CROSS COUNTRY EXPERIENCE IN HEDGING OIL

October 2014

J.P.Morgan

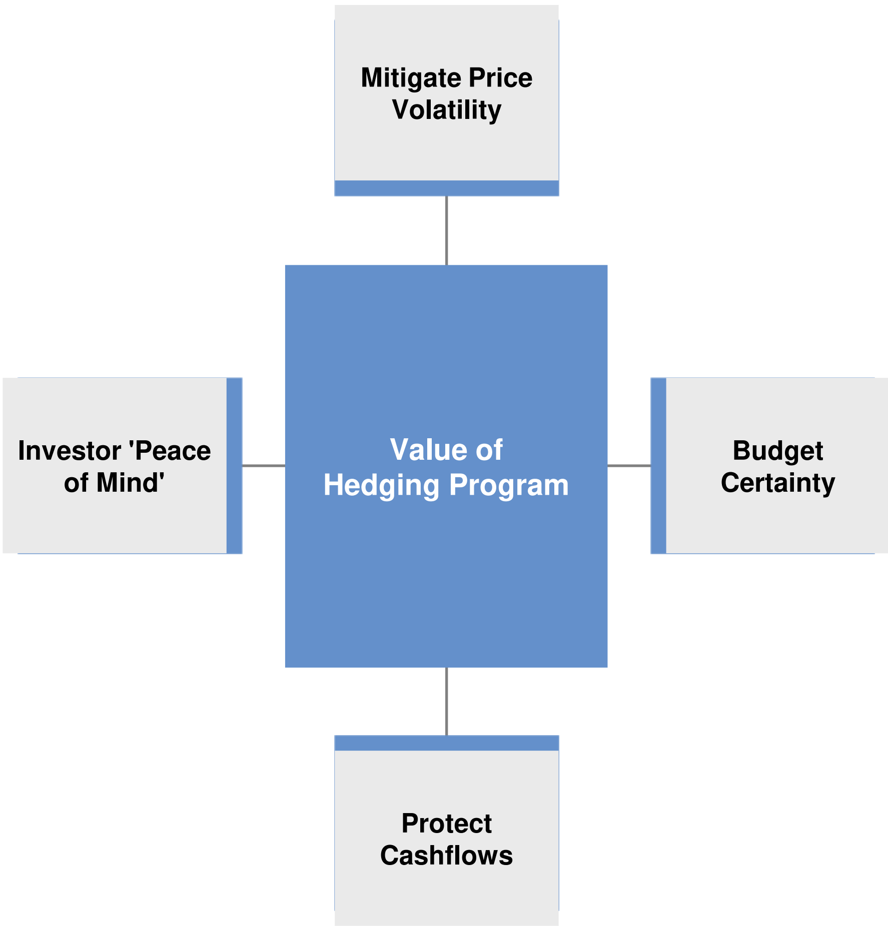
Agenda

How Hedging is Viewed by Different Market Participants

Interested parties	
Company's Management Team	■ Important tool in helping companies meet their defined objectives, be it maximizing cash-flow, protecting its capital program or maximize lending capacity to support operations or an acquisition.
Lenders / Debt Holders	■ Focus for lenders is repayment of principal and interest, so hedging is a valuable tool to ensure ample cash flow to meet these obligations.
Ratings Agencies	■ A consistent approach to hedging can be positively viewed by ratings agencies
Equity Participants	■ Equity participants vary in their views on hedging

The Value of a Hedging Program Can Be Measured by Four Key Factors

Hedging program overview



Value of hedging program

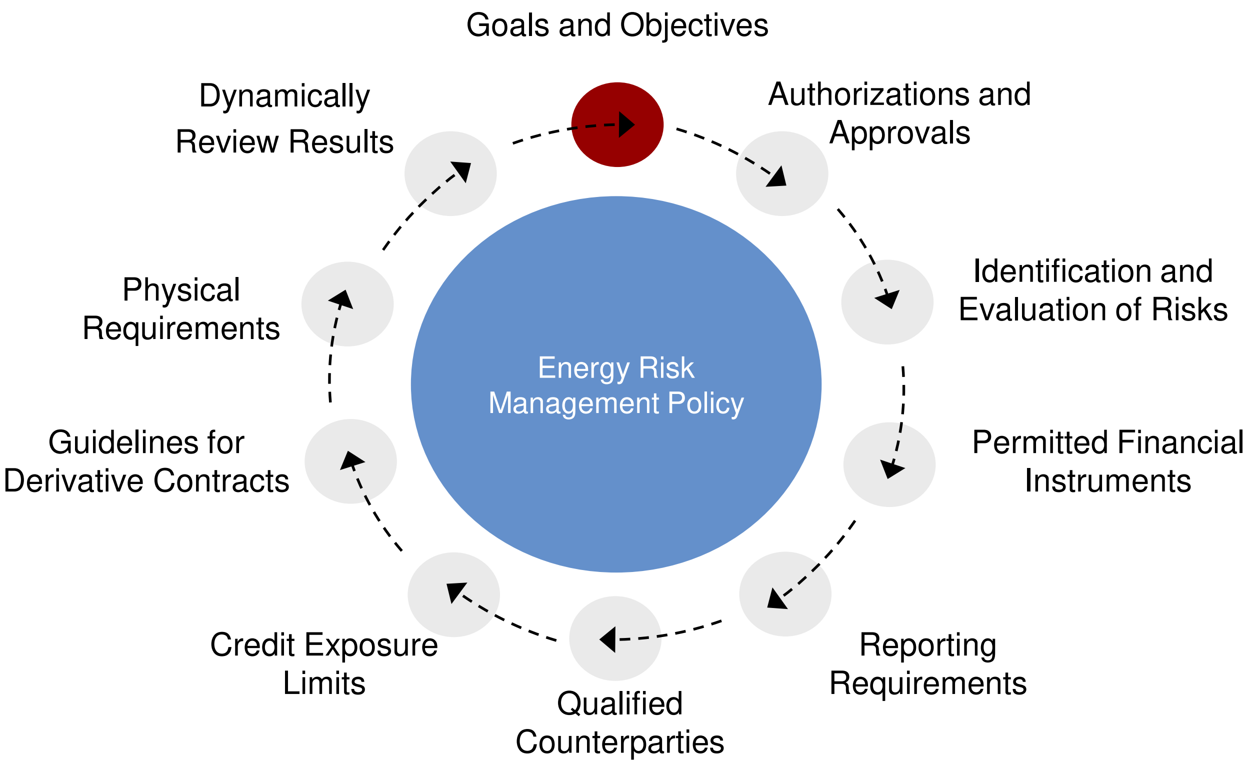
- The value of the hedging program should not be measured by it's “outperformance” versus market prices
- Companies should not be concerned with the “profitability” of its hedging program; rather, it should be concerned with its ability to provide certainty and avoid exposure to any price shocks due to market volatility
- Reasons for implementing hedging program
  - Protecting cash flows to service debt (acquisition or normal operating)
  - Hedging procurement costs
  - Minimizing volatility in cash flows
- Possible hedge program targets
  - Reduce cash flow volatility
  - Budget certainty
- Hedge program considerations
  - Tenor: market appetite, curve shape (backwardation/contango), seasonality
  - Volume: market liquidity
  - Products hedged: Swaps vs Options
  - Credit: credit availability, tenor, volume, pricing levels, collateral/margin requirements
  - Cash availability: ability to pay premium for options

