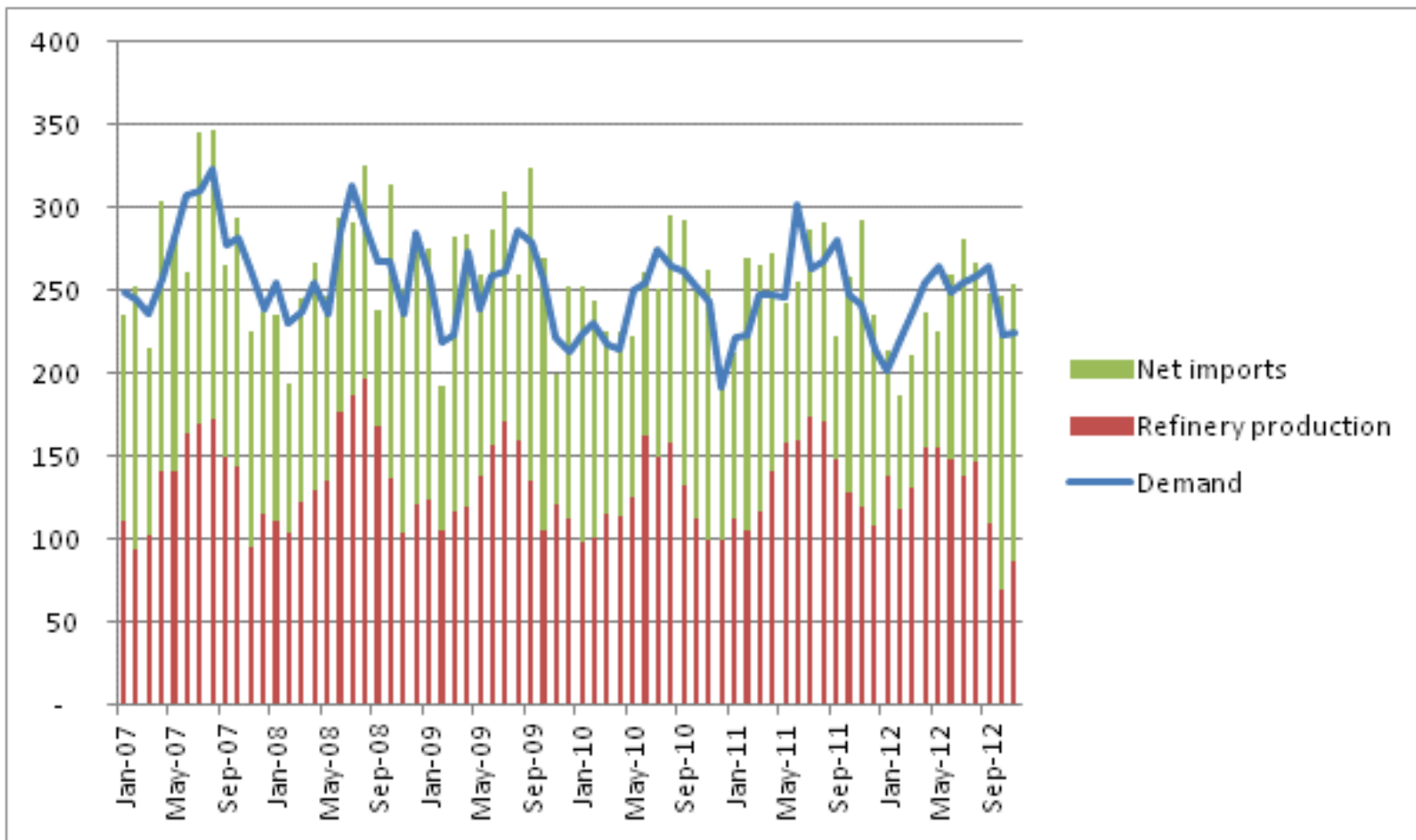
Kb/d



- Stock changes are beginning to play a role in meeting seasonal demand (didn't use to)
- Net imports – once countercyclical with demand – are becoming pro-cyclical.
- France exports to other European countries appear to be giving – less reliable supplier?

