A Practical Guide to Managing Risk Along the Steel Supply Chain
Managing Price Risk Along the Steel Supply Chain

Comprehensive solutions to contain and manage exposure, maximize profit potential

Second only to the international crude oil market, the ferrous industry accounts for a significant and growing amount of the global economic activity driven by robust demand from China and other emerging economies. In recent years, this industry has begun a transition in pricing practice from annual benchmark to shorter-term or spot market pricing. While this adds greater accuracy and timeliness to value determination, it also brings with it higher price volatility and financial risk all along the supply chain. So how are market participants adapting and thriving in an increasingly uncertain environment? In a word: hedging.

What does it mean to manage price risk?
As you fulfill your physical market needs, buying raw materials and manufacturing and moving your finished product, commodity prices are constantly on the move, reacting to supply, demand and the macro fluctuations of the world economy. Whether you are a mining company, steel mill, service center, or auto/construction/white goods manufacturer, hedging is a tool that can help you anticipate and manage associated financial risk.

How does price risk management work?
In financial markets specifically, price risk management is the purchase or sale of a futures contract as a temporary substitute for a cash market transaction to be made at a later date. Hedging usually involves simultaneous, opposite positions in the underlying cash market and the financial futures market. Futures are not meant to be an alternative to purchasing physical product, but rather a paper transaction meant to offset any potential loss from unexpected dips in hard-product prices. Simply put, if you have an order to sell steel at some point in the future at a predetermined price, you will want to gauge and manage your cost leading up to that transaction. Hedging helps you do just this by putting your industry knowledge and intuitive skills to work, positioning you for potential gain in a futures position that can offset any loss in the physical market.

How can I make price risk management work for me?
The enclosed hedging examples provide a working illustration of the practical mechanics of hedging, and demonstrate the importance of comprehensive hedging from input through output—also known as a multi-hedge approach. With an understanding of the hedging process, you will be better positioned to discuss your goals with a qualified futures commission merchant who can execute your hedging plan.

About CME Group
As the world’s leading and most diverse derivatives marketplace, CME Group is where the world comes to manage risk. CME Group exchanges offer the widest range of global benchmark products across all major asset classes, including futures and options based on interest rates, equity indexes, foreign exchange, energy, agricultural commodities, metals, weather and real estate. CME Group brings buyers and sellers together through the CME Globex electronic trading platform and trading facilities in New York and Chicago. CME Group also operates CME Clearing, one of the largest central counterparty clearing services in the world, which provides clearing and settlement services for exchange-traded contracts, as well as for over-the-counter derivatives transactions through CME ClearPort.
A steel mill which produces HRC for an automotive client is concerned the price of a key input cost, Iron Ore, will rise dramatically over the next 12 months

• It is November and the price of Iron Ore is $140 - The steel mill would like to hedge but is concerned about the volatility in swaps pricing causing problems for the company
• The mill decides to look at options as a way of hedging instead of swaps
• The mill contacts its broker and says that, based on its steel contracts, the maximum it can afford to pay for iron ore next year is $150
• The broker goes to the market and purchases the $140 strike call options for calendar year 2012 for $10 in the full required volume

It is now January and the price for Iron Ore has risen to $180/mt

<table>
<thead>
<tr>
<th>Financial</th>
<th>Physical</th>
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</thead>
<tbody>
<tr>
<td>Bought 500,000mt of Calendar 2012 $140 strike calls linked to TSI or Platts for $10/mt, cleared through CME ClearPort</td>
<td>Purchase Iron Ore at $180/mt for January delivery</td>
</tr>
<tr>
<td>The January portion of the option contract settles on the Exchange at $40/mt</td>
<td>The physical costs $40/mt more to purchase, but the profit on the option covers most of this</td>
</tr>
<tr>
<td>Financial profit or loss: $40 profit - $10 purchase price = $30/mt</td>
<td>Physical “Profit” or “Loss” = $40 price change - $30 option profit = $10/mt</td>
</tr>
</tbody>
</table>

> The insurance premium of $10 per contract at the $140 strike has allowed a financial profit of $30 ($140 strike minus $180 end purchase price minus $10 premium for call = $30). By hedging financially, the loss on the physical side was compensated – ensuring a maximum purchase price of $150. If you had not hedged you would have incurred a real loss of $40/mt for purchasing the required Iron Ore.