Key Points to Review in Risk Management

- Evaluate Risk
- Benchmark Peers
- Policies and Procedures
- Counterparty Selection
- Goals and Objectives
- Program Monitoring
- Program Evaluation

Building a Framework for Energy Risk Management

Major areas that should be addressed by an energy risk management policy



Hedging Strategy Outline

Systematic and Market Driven Hedging with a Dynamic Overlay

- The recommended hedge strategy is divided between two approaches – systematic and market driven – with an overlay of dynamic hedging
- ***Systematic hedging* consists of rolling and layering into target hedge percentages**
  - Roll into the desired target percentages to ensure ample price protection
  - Use target hedge percentages as a guide, but maintain flexibility to adjust percentages within a band and use alternative derivative structures to express a view on current market conditions
- ***Market Driven hedging***
  - In comparison to systematic hedging, Market Driven hedging does not follow target percentages
- ***Dynamic overlay* requires the active management of hedge positions in tenors**
  - The portfolio should constantly be tweaked to protect against new or heightened risks and takes into consideration moves in flat price, volatility and/or term structure
  - Hedge percentages, risk management structures, and premium spend will change as dictated by changes in the market and management's risk tolerance

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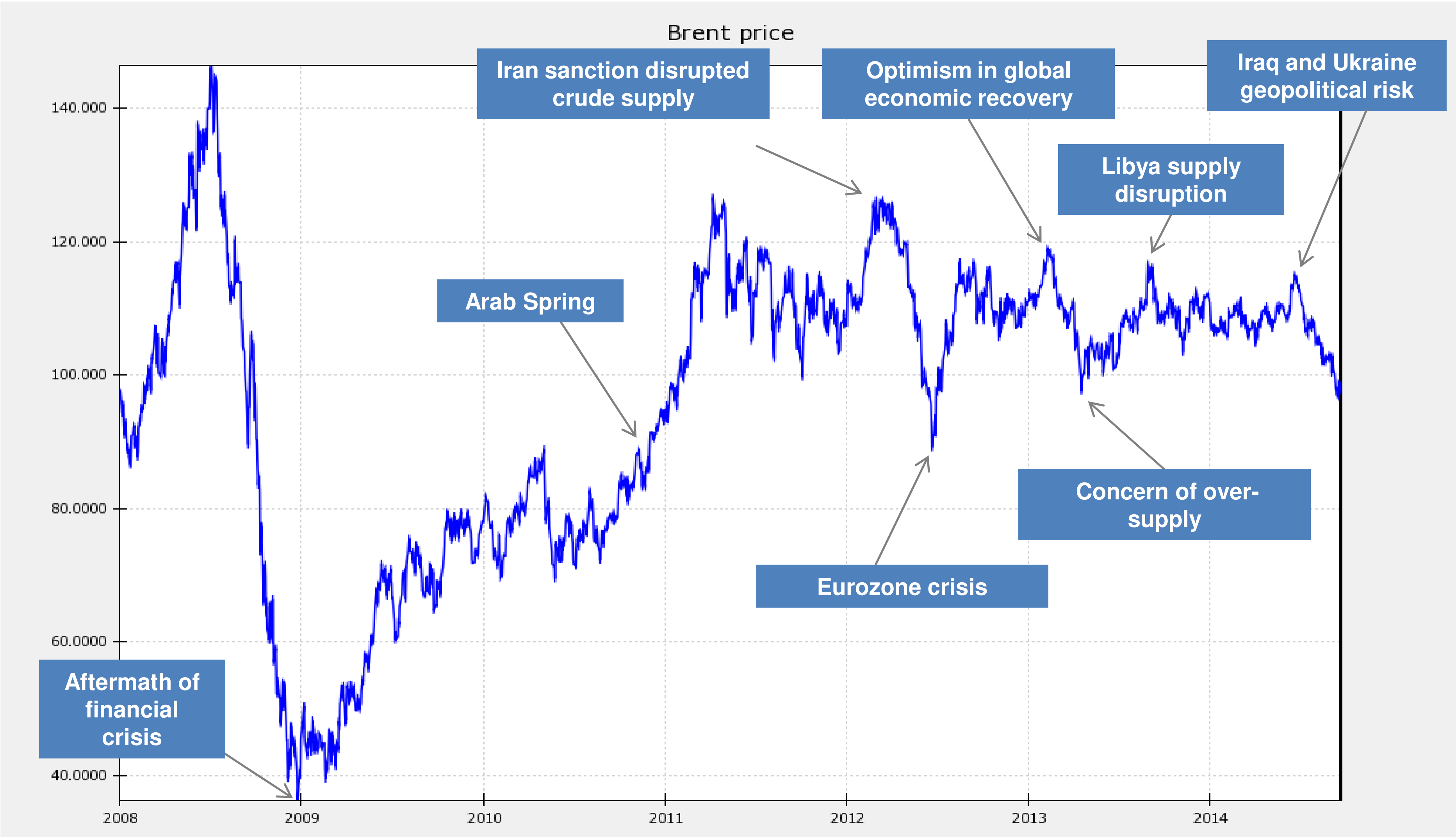
Geopolitical events and market fundamentals exert influence on Brent price