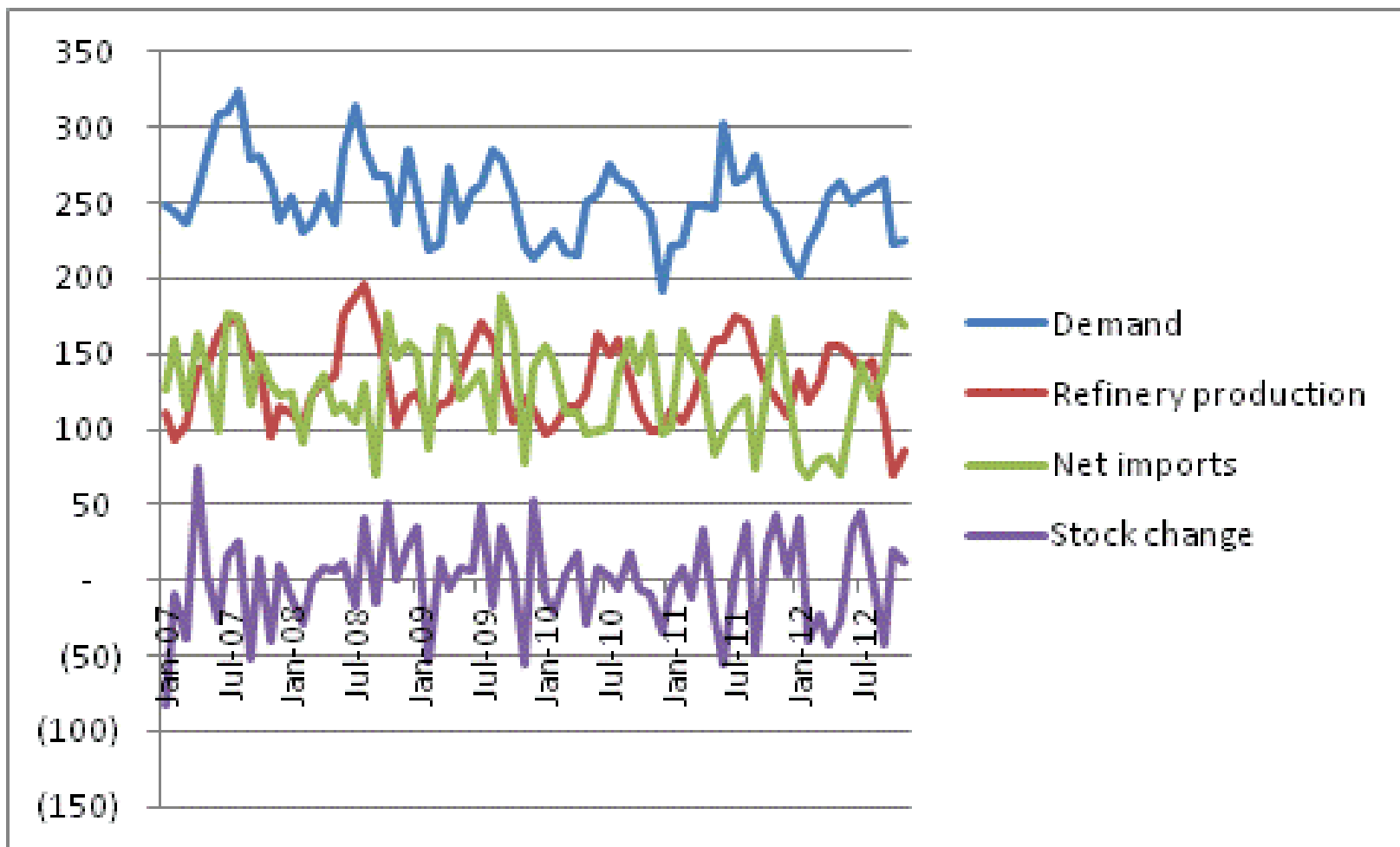
UK jet balance

Kb/d



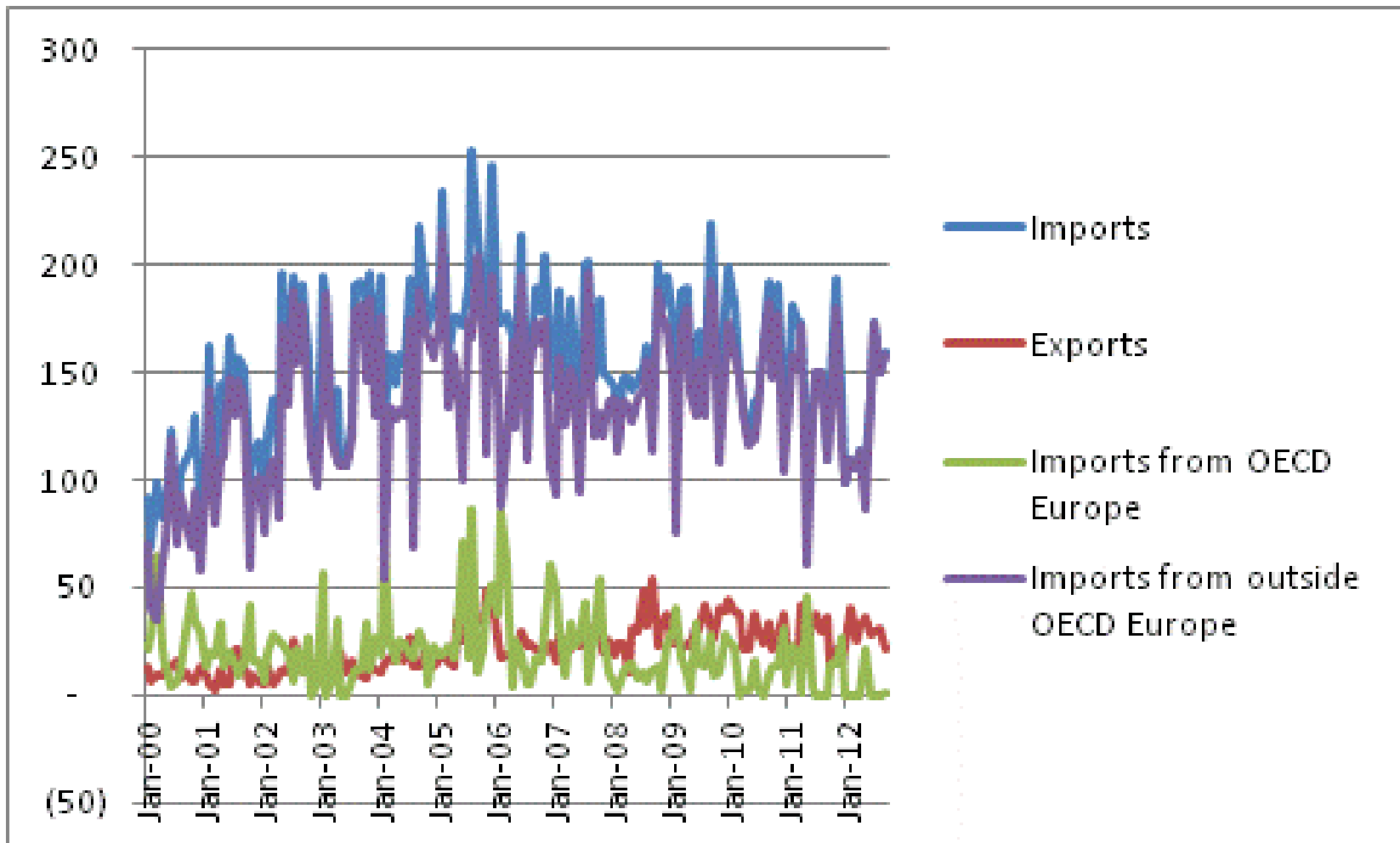
