



Introduction to the LME

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Course objectives

History, purpose and workings of the London Metal Exchange

You will learn about

- Who uses the LME and why
- Pricing – how the global LME price is used in physical metal trading
- Hedging – how LME products are used in price risk management
- Delivery – metal brands, warrants and warehouses
- Trading and terminology
- Prompt date structure and official prices
- Membership and the role of the broker
- Clearing

LME overview

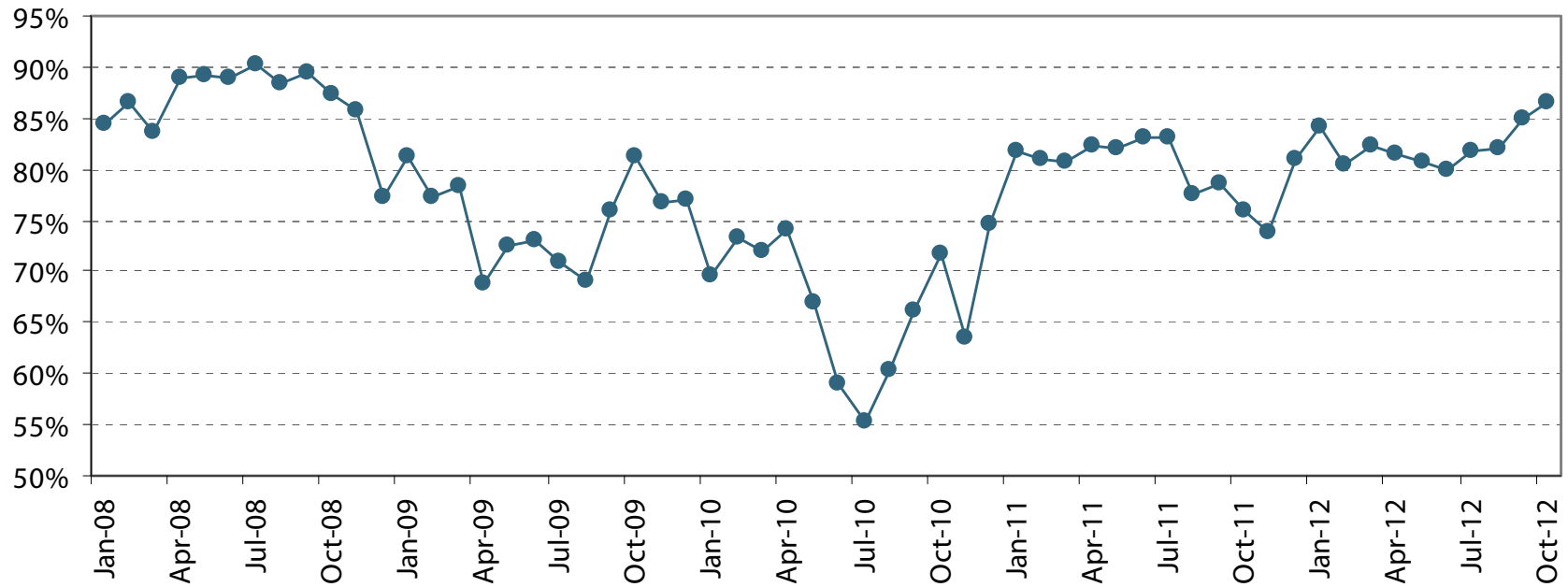
The LME – the world's premier metal exchange

In 2011

- 146 million lots traded
- 3.5 billion tonnes of metal
- \$15.4 trillion notional value
- Record high of 3 million lots open interest

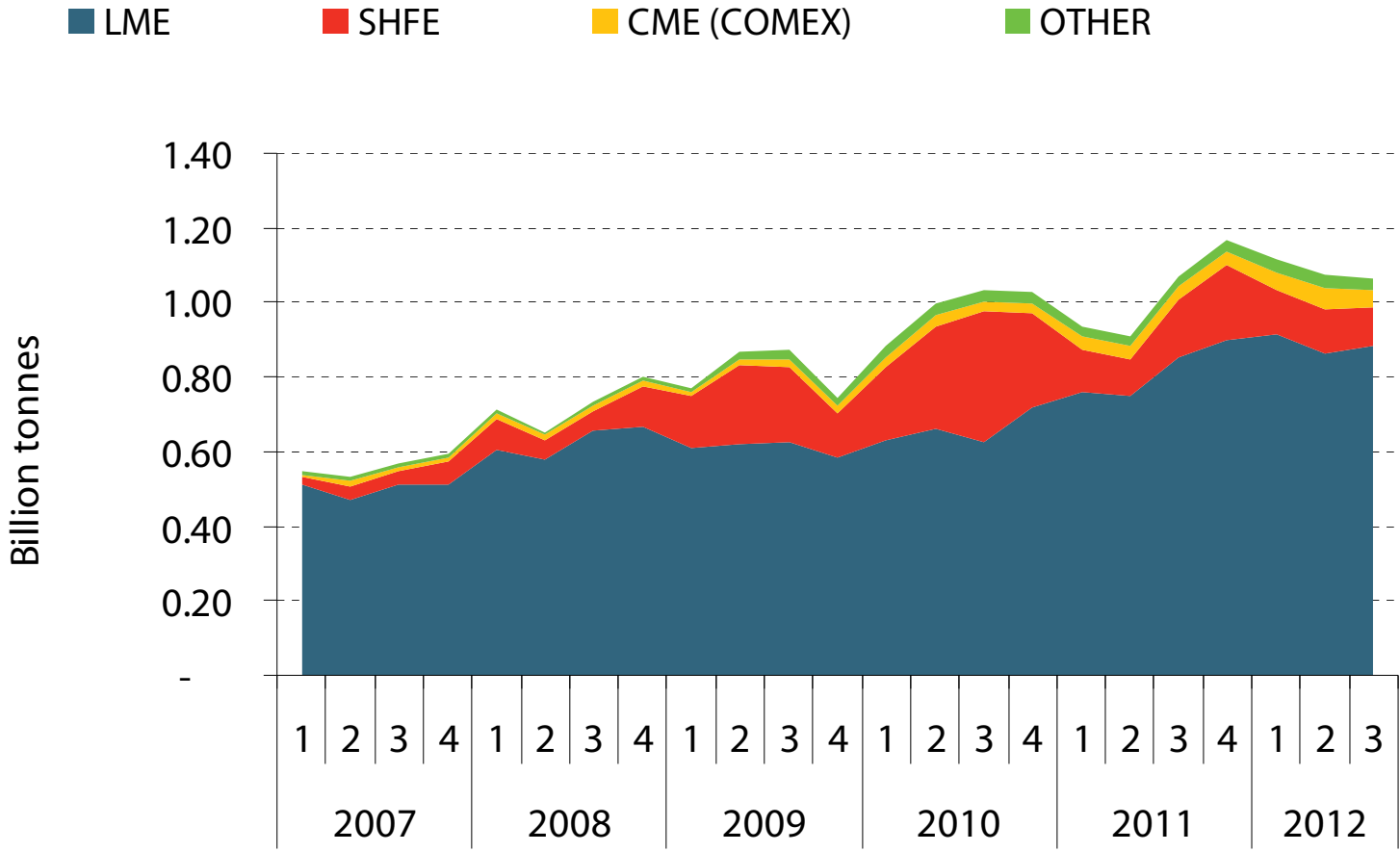
LME market share

LME Market Share



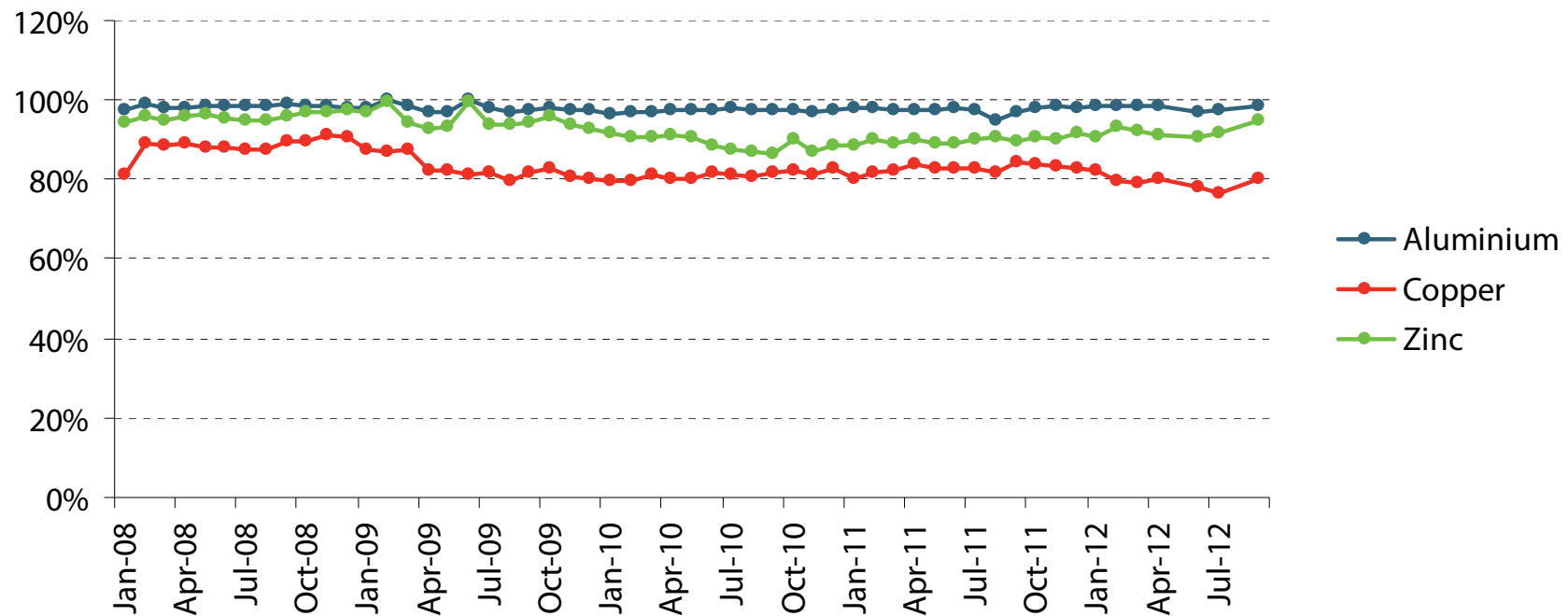
N.B. Drop in LME market share in 2010 reflects increase in SHFE zinc volumes

LME market share

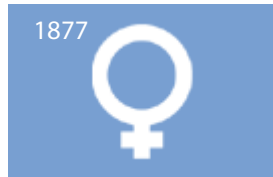


LME market share – open interest (number of open contracts)

LME accounts for at least 93% of global Exchange open interest in Oct 2012 (tonnes).