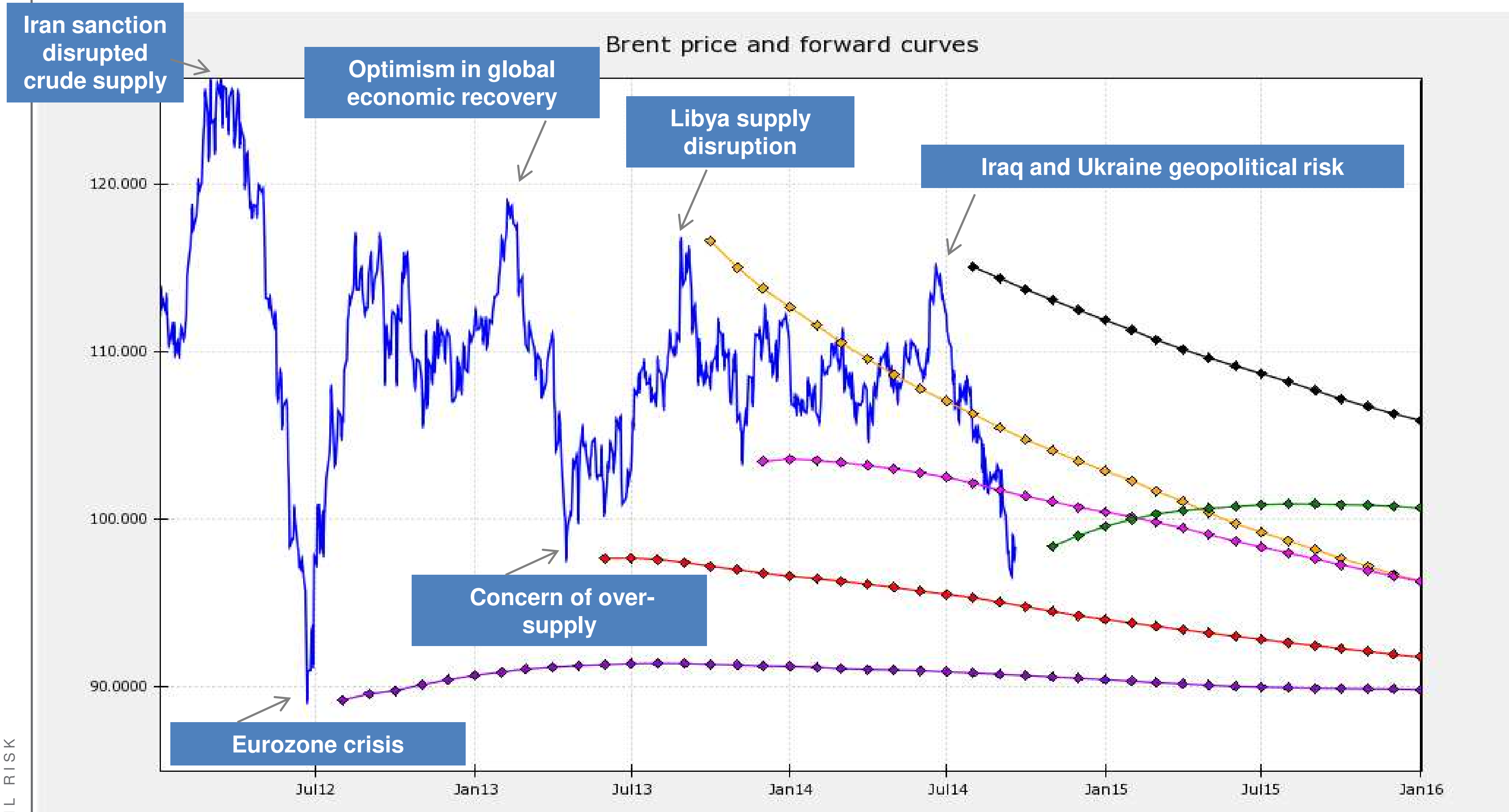
Historical ICE Brent Spot Price



Source : JPMorgan

Brent forward curve is rolling down firmly into contango, last seen in 2012

Historical ICE Brent Spot and Forward Curves



Source : JPMorgan

Key Upstream Risk Management Themes

Current themes for E&P hedging programs

Ongoing Emphasis on Risk Management Strategies

- Comprehensive producer risk management programs are more common now than in previous years. The dramatic price spikes in both oil and natural gas in 2008, accompanied by quick pull backs to multi year lows caused many under-hedged producers to re-evaluate the benefits of a disciplined hedge program
- The shale revolution and advances in drilling and fracking technologies have allowed E&Ps to drill more prolific wells, but at higher costs and capex budgets; the resulting increased leverage to the producers has put a greater emphasis on risk management.

E&P Market Participation Growth

- The emergence of new participants in the E&P space has shifted hedging strategies for some players:
  - E&Ps that are funded by private equity tend to be very ROE focused, or model-based, may hedge at levels that meet or exceed their return targets
  - Foreign-owned oil & gas companies focused on learning shale technologies or securing commodity supply for future potential export; tend to hedge with a tenor of 2-4 years in order to support their longer-term strategies
- Producers use energy risk management strategies to protect acquisitions; both asset prices and M&A transaction volumes have increased since 2007, driven by:
  - The heightened competitive landscape, with growing investment appetite

Market Considerations

- Backwardation
- Contango

Choice of Hedging Index

	NYMEX WTI	ICE Brent	Platts Dated Brent	Platts Dubai
