Introduction to the LME

Presented by Catherine Markey
Head of Education and Marketing
3 December 2012, Hong Kong
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

N.B. Drop in LME market share in 2010 reflects increase in SHFE zinc volumes
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 (1877)
- LME Tin (1877)
- LME Lead (1920)
- LME Zinc (1920)
- LME Aluminium (1978)
- LME Aluminium Alloy (1992)
- LME Nickel (1979)
- LMEX (2000)
- LME NASAAC (2002)
- LMEminis (2006)
- LME Steel Billet (2008)
- LME Molybdenum (2010)
- LME Cobalt (2010)
LME average daily turnover

Average daily LME turnover

Lots

UP 8%

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 countercyclical 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

Pricing

Hedging

Primary Role of LME

Delivery
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 2\textsuperscript{nd} 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 price minus discount

Mining → Concentration → Smelting → Refining → Metal Products

LME price minus discount

LME price plus production costs and profit margin

Low Metal Content

Semi Fabricated Products

Cathode → Ingot → Billet → Wire → Rebar

Cans
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

Quoted price for forward dates
LME market price structure

<table>
<thead>
<tr>
<th>Period</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CASH</td>
<td>$2,000</td>
</tr>
<tr>
<td>1 MONTH</td>
<td>$1,990</td>
</tr>
<tr>
<td>2 MONTHS</td>
<td>$1,995</td>
</tr>
<tr>
<td>3 MONTHS</td>
<td>$2,010</td>
</tr>
</tbody>
</table>
Moving positions
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?

- Helps price convergence between futures/physical
- Price convergence instills credibility in the LME price
- Serves industry in times of over/under supply
- LME delivery is not designed to replace current supply mechanism but to support it
Price convergence

Futures Price

Spot Physical Price
LME role in storage

LME does NOT buy or sell physical material

LME does NOT own storage facilities

LME does NOT own transportation operations

LME does NOT set rates for rents and handling

LME APPROVES locations and storage facilities
Warehouse locations
Over 700 storage facilities listed by the LME

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

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

1. Nagoya, Japan
2. Yokohama, Japan

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

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

- Net consumption area or gateway
- Logistically sound conduit for the passage of material
- Location approval
- Safe and well managed
- Politically economically fiscally stable
Warehouse companies approval

Warehouse company:
- well established and experienced in handling relevant material

Warehouse:
- size, quality, capacity and operation of the building must be suitable

Listed warehouses

Facilities:
- weighing, strapping, cranes and forklifts regularly inspected

Good access to road, rail and water where required
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

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash price</td>
<td>$1820.00</td>
</tr>
<tr>
<td>Cost to finance</td>
<td>$23.50 @ 40 cents/day</td>
</tr>
<tr>
<td>Warehouse rent</td>
<td>$34.20</td>
</tr>
<tr>
<td>Insurance</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

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
Taking metal off warrant

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

Producer → Consumer

Physical Transaction

Broker

“Paper” Transaction

Client

LME
Ring Trading
LME Select
Interoffice

LMEsmart
- Clearing House
The growth in electronic trading
LME electronic trading – LMEselect

Up 17% y/y
LME Asian trading on LMEselect
Average daily volume up 9% y/y

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

Broker Y sells 1000 tonnes to broker Z @ $5000

**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:

<table>
<thead>
<tr>
<th>Scanning range</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ per mt</td>
</tr>
<tr>
<td>LME Copper</td>
</tr>
</tbody>
</table>

Initial margin payment

Initial margin payment for this transaction would be as follows:
$14,500 x 40 lots = $580,000
Variation margin calculation

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

Mark to market       @ $8,053

Variation margin = $53 x 25 x 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

Parliament (HM Treasury)

FSA (including banking supervision)

LCH.Clearnet

Serious Fraud Office

LME Members

London Metal Exchange

Office of Fair Trading
Future UK Regulatory Environment

Bank of England

Financial Conduct Authority (FSA renamed to FCA)

Prudential Regulation Authority (PRA)

Exchanges

Authorised firms

Clearing Houses
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

<table>
<thead>
<tr>
<th>Description</th>
<th>Can Issue LME Contracts</th>
<th>Authorised (Financial Services Act)</th>
<th>Member of LCH for Metals</th>
<th>Trading Rights</th>
<th>May Solicit Brokerage</th>
<th>Minimum Net Worth Requirement</th>
<th>Annual Subscription</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ring Dealing Member</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Freely</td>
<td>Yes</td>
<td>£5mm</td>
<td>£55,000</td>
</tr>
<tr>
<td>2. Associate Broker Clearing Member</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Freely</td>
<td>Yes</td>
<td>£5mm</td>
<td>£55,000</td>
</tr>
<tr>
<td>3. Associate Trade Clearing Member</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>May only deal with 1, 2 or 4, not with each other</td>
<td>No</td>
<td>£2.5m</td>
<td>£19,000</td>
</tr>
<tr>
<td>4. Associate Broker Member</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Freely</td>
<td>Yes</td>
<td>£5mm</td>
<td>£45,000</td>
</tr>
<tr>
<td>5. Associate Trade Member</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Only 1, 2 or 4</td>
<td>No</td>
<td>£50.000</td>
<td>£1.250</td>
</tr>
</tbody>
</table>
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)
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.