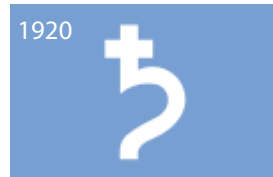
LME contracts



LME Copper



LME Tin



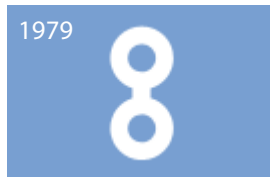
LME Lead



LME Zinc



LME Aluminium



LME Nickel



LME Aluminium Alloy



LMEX



LME NASAAC



LMEminis



LME Steel Billet

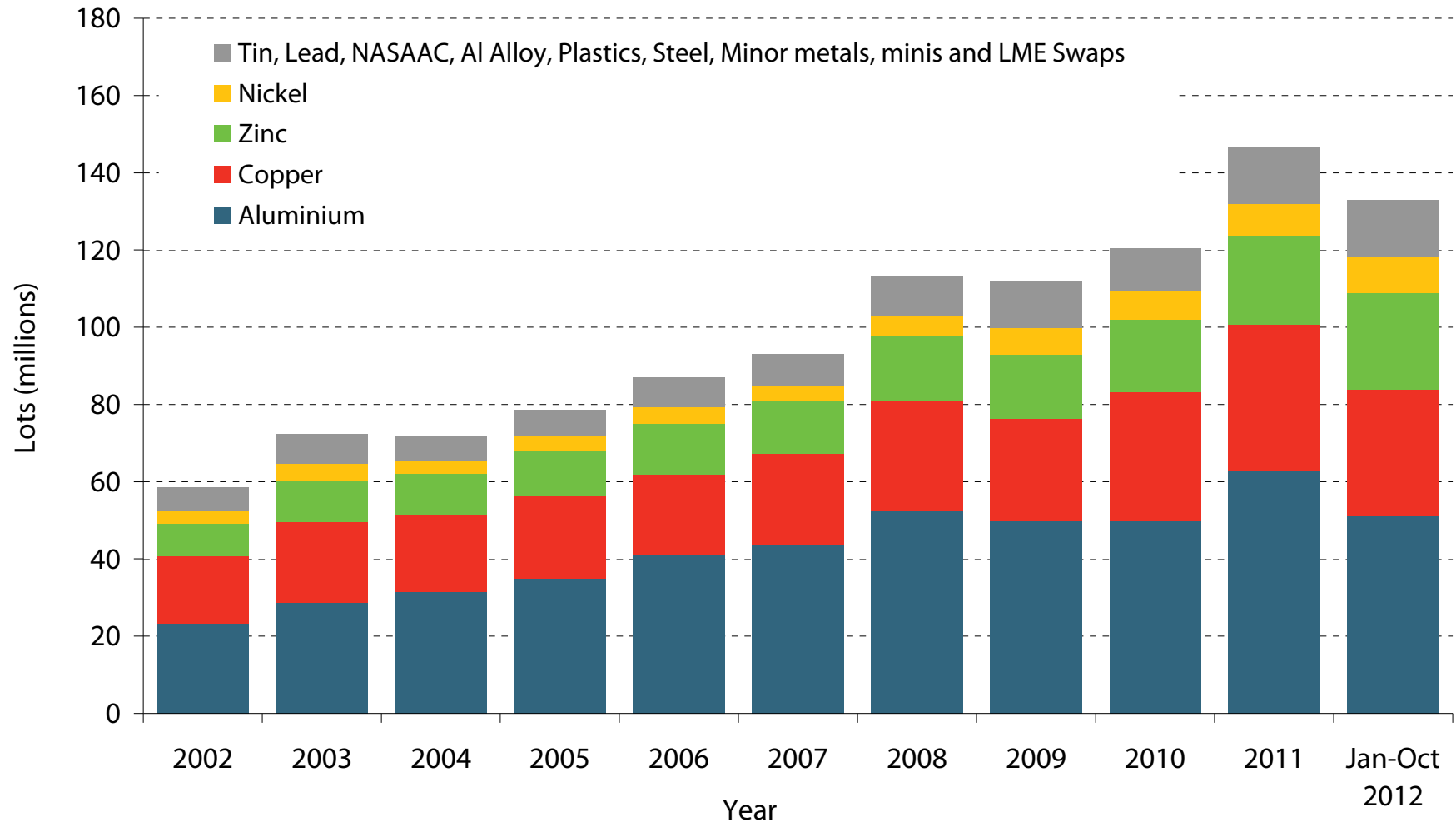


LME Molybdenum

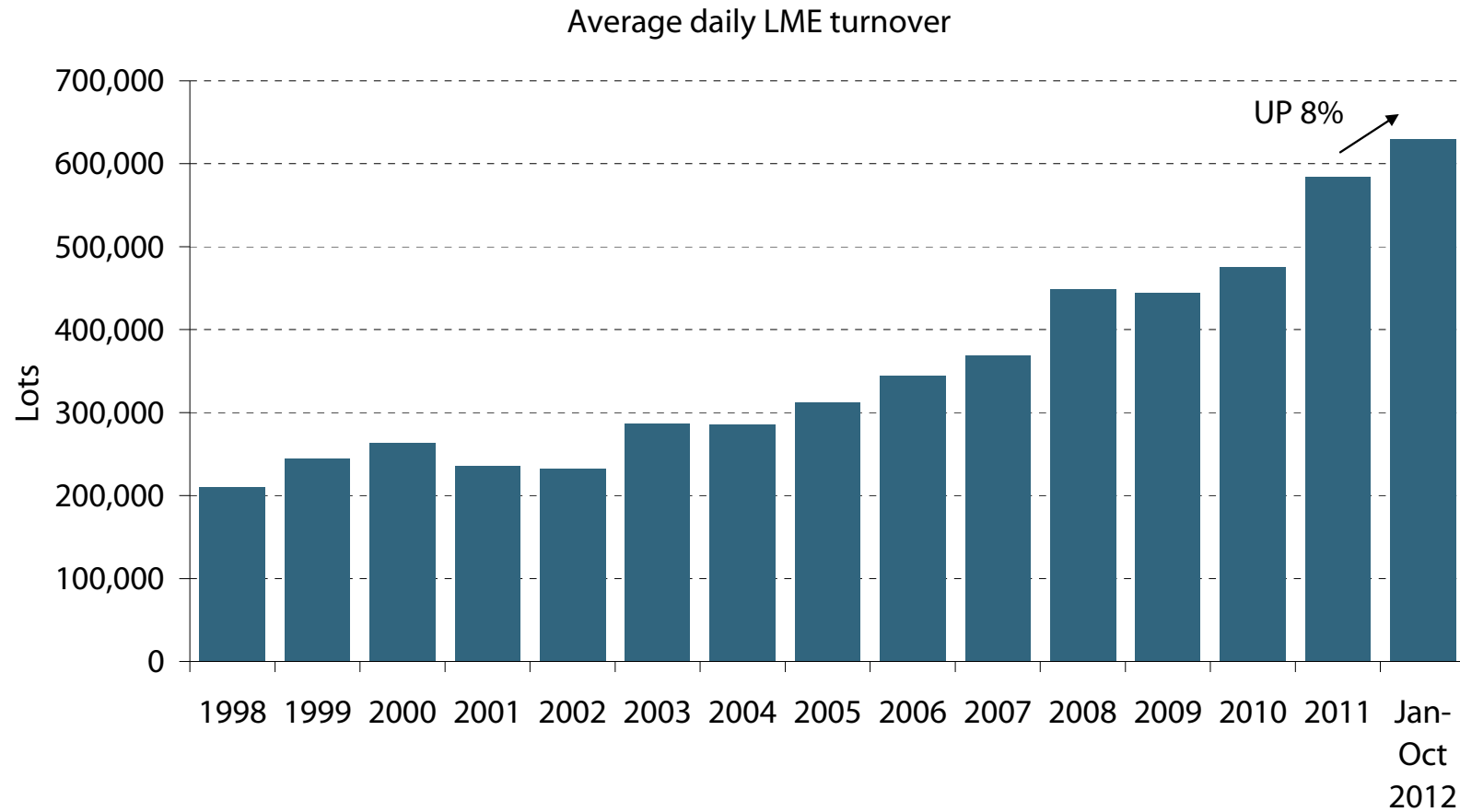


LME Cobalt

LME volumes 2001 - 2012



LME average daily turnover



Who trades in the physical market?

- Material at any stage of production
- Market participants
 - Producers / smelters
 - Traders
 - Converters / fabricators
 - Merchants / distributors
 - End users

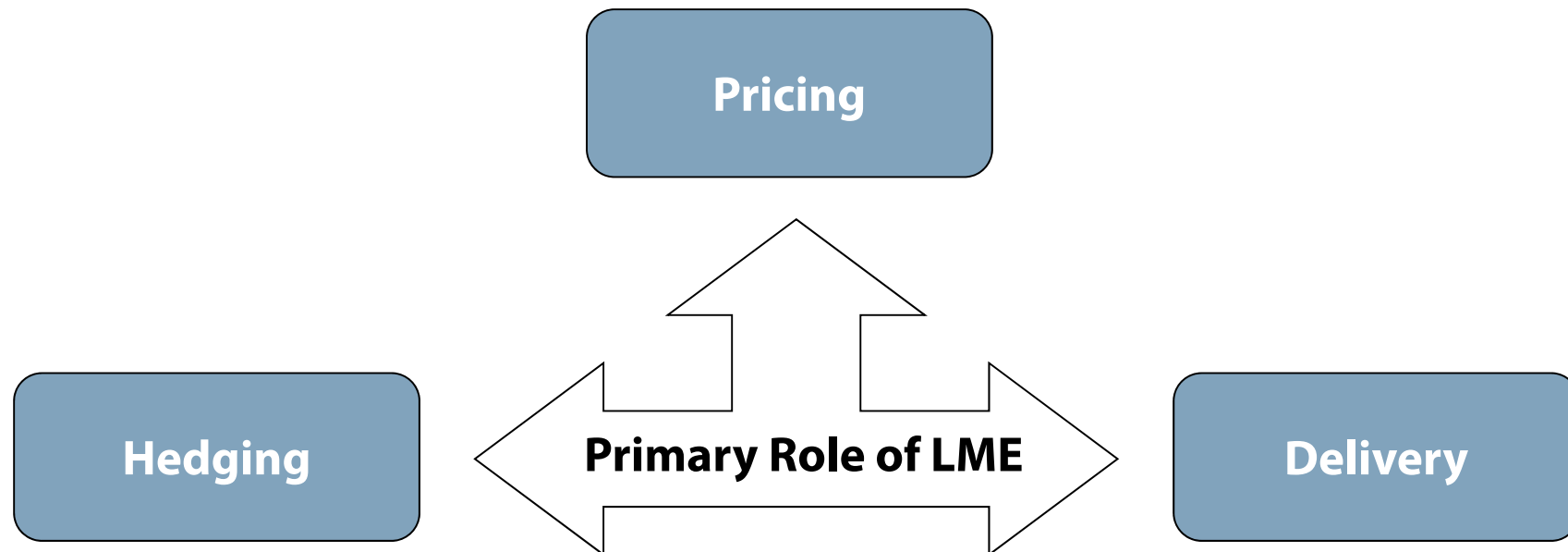
Who trades on the LME?