Description	▪ Benchmark price reference for North America crude oil ▪ Blend of several U.S domestic streams of light sweet crude oil ▪ Delivery point in Cushing Oklahoma	▪ Benchmark price reference for Atlantic Basin crude oil ▪ Benchmark for low-sulphur sweet crude oil ▪ Delivery point in Sullom Voe	▪ Benchmark price reference for light North Sea crude oil ▪ North Sea Brent blended crude oil that has been assigned a date when it will be loaded onto a tanker	▪ Benchmark price reference for Middle Eastern crude oil ▪ Middle Eastern light sour crude oil exports to Asia
Products	▪ Swaps, Options	▪ Swaps, Options	▪ Swaps, Options	▪ Swaps, Options

Vanilla Hedging Strategies – Optimizing Between Downside Protection and Upside Price Participation

	Bought Put	Fixed Price Swap	Zero Cost Collar	Three Way Hedge
Structure	Client buys vanilla put option at a strike and pays cash premium	Client sells forward	Client buys a Put option at a strike Client sells a Call option at a strike	Client buys a Put option 1 at strike and sells a Put option 2 at a lower strike Client sells a Call option at a higher strike
Benefits	✓ Provides guaranteed minimum price floor ✓ Retain full price upside above option strike ✓ Minimal and fixed credit exposure	✓ Lock-in forward price ✓ No fixed cash cost	✓ Low-cost price protection ✓ Retain price upside below the call strike ✓ No fixed cash cost	✓ Low-cost price protection ✓ Retain price upside below the call strike ✓ No fixed cash cost ✓ Higher call strike than Zero Cost Collar for similar put strike
Considerations	✗ Fixed cash cost	✗ Requires credit appetite ✗ No price upside above Swap strike on hedged volume	✗ Requires credit appetite ✗ No price upside beyond call strike	✗ Price protection limited to the difference between Put Strike 1 and Put Strike 2 ✗ No price upside beyond call strike

Note: Please note that the above structures are for discussion purposes only.

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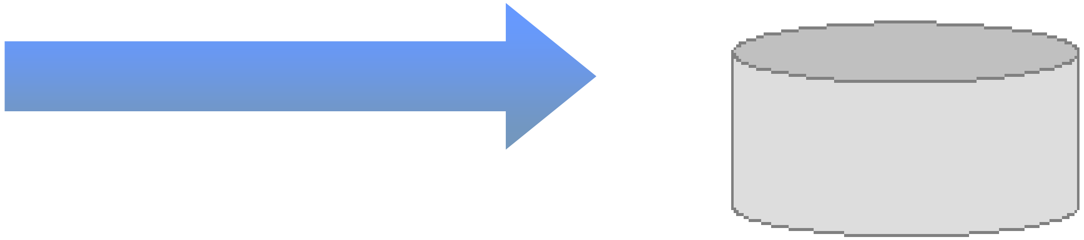
Refinery Flow

Procurement and storage – the adventure begins here..