UK jet balance

Kb/d

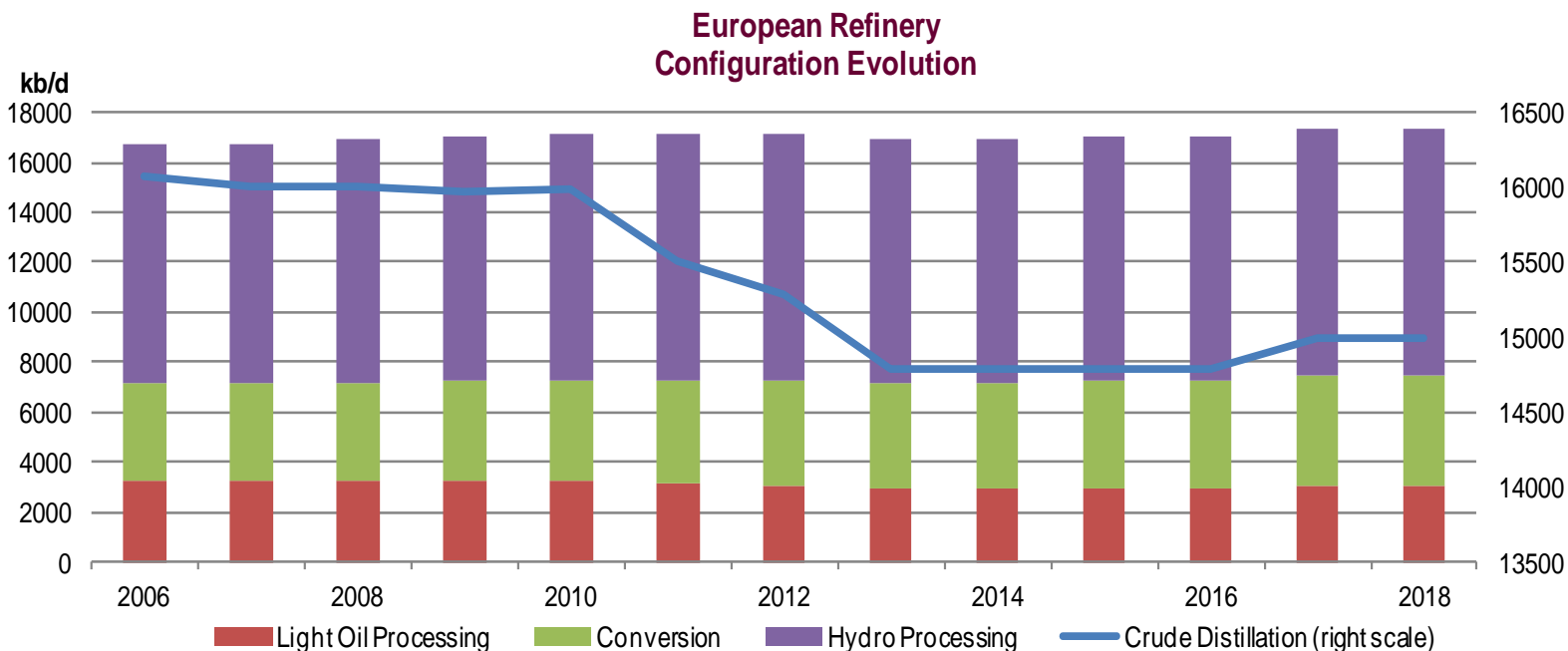


UK jet imports and exports