- Material at semi-converted stage
- Market participants
 - Members
 - Traders/speculators
 - Investment funds
 - Producers/smelters
 - Converters/fabricators
 - Merchants/distributors
 - End Users

Speculators

- Who are the speculators?
 - Technical funds/Algos/HFTs: momentum strategies (1 lot trades)
 - Hedge funds: exploit price anomalies
 - Passive investors: buy and hold
 - Market-makers: buy low, sell high
 - FCMs (Futures commission merchant)
 - CTAs (Commodity Trade Advisers)
 - CPOs (Commodity Pool Operators)
- Most investors pursue strategies that have a neutral or counter-cyclical impact on prices i.e. they buy when they perceive the price to be lower than fair value and sell when it is above fair value.

Primary services of the LME



LME Pricing

LME pricing

LME prices have to reflect the material activities of the market

Advantages:

- Unique price set by supply and demand
- Transparent
- Traded and tradable real-time prices
- Heavily regulated market
- More accurate hedging

LME published prices

Pricing basis – in warehouse, duty unpaid

- **Asian Benchmark**
 - published 07.30 GMT (08.30 BST)
- **Official Prices**
 - prices from the 2nd Ring close
 - cash, 3 months, & three forward December prompts
- **Settlement Price**
 - official “Cash” seller’s price
- **Closing Prices**
 - referred to as “evening evaluations” established at 5pm
 - used by LCH for daily margining purposes
 - used by members for risk management

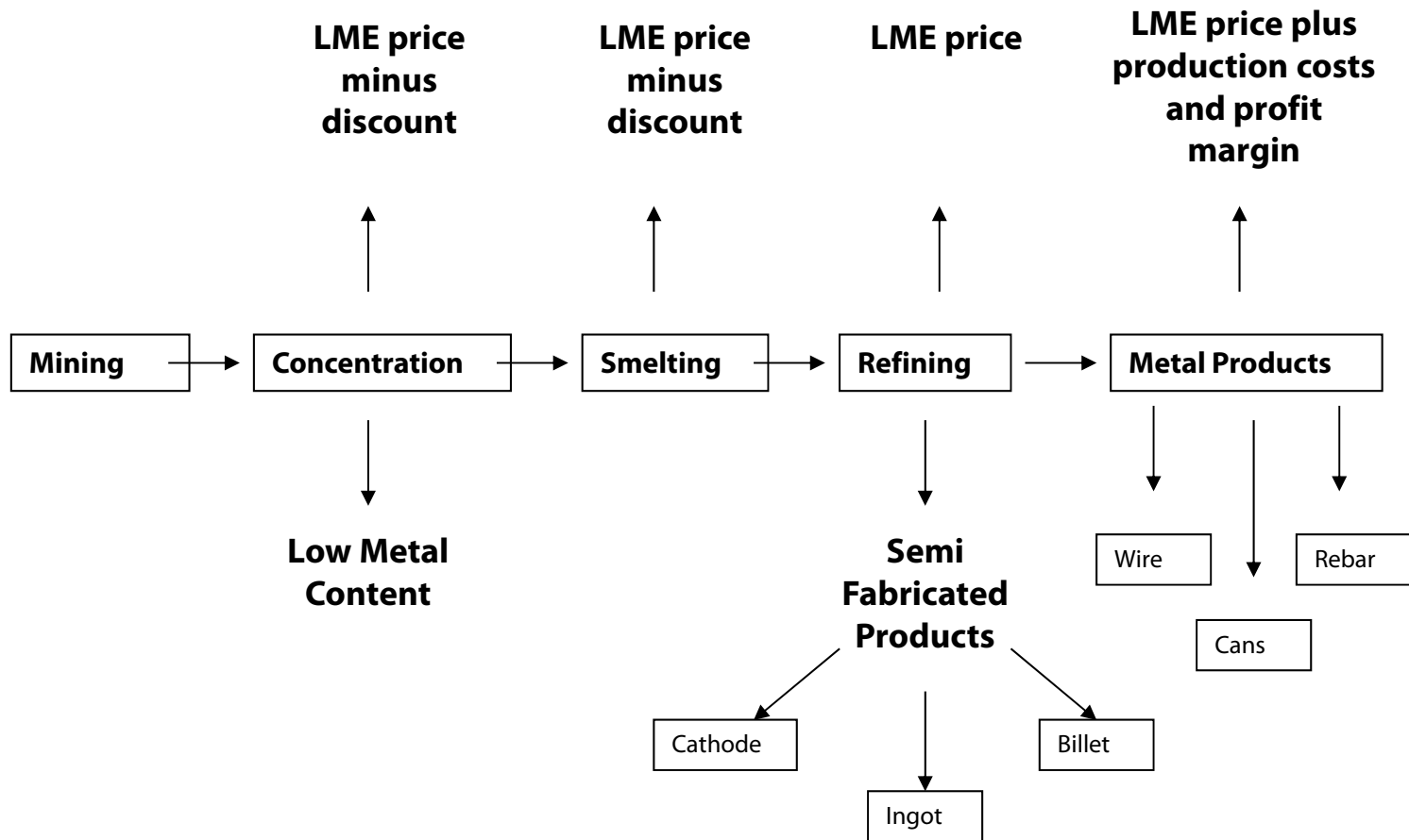
What does the LME price represent?

The LME price represents material:

- From an LME-registered brand
- Stored in an LME-approved warehouse
- Duty unpaid
- Buyer to pay for delivery out of warehouse

The metals value chain

How to use an LME price

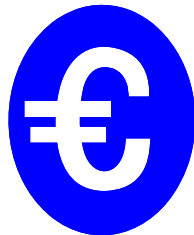


LME traded and cleared currencies

LME contracts trade in US Dollars



LME contracts can also be cleared in the following currencies:



Euro



GB Sterling



Japanese Yen

Prompt date structure

Prompt dates

The LME has a unique prompt date structure

All products:

- **Daily** from cash to 3 months
- Then **weekly** from 3 months to 6 months (every Wednesday)
- Then **monthly** from 7 months (every third Wednesday)
- Aluminium and copper contracts trade out to 10 years

Prompt dates

- The prompt date structure reflects needs of physical industry
- May need to hedge for a specific date to match arrival of shipment
- Ability to move the prompt date by a few days or weeks necessary when shipments are delayed so the date of pricing is delayed
- Aluminium and copper contracts trade out to 10 years
- Long term prompt dates used to hedge forward production particularly for new mining projects

Rolling prompt dates

- **Cash – Two business days from today**
- **Tom – Tomorrow's date**
- **3 months – 3 calendar months from today**

LME contracts

What is a futures contract?

A future is an agreement to buy or sell a

standard quantity of a specified asset (material)
on a fixed date at a price agreed today

LME traded options contracts

“The purchase of an option gives the buyer (of the option)

the right but not the obligation to buy or sell

an underlying futures contract for **a fixed delivery date**

at **a fixed price**”

LME Options and TAPOs

- Traded options declare on the first Wednesday of the month and result in a futures position for the third Wednesday of the month
- TAPOS are Asian-style options
- 'Strike Price' settled for differences against the MASP (Monthly Average Settlement Price)

LMEswaps

- Financially settled contract
- Buyer of LMEswaps fixes the purchase price and closes this purchase at the Monthly Average Settlement Price (MASP). Cash difference is paid the second business day of the next month
- Seller fixes the sale price and close this sale at the MASP. Cash difference is paid the second business day of the next month
- MASP is floating price
- Used by physical industry to hedge price risk on 'unknown' LME formula monthly price agreements

Monthly physical pricing

Typical pricing formulae:

- M – 1 (pricing month before month of shipment)
- M (pricing month of shipment)
- M+1 (pricing month after month of shipment)
- Eg. Producer sells 5,000 mt copper to consumer @ LME M-1 shipment in June 2013. Price would be MASP for May

LMEminis



- Monthly and cash settled contracts which can be easily traded outside the open outcry environment
- LME Copper, LME Aluminium and LME Zinc 5-tonne futures contracts, tradable up to 12 months forward
- Telephone and LMEselect only

Settlement on prompt date

- LME contracts are forward contracts
- Can be settled financially or by delivery of warehouse warrants
- Realised profits and losses only settled on prompt date
- Only LMEminis are cash settled daily
- Brokers may give credit to finance margins

Settlement of LME contracts

Settlement on prompt date (or expiry date) by:

- Financial settlement of futures contract
 - Buy / sell an equal and opposite position

and / or

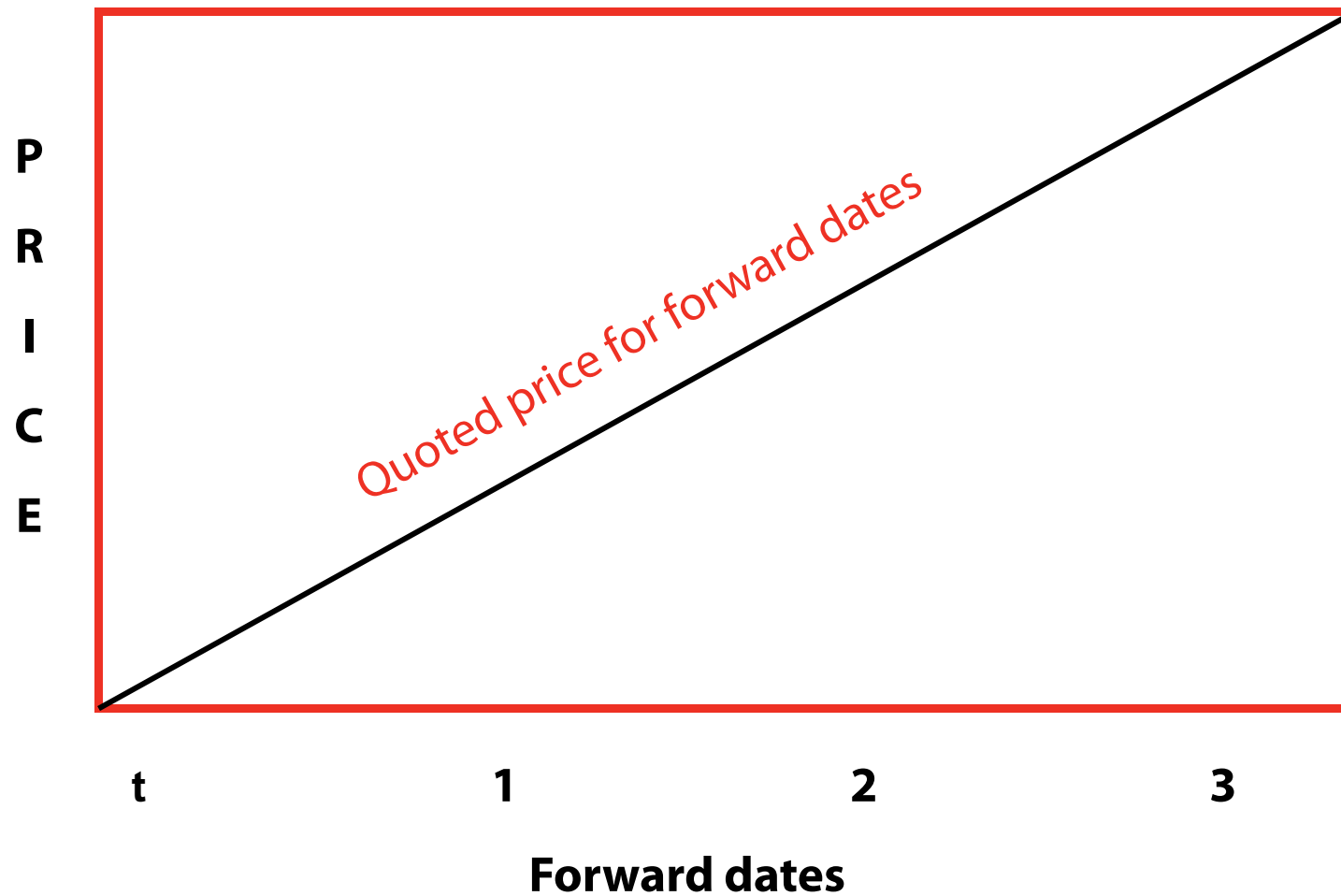
- Delivery
 - Using LME Warrants, the method by which LME contracts are delivered
 - Settlement price is discovered two days before the prompt date (two days before Cash)