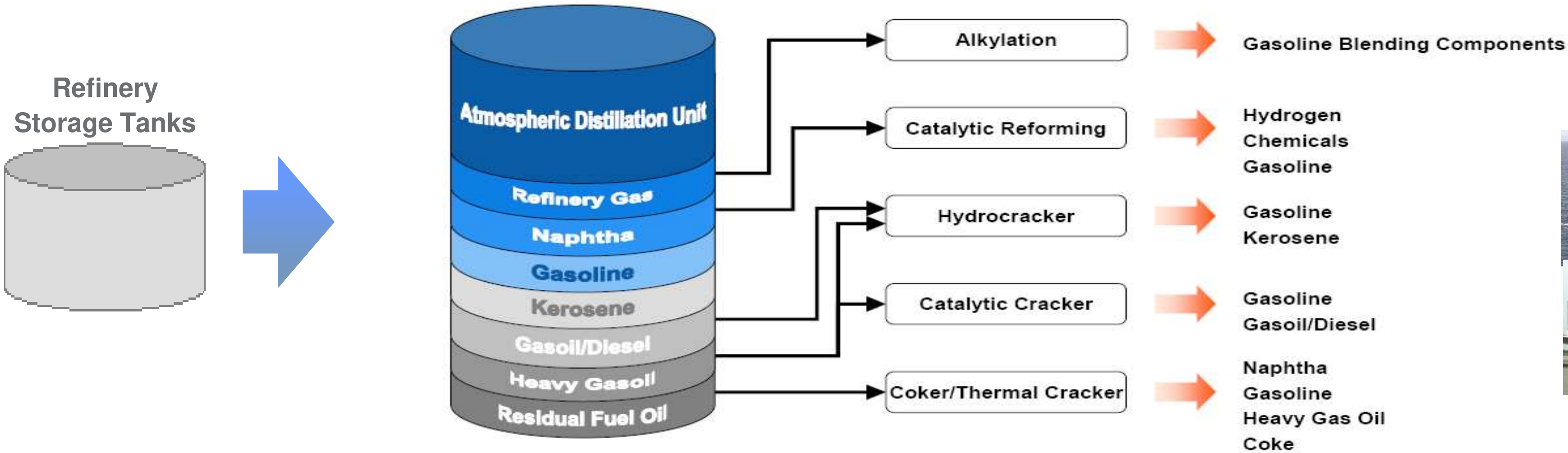
E &P

Crude is shipped ,stored and refined

Refinery Storage Tanks



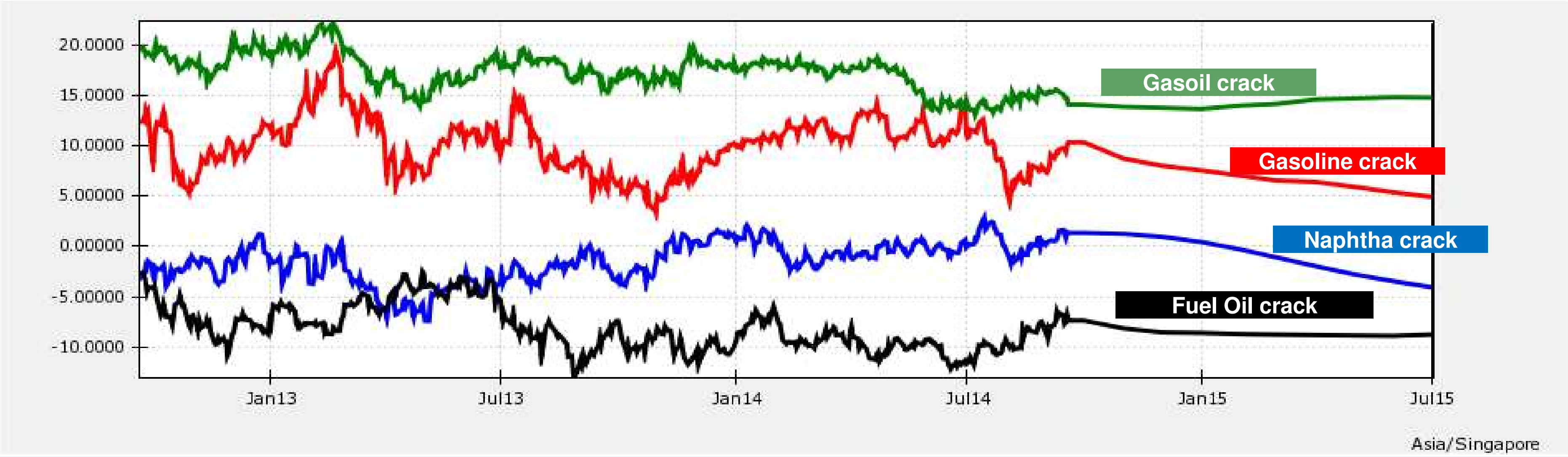
Refining and distribution



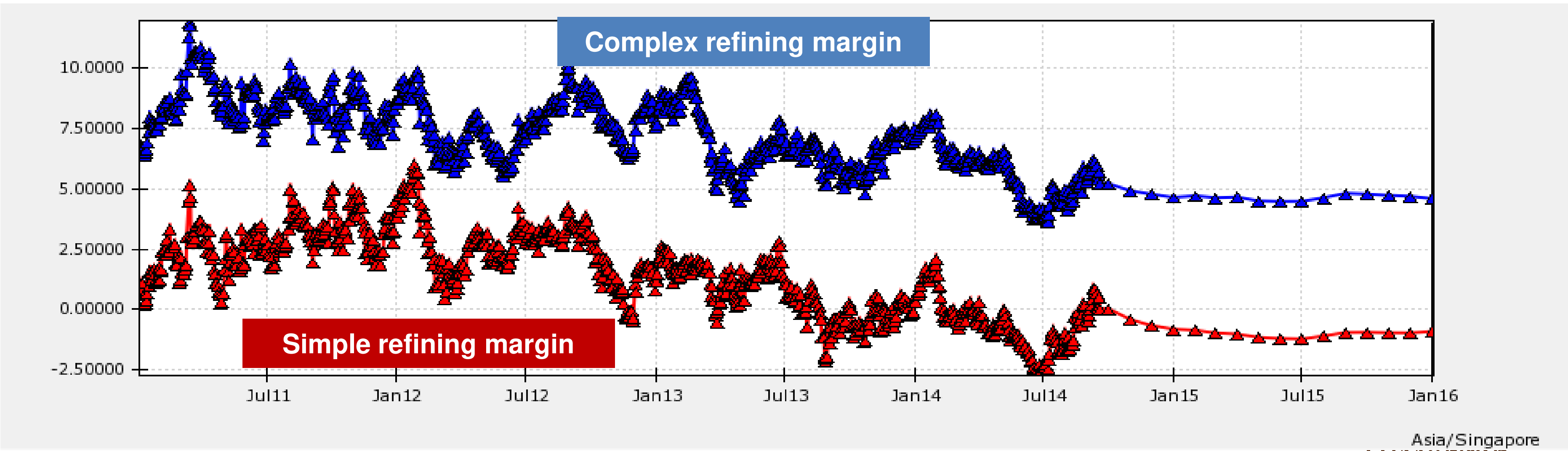
End Consumers

Refinery Margin

Historical Asian product crack (vs Dubai) spot & forward curves



Historical Asian Refinery Margins (vs Dubai) spot & forward curves



Source : JPMorgan

Lock in Procurement Cost

Before hedging

- Refiner buys physical crude at market price
- Key risk: Floating crude price

After hedging

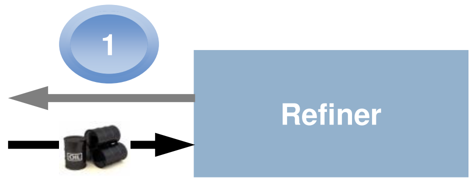
- The refiner pays a fixed price for physical crude cargo
- The key risk in floating crude price is hedged

Hedging solution

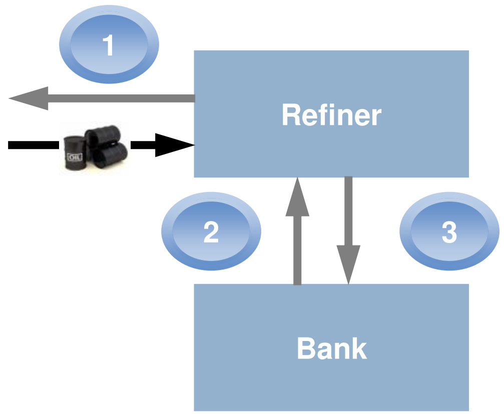
- Buy crude oil paper swap

Transaction structure

Before:



After:



1. Refiner pays floating price for physical crude
2. Refiner receives floating price on the paper swap
3. Refiner pays fixed price on the paper swap

Protect Inventory Risk

Before hedging

- Refiner has physical crude in tankage
- Key risk: Inventory value decreases if market price drops

Hedging solution

- Sell crude oil paper swap

After hedging

- Refiner gets compensation if market price drops
- If market price rises, increase in inventory value will offset loss on hedging

Product Margins

Before hedging

- Refiner buys physical crude, and sells refined products
- Key risk: Price difference between crude oil and products

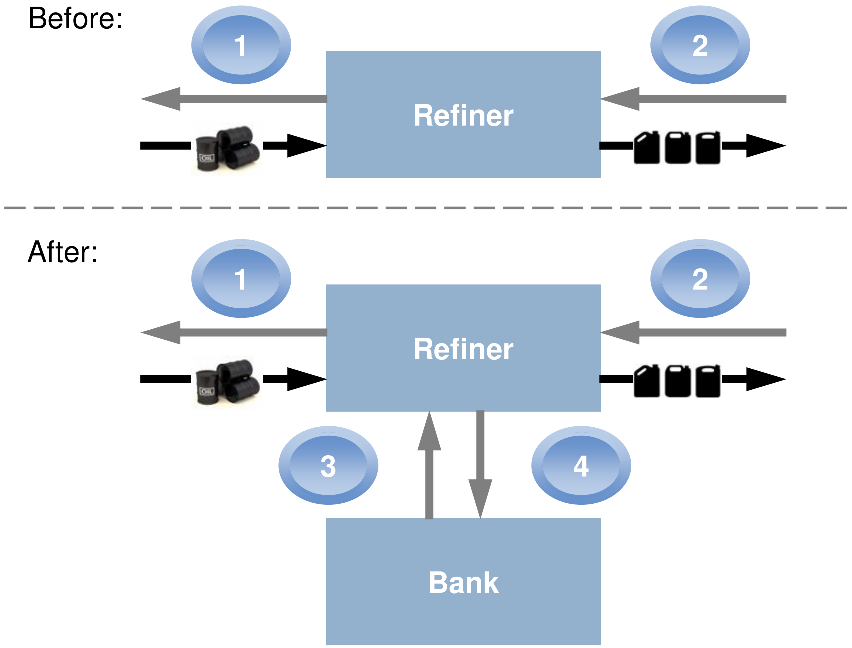
Hedging solution

- Sell product/crude cracks

After hedging

- The product margin is locked in
- The key risk of uncertain product margins is avoided