It is now June and the price for Iron Ore has fallen to $100/mt

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<tr>
<th>Financial</th>
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</thead>
<tbody>
<tr>
<td>Bought 500,000mt of Calendar 2012 $140 strike calls linked to TSI or Platts for $10/mt, cleared through CME ClearPort</td>
<td>Purchase Iron Ore at $100/mt for June delivery</td>
</tr>
<tr>
<td>The June portion of the option contract settles on the Exchange at $0/mt</td>
<td>The physical costs $40/mt less to purchase but the purchase price of the option is written off</td>
</tr>
<tr>
<td>Financial profit or loss: $10 purchase price of the option = $10/mt</td>
<td>Physical “Profit” or “Loss” = $40 price change - $10 option loss = $30/mt</td>
</tr>
</tbody>
</table>

> The financial loss on the option has been compensated for by the cheaper purchase price of Iron Ore on the physical side. That means you have not only been guaranteed a maximum purchase price for iron ore of $150/mt, but you are also able to gain when the market price for Iron Ore falls.
Benefits of using Options:

- Protect against price volatility in one direction but benefit from price volatility in the other direction effectively insuring against price exposure
- In times of great market stress, options become more valuable, so it is possible to profit on an option hedge given the right advice
- Lock in profit margins and benefit from falling prices
- Improved ability to budget
- Known financial cost of the hedge prior to execution – you cannot lose more on an option than the amount you pay for it

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A steel mill purchasing manager that produces HRC for an automotive client is concerned the price of its main input, Iron Ore, will rise dramatically over the next 12 months

- It is November – The steel mill is in negotiations to secure 500,000mt/month of Iron Ore for the next 12 months, the amount it needs to produce HRC for its automotive client.
- The mill is confident of securing Iron Ore volume, however, due to the demise of the annual benchmark pricing mechanism, a fixed price is no longer available.
- The mill contracts to purchase the volume of Iron Ore required and agrees to link the price to a leading published index as listed on CME Group.
- The mill is concerned that the price of Iron Ore might rise dramatically over the coming year and it might not be able to increase the HRC price by the same amount, as increased competition is keeping the price of HRC from rising.
- The mill decides it would like to fix its cost of Iron Ore by hedging on the CME Group.
- The mill contacts its broker who offers a fixed price of $140mt per month for the entire volume over the year beginning in January. The hedge is to be linked to the same leading index as the physical price for Iron Ore.
- The mill accepts, secure in the knowledge that at this price it will be able to supply HRC to its customer at a profit.

It is now January and the price for iron ore has risen to $170mt

<table>
<thead>
<tr>
<th>Financial</th>
<th>Physical</th>
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</thead>
<tbody>
<tr>
<td>Bought 500,000mt of January Iron Ore swap futures through CME ClearPort at $140/mt</td>
<td>Purchase 500,000mt of Iron Ore at market price of $170/mt for January delivery</td>
</tr>
<tr>
<td>Sell CME January Iron Ore swap futures position at the new price of $170/mt</td>
<td>Physical market price has also risen to $170/mt, therefore, it is more expensive to purchase the Iron Ore required to make steel.</td>
</tr>
<tr>
<td>Financial profit or loss: $170 - $140= $30/mt</td>
<td>Physical “Profit” or “Loss” = $30/mt</td>
</tr>
</tbody>
</table>

The Financial profit achieved by hedging has compensated for the increased price of iron ore in the physical market, which means you have realized your fixed price for Iron Ore of $140/mt. If you had not hedged you would have incurred a real loss of $30/mt for purchasing the required Iron Ore.

It is now June and the price for iron ore has fallen to $120mt

<table>
<thead>
<tr>
<th>Financial</th>
<th>Physical</th>
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</thead>
<tbody>
<tr>
<td>Bought 500,000mt of Iron Ore swap futures on the CME at $140/mt</td>
<td>Purchase 500,000mt of Iron Ore in the physical market at $120mt</td>
</tr>
<tr>
<td>Sell CME Iron Ore swap futures position at the new price of $120/mt</td>
<td>Physical market price has fallen to $120mt, therefore, it is less expensive to purchase the Iron Ore required to make steel.</td>
</tr>
<tr>
<td>Financial profit or loss: $120 - $140= $20/mt</td>
<td>Physical “Profit” or “Loss” = $20/mt</td>
</tr>
</tbody>
</table>

The Financial loss incurred by hedging has been compensated for by the cheaper physical price for iron ore—meaning you have achieved the $140/mt price for iron ore you wanted at the outset.
Benefits of Hedging:

- Protect yourself against price volatility
- Lock-in profit margins and protect against any adverse price movements
- Improved ability to budget
- Guarantee cash flow
- Benefit from lower cost of financing as you have a fully hedged position
- Secure long-term client business
- Hedging offers you a competitive advantage
- Collateralize inventory
- Improve credit rating

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<tbody>
<tr>
<td>Iron Ore 62% Fe, CFR North China (Platts) Swap Futures</td>
<td>PIO</td>
<td>&lt;0#PIO:&gt;</td>
<td>ICPA</td>
</tr>
<tr>
<td>Iron Ore 62% Fe, CFR North China (Platts) Swap Options</td>
<td>ICP</td>
<td>&lt;0#ICP+&gt;</td>
<td>PIOZ1</td>
</tr>
<tr>
<td>Iron Ore 62% Fe, CFR China (TSI) Swap Futures</td>
<td>TIO</td>
<td>&lt;0#TIO:&gt;</td>
<td>ICTA</td>
</tr>
<tr>
<td>Iron Ore 62% Fe, CFR China (TSI) Swap Options</td>
<td>ICT</td>
<td>&lt;0#ICT+&gt;</td>
<td>TIOZ1</td>
</tr>
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The purchasing manager of a steel mill that produces HRC for an automotive client is concerned the price of a key input cost, Coking Coal, will rise dramatically over the next 12 months.