The forward curve

Forward prices

- **Forward prices**
the prices being quoted for delivery dates beyond the cash prices
- **Contango**
nearby price of material is lower than the forward price
- **Backwardation**
nearby price of material is higher than the forward price

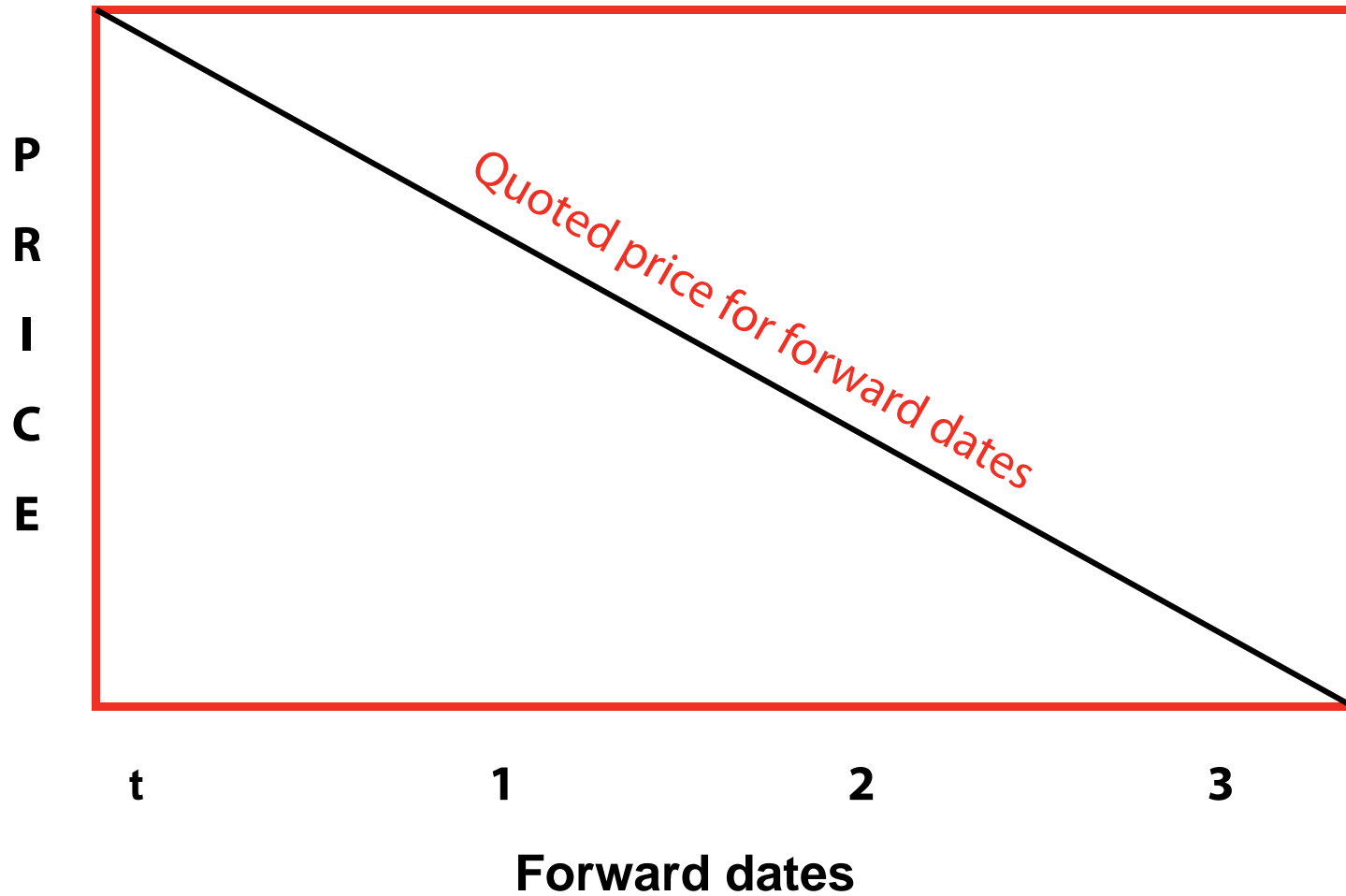
Forward price - contango



Effect of stocks on contango

- Cash to 3 months maximum contango is \$66.00
- Maximum contango calculated as cost to finance and store metal
- Stocks are falling
- Demand rising for nearby delivery
- Contango depreciates according to nearby demand
- When Cash and 3 months are the same the forward curve is level

Forward price - backwardation

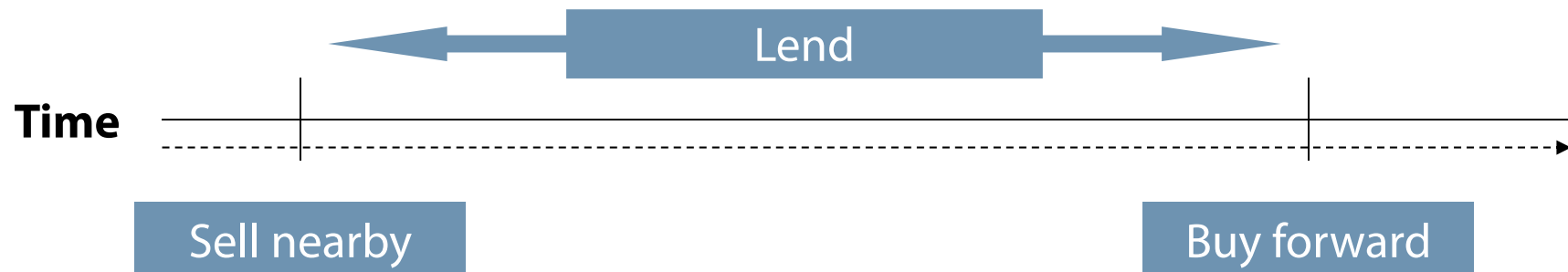
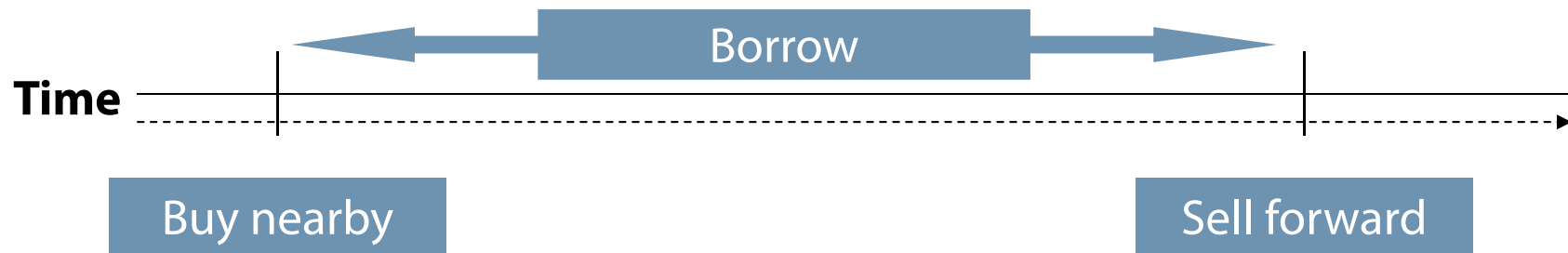


LME market price structure

CASH	\$2,000
1 MONTH	\$1,990
2 MONTHS	\$1,995
3 MONTHS	\$2,010

Moving positions

LME trading - Carries



Hedging

What is hedging?

Hedging

Establishing a position in a commodity futures market (LME) which is equal and opposite to a transaction made on a physical market.

- Protects against adverse price movements
- Locks in an agreed profit margin
- Protects inventory value

Hedging is addressing Risk Positions

- A RISK position is one that has an uncertain outcome, a position which may make or lose money depending on market movements
- It is a purchase not yet matched with a sale or a sale not yet matched with a purchase
- A LONG position will make a profit if the price goes up; a loss if the price goes down
- A SHORT position will make a profit if the price goes down; a loss if the price goes up
- If you are SQUARE, you will not be affected by market movements but you may still have basis risk

Hedger vs speculator

- A **hedger** starts **with** a price exposure, buys or sells futures contracts, and therefore offsets the price exposure.
- A **speculator** starts **without** price exposure, buys or sells futures contracts, and takes on price exposure

Hedgers

- Who are the hedgers?
 - Mining companies locking in a sale price
 - Manufacturers who want to lock in raw material costs
 - End use consumers who want to lock in known costs
 - Merchants who wish to hedge inventory
- Hedging replaces an unknown price with a known price

Market data

LME data via licensed distributors

- **Real time data**
 - 24 hours per day
 - coverage will vary between distributors
- **Delayed data**
 - 30 minutes delayed data at a reduced fee
- **Next Day data**
 - published after midnight UK time
- **Historical data**
 - some distributors provide this service