Kb/d

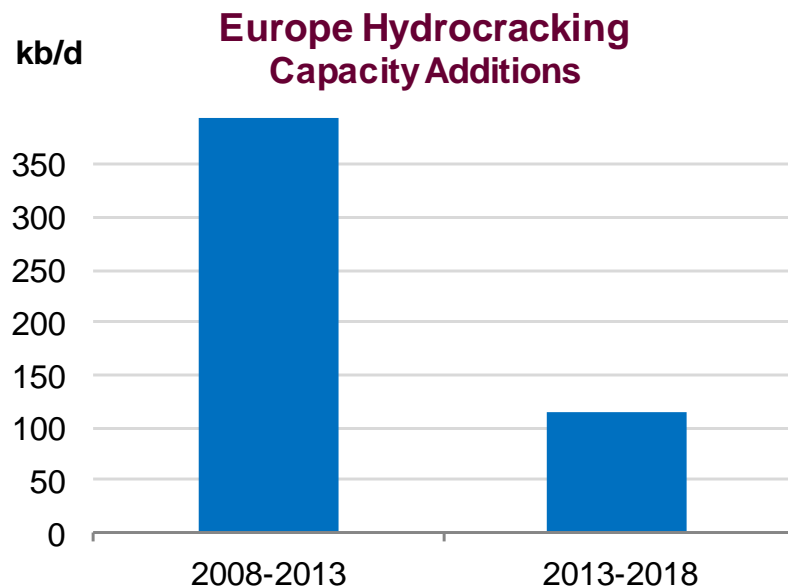
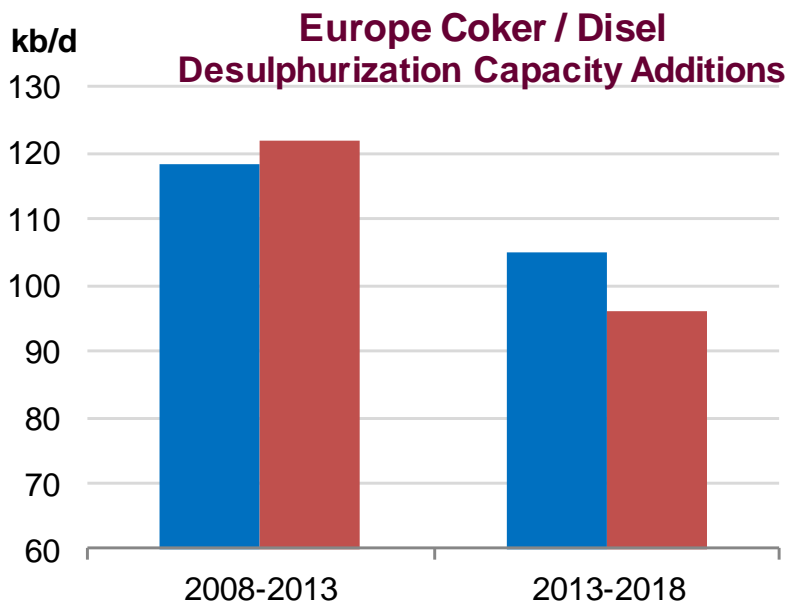