Transaction structure



1 Refiner pays for physical crude

2 Refiner sells products and receives products' price

3 Refiner receives floating price of crude

4 Refiner pays floating product price

Key risk of uncertain product margins is gone

Refiner locks in profit margin

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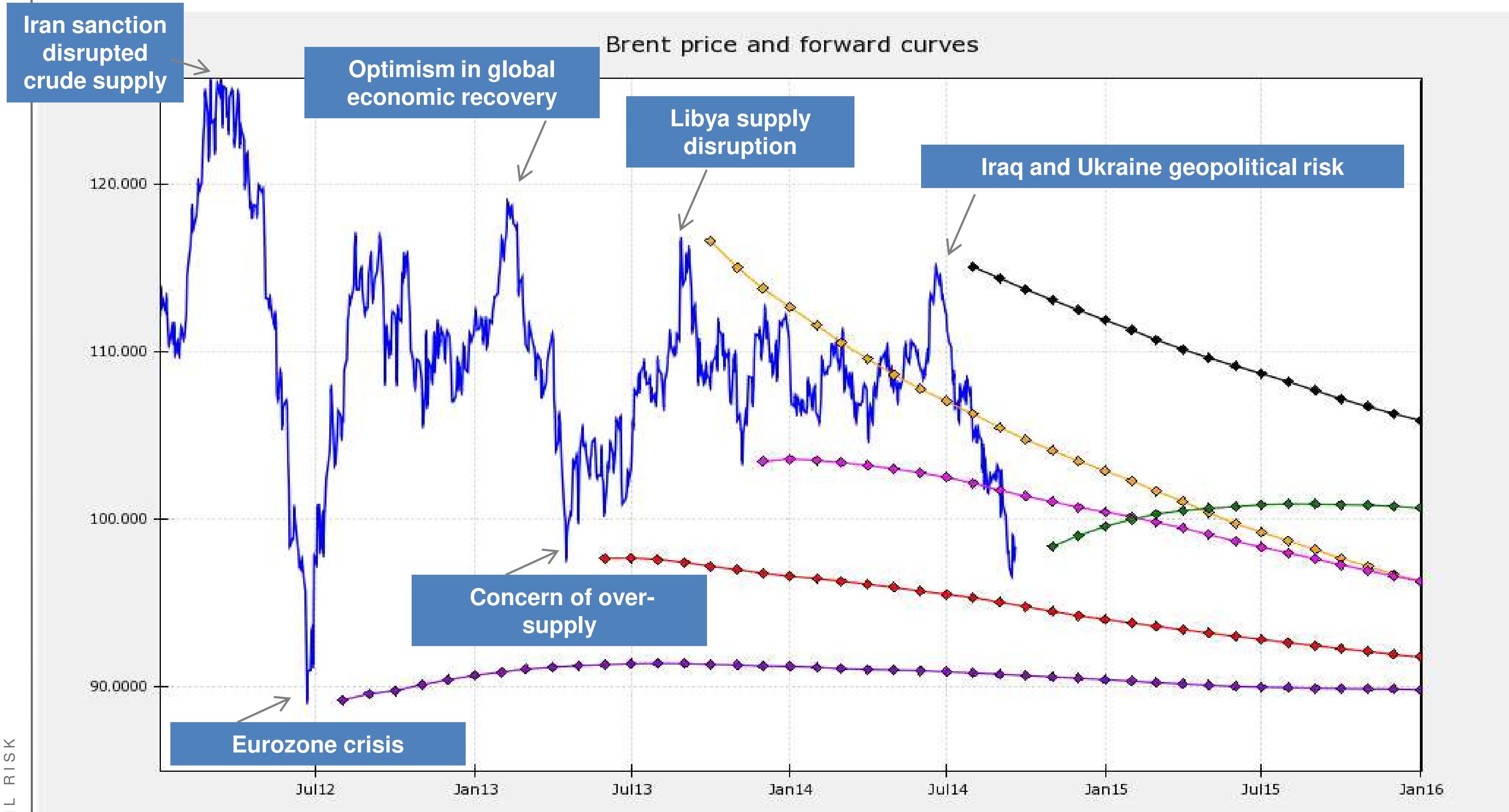
Brent forward curve is rolling down firmly into contango, last seen in 2012

Historical ICE Brent Spot and Forward Curves



Source : JPMorgan

Choice of Hedging Index

	Platts MOPS Jet Kero	Platts MOPS Gasoil	Platts MOPS Fuel Oil	ICE Low Sulphur Gasoil	NYMEX Heating Oil
Description	■ Jet fuel assessed on a FOB Singapore basis ■ Standard commercial Jet-A1 specifications ■ Loading 15-30 days from the date of publication	■ Gasoil assessed on a FOB Singapore basis ■ Sulphur specification of 500ppm (0.05%) ■ Loading 15-30 days from the date of publication	■ Fuel oil assessments basis HSFO 180 and 380 CST ■ 180 centistoke with a 3.5% sulphur content ■ 380 centistoke with a 3.5% sulphur content ■ Loading 15-30 days from the date of publication	■ With effect from Feb15 IPE Gasoil will change its specification to Low Sulphur Gasoil ■ Specification will be changed to 10ppm low sulphur gasoil ■ Current contract will cease to trade after Jan15	■ NY Harbour Ultra-low Sulphur Diesel (ULSD) specification ■ Sulphur specification of 15ppm (ULSD)
Products	■ Swaps, Options	■ Swaps, Options	■ Swaps, Options	■ Swaps, Options	■ Swaps, Options

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Hedge Structure Can Be Tailored to Suit Desired Risk-return Profile

Balancing between desired price protection and hedging cost (in form of premium paid or price participation forgone)