LME direct data

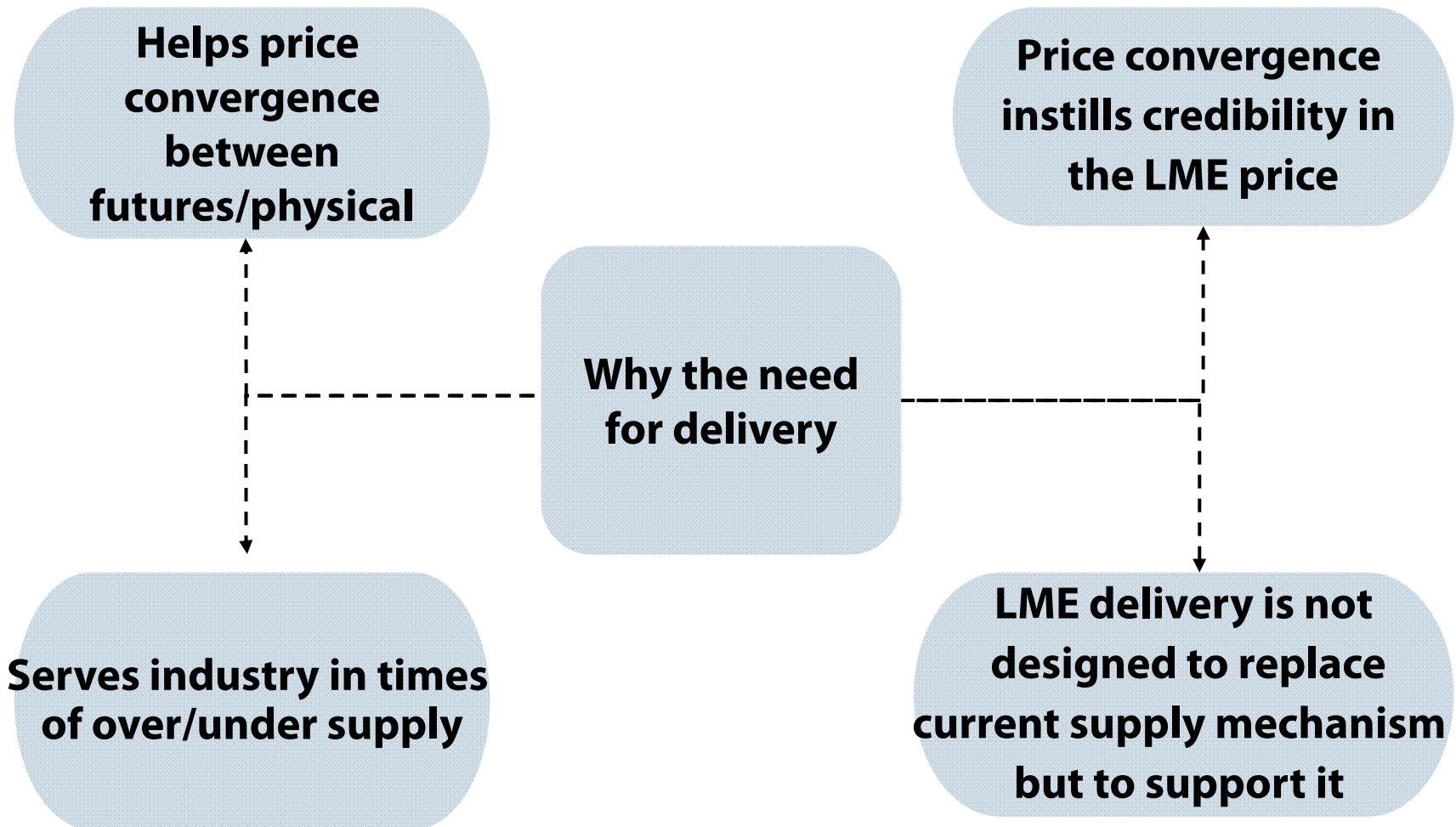
- **Historical data**
 - the Exchange offers this service via the LME Online Store
- **LME website data (free of charge)**
 - daily stocks and price for metals
 - daily index value
 - selection of market reports
 - monthly average prices and volumes
 - graphing tool for chart pricing
 - one or two days delayed

Vendor and subscriber statistics

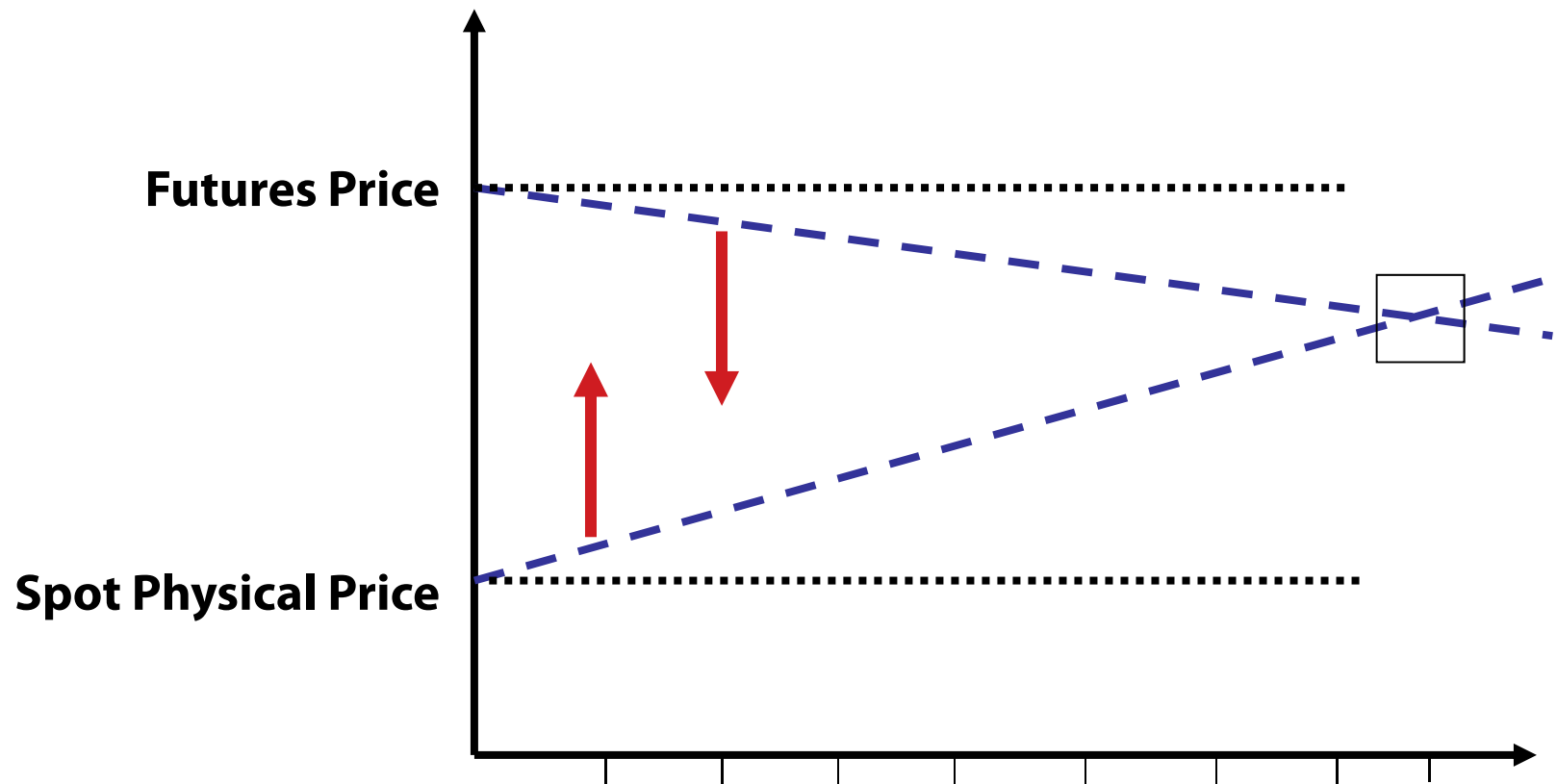
- Over 90 authorised vendors worldwide
- 38,000 users worldwide
- Over 24,000 real-time terminals worldwide:
 - 50 % Europe, Middle East & Africa
 - 30 % North America, Latin America
 - 20 % Asia
- Over 13,000 users receiving “30 minute delayed data” worldwide
- Countless users of “next day data” (www.lme.com)
- Vendors include:
 - a) leading global data aggregators (Bloomberg, Thomson Reuters, etc)
 - b) information providers specialising in metals news and prices (Fastmarkets, Metalprices.com etc)

LME warehousing & fundamentals of delivery

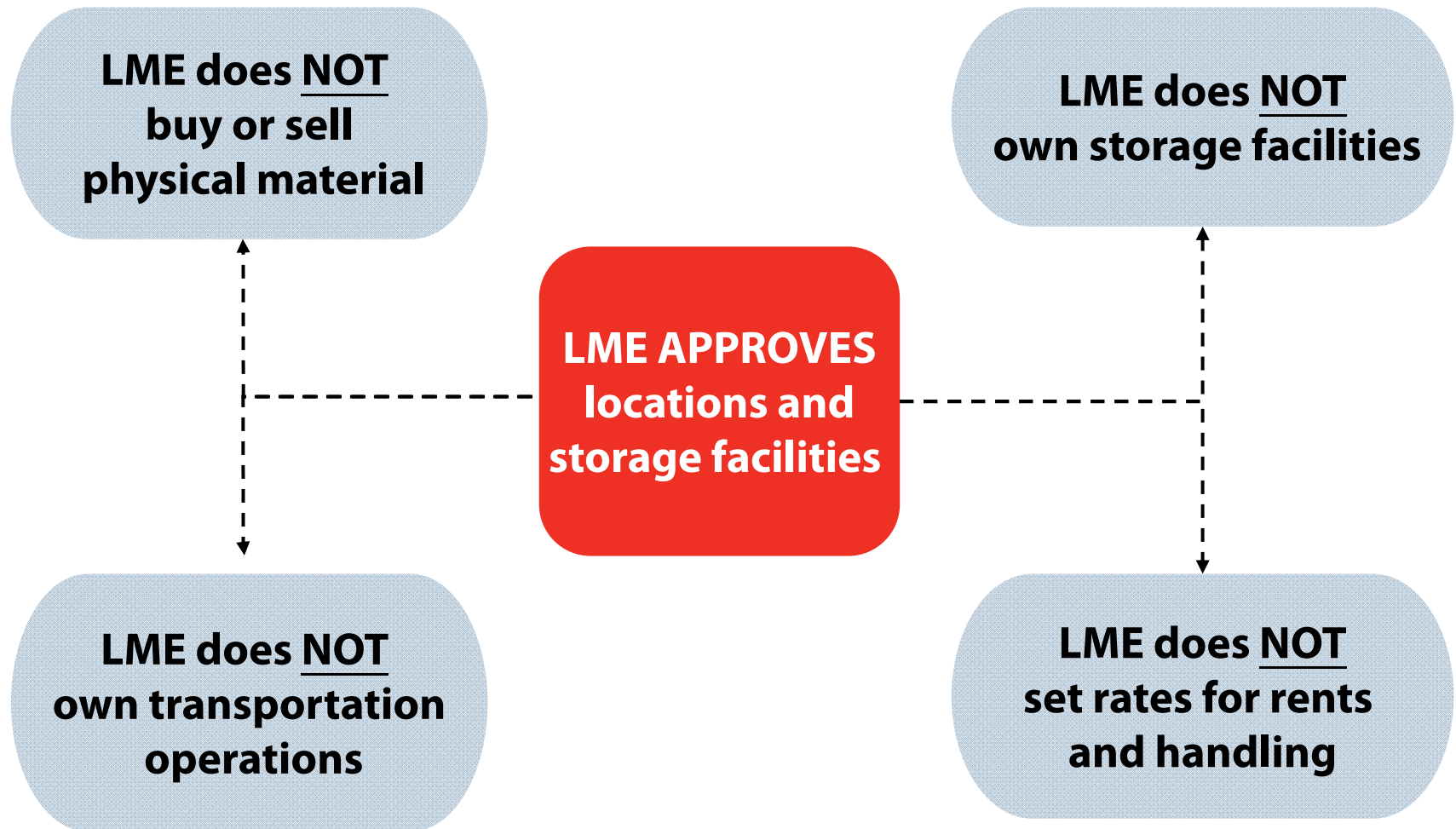
LME delivery: why?