EU refinery distillation vs upgrades



- **Several EU upgrading projects commissioned and planned to adapt to the new product demand structure.**
- **Conversion capabilities will improve amid demand switch from fuel oil to distillate.**

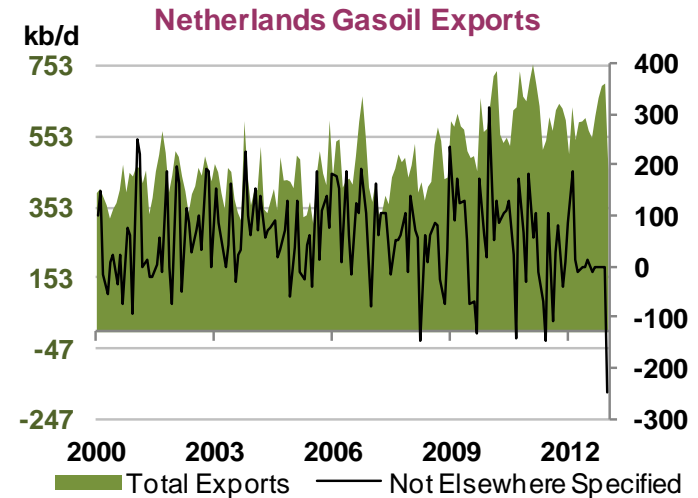
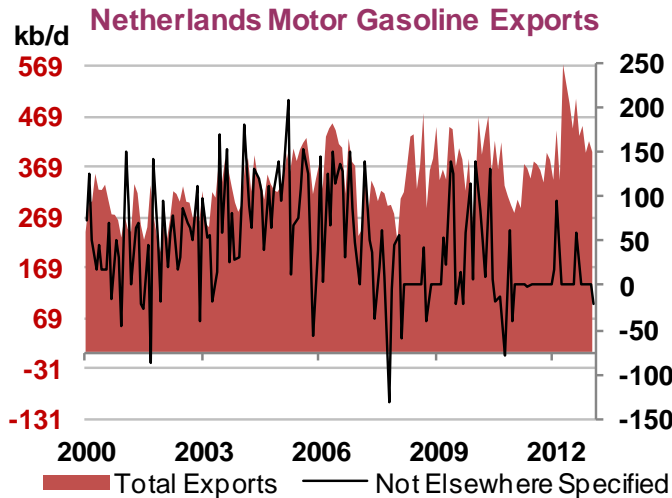
EU refining upgrades to continue



- **Hydrocracking capacity + 29% 2008-2013**
- **Coking capacity + 34% 2008-2013**
- **Coking capacity expected to increase + 23% over the next five years**
- **Distillate desulfurization increases nearly 4% and will continue so**

Netherlands trade statistics

"It is a capital mistake to theorize before one has data" Sherlock Holmes



■ Netherlands – Rank 6 in Europe

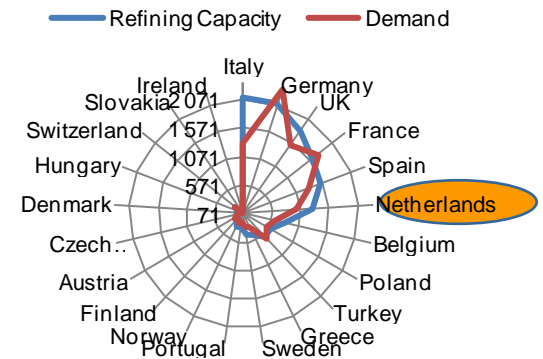
- 2012 demand: 998 mb/d

- Refining capacity: 1 292 mb/d

■ Inconsistencies in trade statistics

- Gasoline export: 'not elsewhere specified' ranging from -45% to +55%

- Diesel export: 'not elsewhere specified' ranging from -55% to +55%



Concluding remarks

- **Refinery strategies vary on location, investments...**
- **More European closures in the cards**
- **Europe increasingly short some products**
- **Import dependency on the rise, esp. jet fuel**
- **Jet imports at parity with domestic supply in UK, France**
- **Heightened supply disruption risk – longer haul, bottlenecks, reduced short-term flexibility**
- **Suppliers exposed to political risk**
- **Product storage to rise from refinery, crude conversion**
- **Inter-European shipments on the rise?**
- **Jet fuel shelf life?**
- **Logistical links are key – poorly canvassed**
- **Inefficiencies (price signals, distribution)?**
- **Capacity attrition not the only change - effect of changing incentives, market power of market participants has yet to be assessed**