	Bought Call	Fixed Price Swap	Zero Cost Collar	Three Way Hedge
Structure	Client buys vanilla Call option at a strike and pays cash premium of in $/ton	Client buys forward i.e. receives floating price and pays fixed price. Client receives difference between actual price and swap price, if actual price is higher than swap price. Otherwise, Client pays the difference	Client buys a Call option at a strike and Client sells a Put option at a lower strike. Guaranteed cap level financed by selling a put options for the same time period	Client buys a Call option 1 at strike of A and sells Call option 2 at a higher strike B Client sells a Put option at a lower strike than A
Benefits	✓ Full protection against price increase above the cap level ✓ Full participation in downward price movements ✓ Minimal and fixed credit exposure	✓ Lock-in forward price ✓ No fixed cash cost	✓ Low-cost price protection ✓ Maintain some downward participation ✓ No fixed cash cost	✓ Low-cost price protection ✓ Retain price participation between call strike A and Put option ✓ Lower bought Call or sold Put strike than Zero Cost Collar
Considerations	× Fixed cash cost (equal to premium$/t)	× Requires substantial credit appetite × No price upside below Swap strike on hedged volume	× Upward price exposure to call strike price × Downward participation capped at sold put strike price	× Upward price exposure to call strike A × Price protection limited to the difference between call strike A and call strike B × Downward participation capped at sold put strike price

Comments

- Hedging as relevant now as ever before
- Developed markets
  - Efficient market
  - Focus on Transparency & Counterparty Risk
  - Post Trade MTM management
- Emerging markets
- Key elements of effective hedging program
  - Starts with intent / hedging objectives
  - Well articulated risk management policy / mandate – which is socialized and signed off with all stakeholders
  - Fuller disclosure around derivatives exposure – to avoid any surprises and enable self governance

Agenda

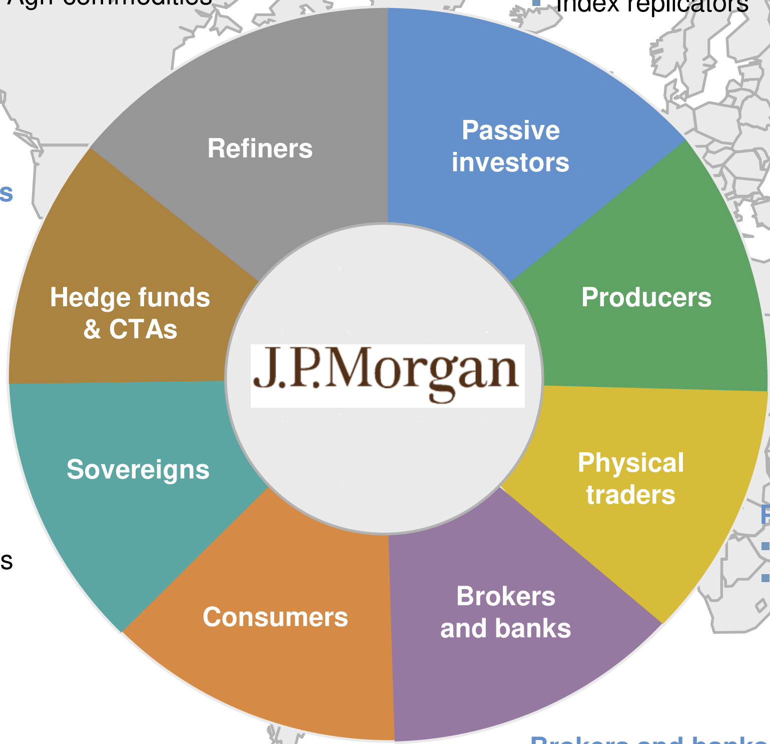
J.P. Morgan is a Recognized Leader in Commodities Trading & Marketing

Business model

Refiners & processors
- Energy
- Base & precious metals
- Agri-commodities

Investors
- Private equity
- Pension funds and asset managers
- Private banks
- Index replicators

Hedge funds & CTAs
- Macro investors
- Technical funds



Producers
- Upstream oil & gas
- Base and precious metals
- Agriculture
- Shipowners

Sovereigns
- Central banks
- Government investment offices
- Supernationals

Physical traders
- Physical merchants
- Physical trade houses

Consumers
- Transport: airlines, road, rail, shipping
- Utilities: power, gas, oil, emissions
- Industrials: feedstocks, light & heat

Brokers and banks
- Proprietary trading desks
- Third party brokers
- Regional banks

Awards

2012 & 2013
Greenwich Associates
#1 In Service Quality, Strategic Relationships, and Market Penetration

2013 & 2014
Energy Risk
Oil & Products House of the Year

2013
Energy Risk
Derivatives House of the Year

2012
Risk
Commodity and Energy Derivatives House of the Year

2011
Energy Risk
Oil and Products House of the Year

2011
Energy Risk
U.S. Natural Gas House of the Year

2011
Energy Risk
Coal House of the Year

2010
Energy Risk
Base Metals House of the Year

J.P. Morgan Covers Commodities Across the Supply Chain

Research	Global Commodities	Futures & Options
Metals, Bulk Commodities	OTC Metals, Energy and Ags	Listed Futures and Options
Energy	Structured Products	Specialist Trading Desks
Grains and Agricultural	Long Dated Contracts	Global Clearing Solutions
Economic Outlook	Bullion	Electronic Trading

Oil
- Light crudes
- Medium crudes
- Heavy crudes
- Sweet crudes
- Sour crudes
- Distillates
- Gasoline
- Natural Gas Liquids
- Plastics

Natural Gas
- Nymex

Base Metals
- Copper
- Aluminium
- Lead
- Nickel
- Zinc
- Tin
- Steel
- Iron Ore

Precious Metals
- Gold
- Silver
- Platinum
- Palladium

Agriculture
- Cattle

Grains
- Soybeans
- Wheat
- Corn

Softs
- Coffee
- Sugar
- Cocoa