Price convergence



LME role in storage



Warehouse locations

Over 700 storage facilities listed by the LME

- | | |
|----------------------------|-------------------------|
| 1. Antwerp, Belgium | 10. Barcelona, Spain |
| 2. Bremen, Germany | 11. Bilbao, Spain |
| 3. Hamburg, Germany | 12. Helsingborg, Sweden |
| 4. Genoa, Italy | 13. Hull, UK |
| 5. Leghorn, Italy | 14. Liverpool, UK |
| 6. Ravenna, Italy | 15. Tyne & Wear, UK |
| 7. Trieste, Italy | |
| 8. Rotterdam, Netherlands | |
| 9. Vlissingen, Netherlands | |

1. Busan, South Korea
2. Gwangyang, South Korea
3. Incheon, South Korea

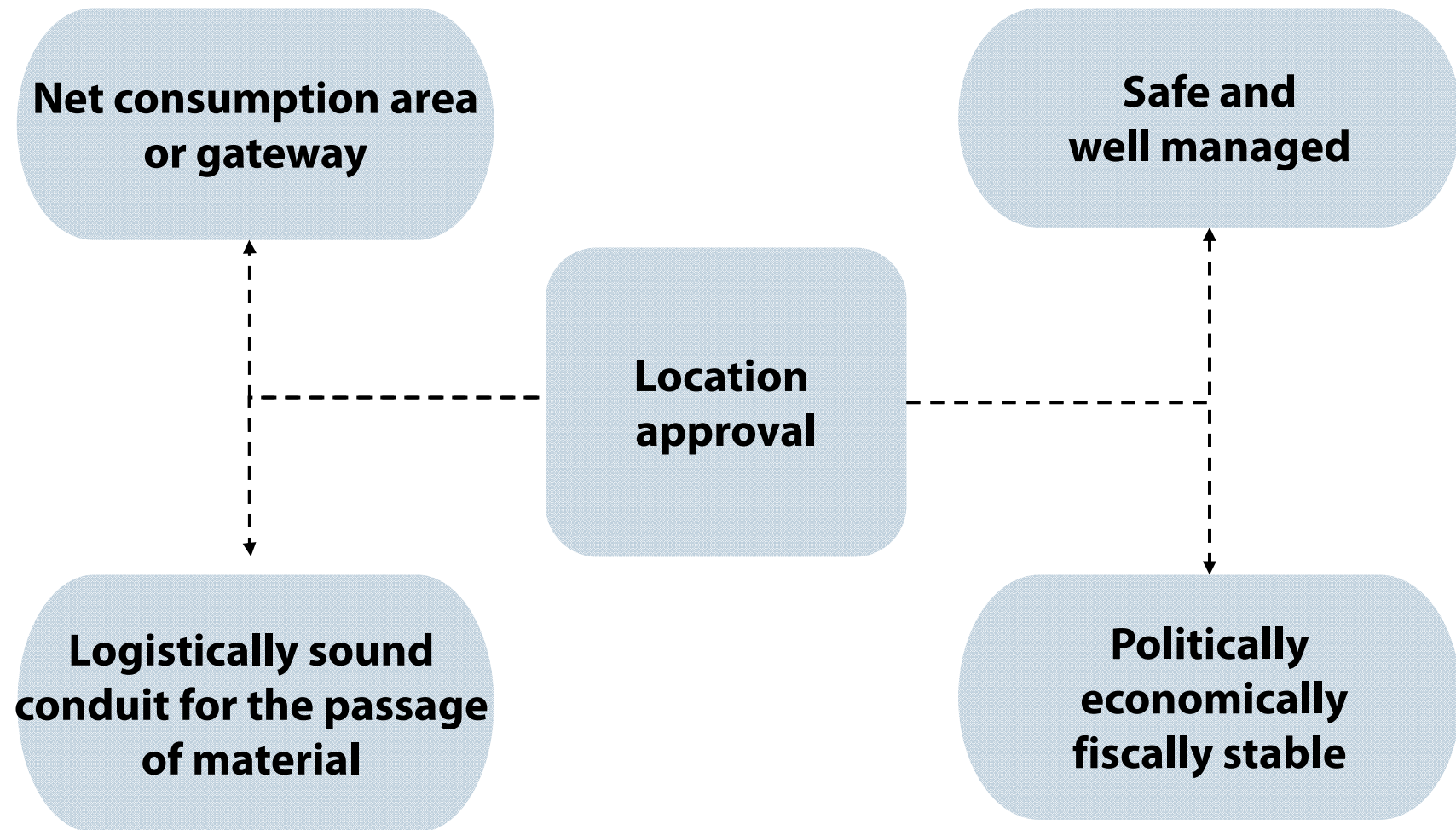
1. Baltimore, Maryland
2. Chicago, Illinois
3. Detroit, Michigan
4. Long Beach, California
5. Los Angeles, California
6. Louisville, Kentucky
7. Mobile, Alabama
8. New Orleans, Louisiana
9. Owensboro, Kentucky
10. St. Louis, Missouri
11. Toledo, Ohio

1. Nagoya, Japan
2. Yokohama, Japan

1. Dubai, UAE
2. Kocaeli, Turkey
3. Tekirdag, Turkey

1. Johor, Malaysia
2. Singapore
3. Port Klang, Malaysia

LME location approval process



Warehouse companies approval



How does the LME regulate approved warehouses?

Regular inspections

Sets load out rates for warehouses

Currently:

More than 900,000 mt capacity must deliver out minimum 3,000mt daily per warehouse company per location

600,000 – 900,000mt capacity must deliver out minimum 2,500mt daily per warehouse company per location

300,000 – 600,000 mt capacity must deliver out minimum 2,000mt daily per warehouse company per location

Less than 300,000mt capacity must deliver out minimum 1,500mt daily per warehouse company per location

From April 2013, additional load out of minimum 60mt of tin and nickel

Metal Financing

After global financial crisis high counterparty risk led to unwillingness to offer credit

Banks had access to cheap money

Borrowing metal (buying now and agreeing to deliver back later) has a guaranteed return often in excess of interest rates

Metal bought and placed in warehouse for anything up to three years

Metal is 'locked up' and unavailable for purchase on LME

The maximum contango LME Aluminium

Cash to 3 months

Cash price		\$1820.00
Cost to finance	+	\$ 23.50 @ 40 cents/day
Warehouse rent	+	\$ 34.20
Insurance	+	\$ 3.00
3 month price		\$1880.70

What if warehouse rents were to fall to 30 cents/day?

LME delivery and LMEsword

Delivery of LME futures contracts is satisfied by delivery of LME warrants

- LME warrants are bearer documents of possession relating to one specified lot of material in warehouse
- Delivery is made through the transfer of warrants from seller to buyer
- LME warrants transferred through electronic transfer system – LMEsword
- Secondary market in LME warrants
 - location & brand premiums

LMEsword system



Warehouse



Warehouse Agent



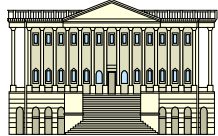
Warrant Owner



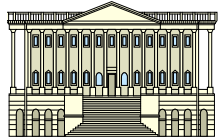
LMEsword Member



Original Owner



LCH.Clearent



LME



Depository



LMEsword

- = LMEsword Electronic Connection
- = Other Instruction or Data Transfer

Taking metal off warrant

**Removal of LME warrant
from depository**



Cancellation of LME warrant



Await release instructions



Removal of material

1. The LME warrant is collected from depository and delivered to the London Agent together with cancellation instructions and details for the material release.
2. The London agent cancels the LME warrant in LMEsword. Notification of cancellation sent to the warehouse company to release material. Cancellation of the warrant is completed and no longer deliverable on exchange.
3. Upon receipt of release instructions, the warehouse company will allow material to leave once all outstanding charges are paid.
4. Material is delivered out and the LME warrant is removed from LMEsword.

Trading at the LME

Trading on the LME

- No position limits
- No price limits
- There is always a price, 24 hours a day
- Access through LME member companies

LME trading platforms



Ring trading (11.40 – 17.00)



Telephone trading (24 hours)



Electronic trading (01.00 – 19.00)

(Australia, Hong Kong, Japan, China,
Singapore, South Africa, Switzerland, UK &
USA)

The Ring



The Ring



Trader

- The only individual from the team who can transact within the Ring
- This individual will be seated on the red seats in the Ring

The Ring



Clerks

- Usually two individuals per team who provide communication in and out of the Ring.
- One will be using hand signals to indicate what price is currently trading, while the other will be recording transactions.

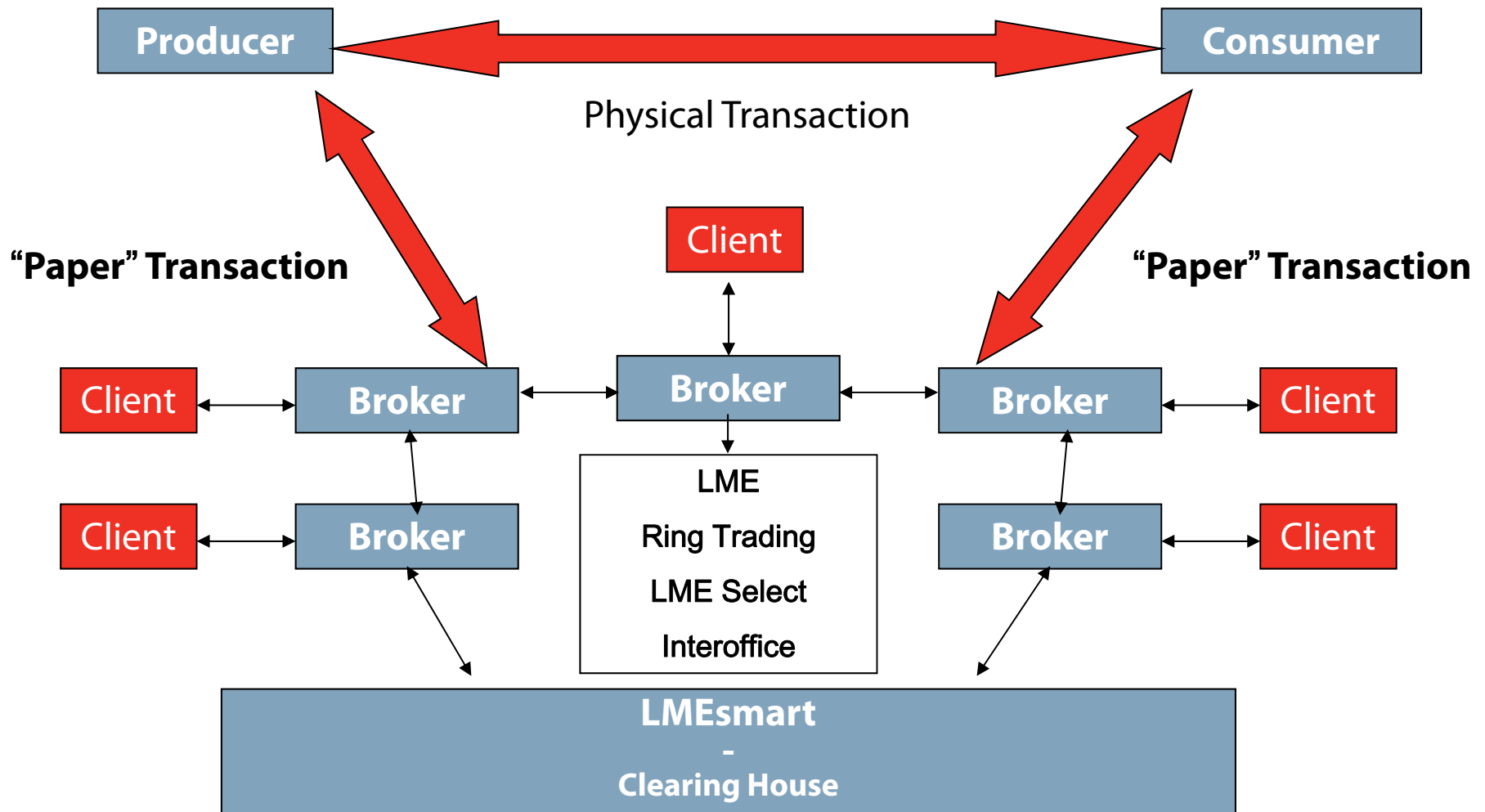
The Ring



Telephone clerks

A number of team members who utilise telephones to either receive orders from large clients, or provide a commentary back to their offices in London & overseas offices.

A futures contract in practice

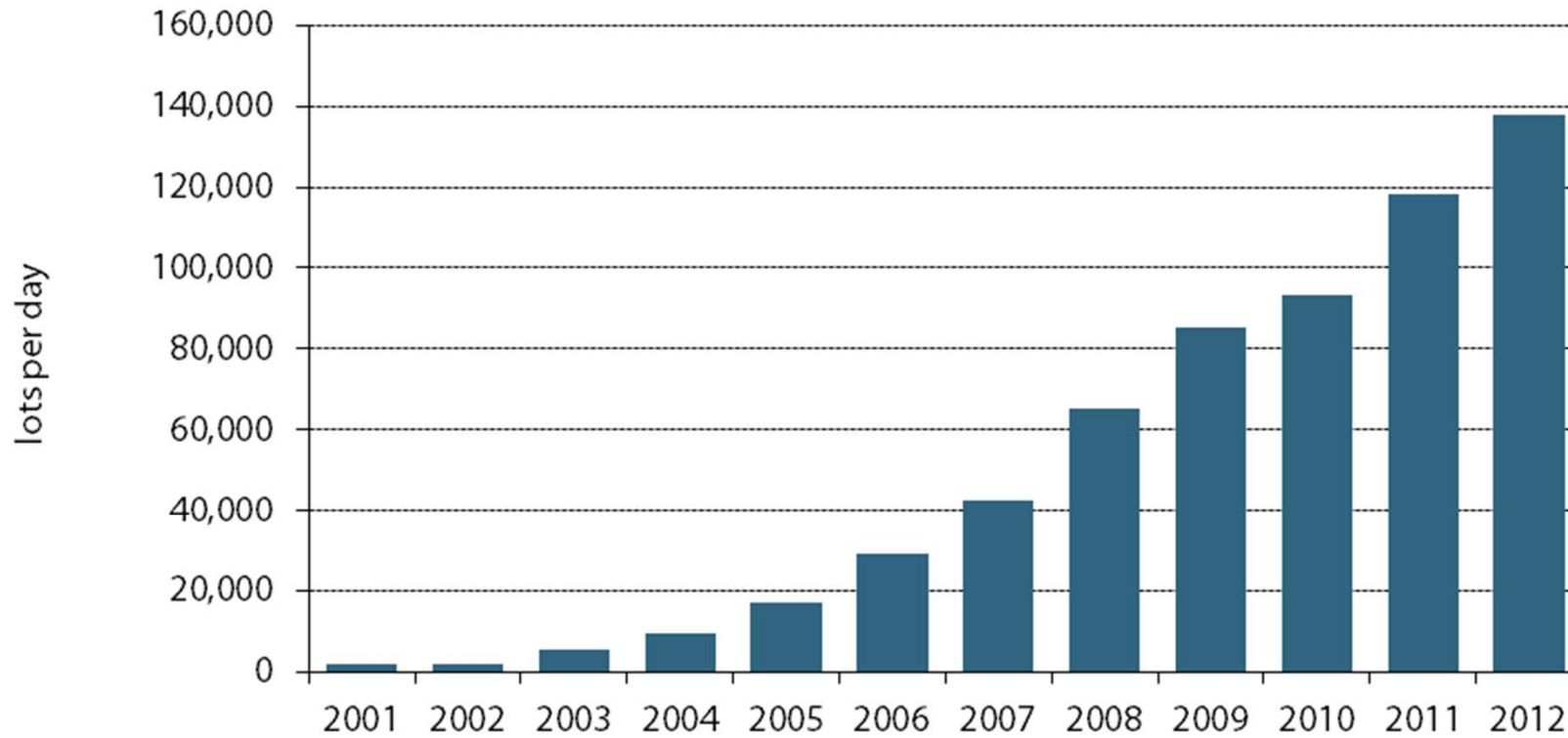


The growth in electronic trading

LME electronic trading – LMEselect

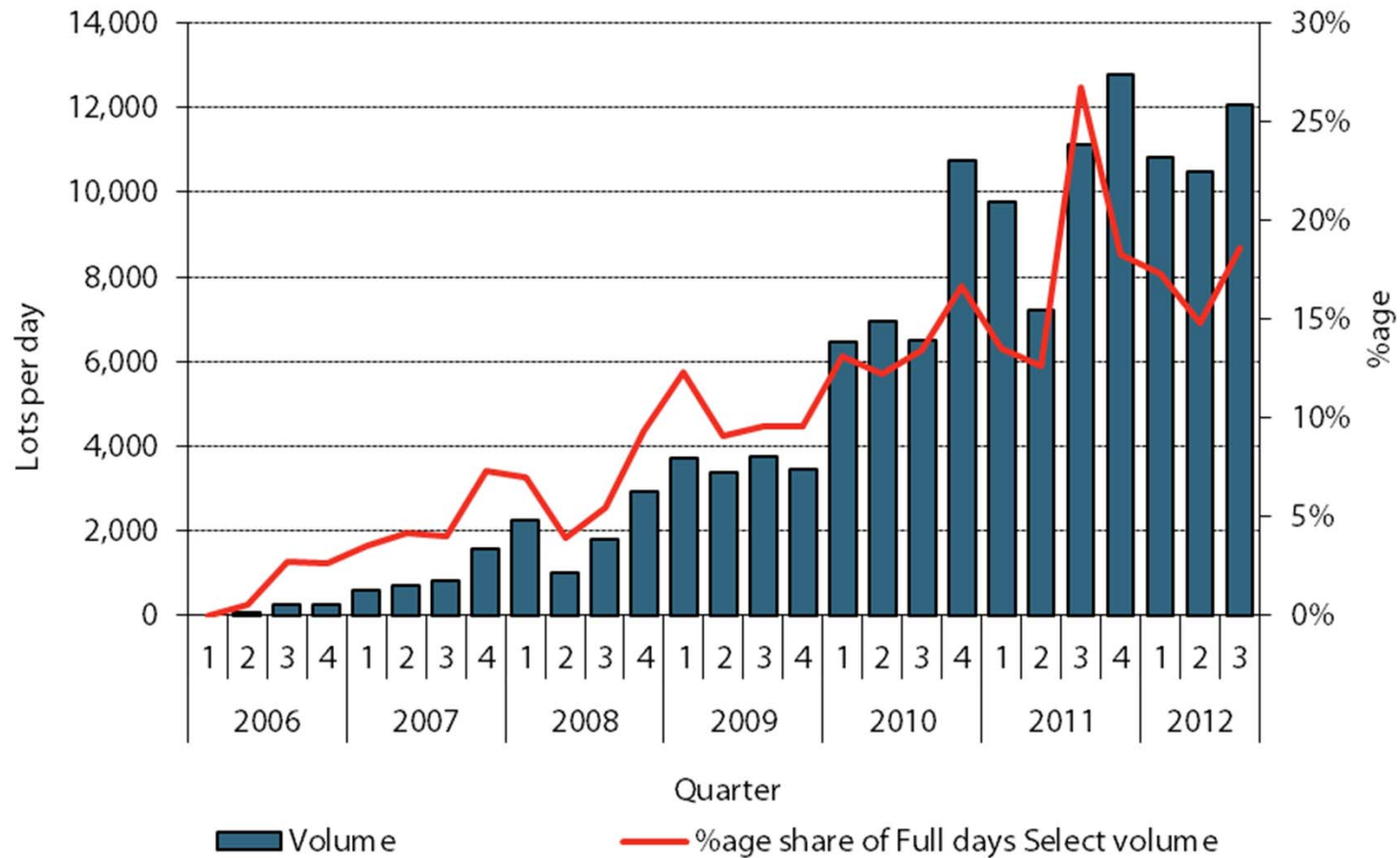
Up 17% y/y

LME Select



LME Asian trading on LMEselect

Average daily volume up 9% y/y



* Select: 00:00-7:00am UK, client and exchange, 3-month outright

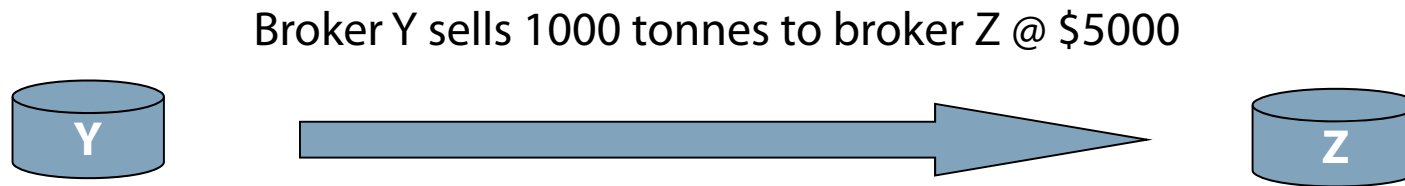
Overview of LME clearing

Role of clearing

- LME currently clears through LCH.Clearnet
- LME Clear will launch 2014
- The main purpose of the self clearing project is to provide the LME with its own, independent clearing capability and more easily launch new contracts.
- Manager of counterparty risk to clearing members
- Settlement and delivery of warrants
- Management of credit risk

How clearing works

Futures contracts without clearing



Futures contracts with clearing

Y sells to LCH.Clearnet
1000 tonnes @ \$5000

LCH.Clearnet sells to Z
1000 tonnes @ \$5000



Role of risk – Margin deposits

- The clearing house takes security to protect against a clearing member unable to pay its losses
- Two elements:
 - Initial margin
 - Variation margin

Initial margin

- **Returnable** deposit in respect of net open positions
- Calculated using London SPAN
- Initial margin payable using cash or acceptable collateral (bank guarantee, letter of credit, warehouse warrants etc.)
- Rates set by the Risk Management department in consultation with the LME

Initial margin calculation

- Client A sells 1000mt LME Copper prompt 3 months.
- Initial margin rates for LME Copper are as follows:

	Scanning range	
	\$ per mt	\$ per lot
LME Copper	580	14,500

Initial margin payment

Initial margin payment for this transaction would be as follows:

$$\text{\$14,500} \times 40 \text{ lots} = \text{\$580,000}$$

Variation margin calculation

Client A Sells 1000mt 3 month Cu @ \$8,000mt

Mark to market @ \$8,053

Variation margin = $\$53 \times 25 \times 40$

Variation margin to be paid = \$53,000

The role of an LME broker/dealer

The role of an LME broker/dealer

The broker/dealer

- Provides its clients with access to the market
 - acts as broker, i.e. intermediary
- Trades
 - for its own account (dual capacity) with
 - Clients
 - Other market members
- Provides liquidity to clients and the market

LME client contracts

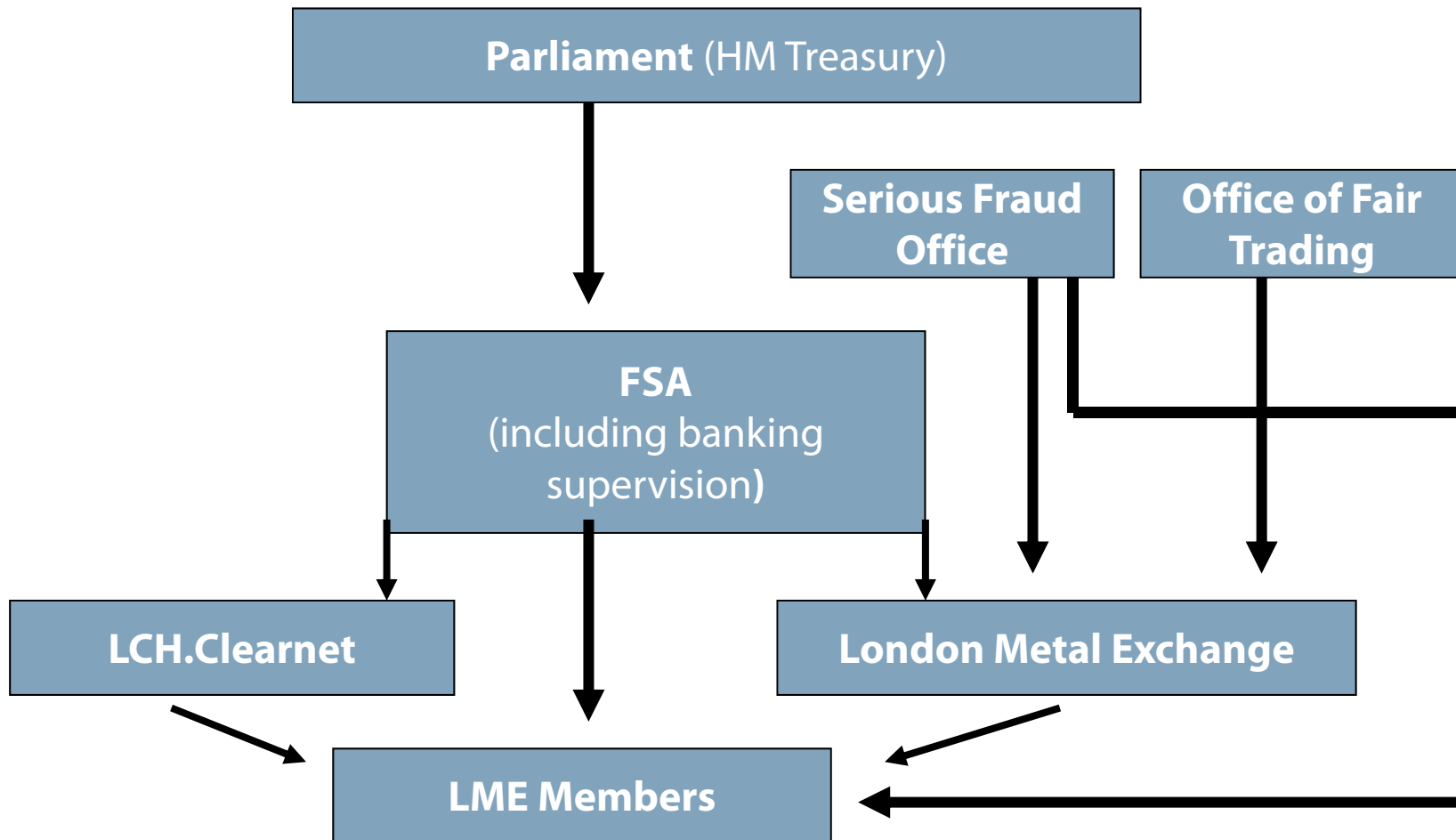
- Clients have contracts with the broker – not the Exchange or LCH.Clearnet or any other member
- Responsibility of the client to make final decision on how to trade, although broker will advise
- Broker responsible for contract performance and assumes the risk on the client
- Client is buying or selling from the broker and not the market or another member firm.

LME client contracts

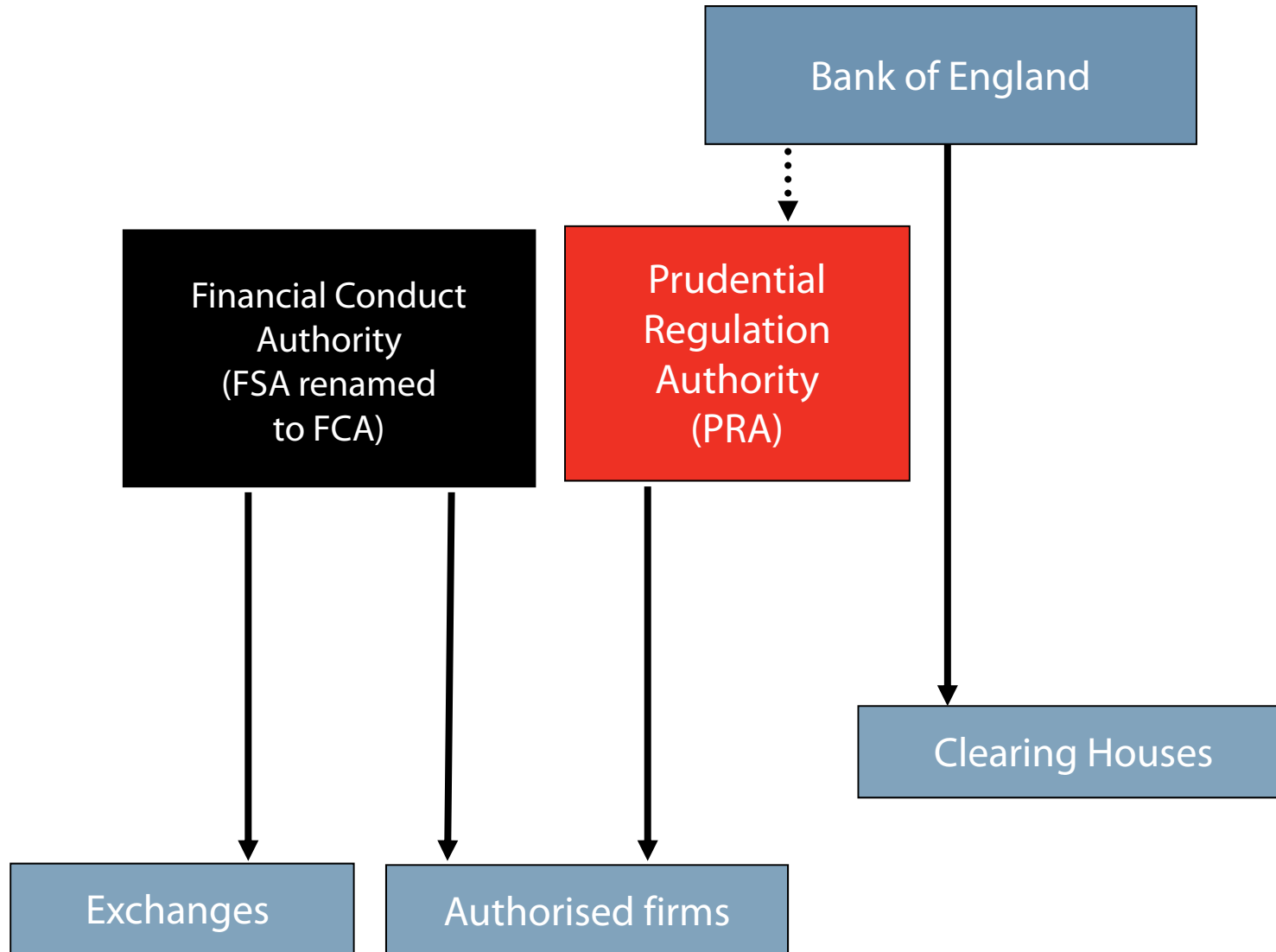
- It is at the broker's discretion whether he fills the order:
 - From his proprietary trading book
 - Cross it with opposite order from another client
 - Put it into the market to seek other bids and offers
- The broker is acting in a 'dual capacity'

Regulation and membership

UK regulation introduced in 1988



Future UK Regulatory Environment



Regulation of LME members

- LME members providing investment services to customers are regulated under the FSMA 2000 and:
 - Must be authorised by FSA
 - Staff giving investment advice must be registered with FSA
 - Company must comply with regulatory capital rules
 - Company must comply with conduct of business rules
- LME members are required to comply with all LME rules including market conduct
- LME members must maintain proper records

LME membership trading categories

Description	Can Issue LME Contracts	Authorised (Financial Services Act)	Member of LCH for Metals	Trading Rights	May Solicit Brokerage	Minimum Net Worth Requirement	Annual Subscription
1. Ring Dealing Member	Yes	Yes	Yes	Freely	Yes	£5mm	£55,000
2. Associate Broker Clearing Member	Yes	Yes	Yes	Freely	Yes	£5mm	£55,000
3. Associate Trade Clearing Member	No	No	Yes	May only deal with 1, 2 or 4, not with each other	No	£2.5m	£19,000
4. Associate Broker Member	Yes	Yes	No	Freely	Yes	£5mm	£45,000
5. Associate Trade Member	No	No	No	Only 1, 2 or 4	No	£50,000	£1,250

LME member default provisions

- Companies Act has unique provisions for Exchange-traded contracts
- LME and LCH.Clearnet act ahead of liquidator
 - LCH.Clearnet manages Exchange Contracts
 - LME manages Client Contracts
 - Client Contracts closed out at market price
 - Profits and losses netted
 - Positions transferred to other brokers
- These provisions do not apply to OTC contracts

What's next for LME Asia

LME developments in Asia

- LME Asia office opened in Singapore March 2010
- 28 member companies now have trading operations in Singapore or Hong Kong
- Growth of Chinese trading on international exchanges including the LME expected to continue
- Further applications to list metal from Chinese producers
- Subject to regulatory approval, LME anticipating more Chinese banks or brokerage firms to become LME members (currently BOCI)

Disclaimer

The information contained within this presentation is for illustrative and educational purposes only and should not be relied upon in making any investment decision. Whilst every effort has been made to ensure the information is up-to-date and correct, the LME cannot guarantee that it is completely accurate and free from human error.