- It is November – A steel mill purchasing manager is in negotiations to secure 100,000mt/month of Coking Coal for the next 12 months, the amount it needs to produce HRC for its automotive client.
- The mill is confident of securing Coking Coal volume, however, due to increasing demand for this product the supplier will only agree to sell on a monthly average price basis.
- The mill contracts to purchase the volume of Coking Coal required and agrees to link the price to a leading published index as listed on CME Group.
- The mill is concerned that the price of Coking Coal might rise dramatically over the coming year and it will be forced to pay this price to secure supply.
- The mill’s purchasing manager decides it would like to fix its cost of Coking Coal by hedging through CME Group.
- The mill contacts its broker who offers a fixed price of $240mt per month for the entire volume over the year beginning in January. The hedge is to be linked to the same leading index as the physical price for Coking Coal agreed.

It is now January and the price for Coking Coal has risen to $280mt

<table>
<thead>
<tr>
<th>Financial</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought 100,000mt of January Coking Coal swap futures through CME ClearPort at $240/mt</td>
<td>Purchase 100,000mt of Coking Coal at unknown future price for January delivery</td>
</tr>
<tr>
<td>Sell CME January Coking Coal swap futures position at the new price of $280/mt</td>
<td>Physical market price has also risen to $280/mt, therefore, it is more expensive to purchase the Coking Coal required to make steel.</td>
</tr>
<tr>
<td>Financial profit or loss: $280 - $240 = $40/mt</td>
<td>Physical “Profit” or “Loss” = $240 - $280 = ($40/mt)</td>
</tr>
</tbody>
</table>

> The Financial profit achieved by hedging has compensated for the “loss” of profit on the physical side which means you have realized your fixed price for coking coal of $240/mt. If you had not hedged you would have incurred a real loss of $40/mt for purchasing the required coking coal.

It is now June and the price for Coking Coal has fallen to $220mt

<table>
<thead>
<tr>
<th>Financial</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought 100,000mt of coking coal Swap Futures on the CME at $240/mt</td>
<td>Purchase 100,000mt of coking coal in the physical market at $220mt</td>
</tr>
<tr>
<td>Sell CME coking coal Swap Futures position at the new price of $220/mt</td>
<td>Physical market price has fallen to $220mt, therefore, it is less expensive to purchase the coking coal required to make steel.</td>
</tr>
<tr>
<td>Financial profit or loss: $220 - $240 = ($20/mt)</td>
<td>Physical “Profit” or “Loss” = $20/mt</td>
</tr>
</tbody>
</table>

> The Financial loss incurred by hedging has been compensated for by the cheaper physical price for coking coal meaning you have achieved the $240/mt price for coking coal you wanted at the outset.
Benefits of Hedging:

- Protect yourself against price volatility
- Lock-in profit margins and protect against any adverse price movements
- Improved ability to budget
- Guarantee cash flow
- Benefit from lower cost of financing as you have a fully hedged position
- Secure long-term client business
- Hedging offers you a competitive advantage
- Collateralize inventory
- Improve credit rating

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<tbody>
<tr>
<td>Australian Coking Coal (Argus) Low Vol Swap Futures</td>
<td>ACR</td>
<td>&lt;0#ACR:&gt;</td>
<td>ACRZ1</td>
</tr>
<tr>
<td>Australian Coking Coal (Platts) Low Vol Swap Futures</td>
<td>ALW</td>
<td>&lt;0#ALW:&gt;</td>
<td>ALWZ1</td>
</tr>
<tr>
<td>Australian Coking Coal (Platts) Swap Futures</td>
<td>ACL</td>
<td>&lt;0#ALC:&gt;</td>
<td>ACLZ1</td>
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The Virtual Steel Mill: Hedging Along the Supply Chain

**Hedging Scenario**

**Billet, FOB Black Sea (SSF)**

Billet producer selling forward on a fixed price basis to secure a contract while locking in profit margin

- It is November – A billet producer has a client who would like to buy 10,000mt of billet per month for twelve months beginning in January.
- To secure the deal the billet producer must agree to supply billet on a fixed price basis.
- It costs the billet producer $550mt to produce billet.
- The current price for a calendar Billet swap is $600mt which would provide a $50mt profit.
- Both the billet producer and the client are happy to agree to contract to buy and sell 10,000mt per month of billet at a fixed price of $600mt as referenced on CME ClearPort.
- The billet producer is concerned that an adverse price movement might affect its forecasted $50mt profit margin. The producer decides to lock in this profit margin by hedging through CME Group.
- The billet producer contacts its broker and agrees to buy 20 CME Billet swap contracts per month at a fixed price of $600mt basis the CME Group Steel Billet, FOB Black Sea (Platts) swap futures. (Note: each CME Group Billet swap contract = 100mt)

**It is now January and the price for billet has risen to $700mt**

### Financial

- Bought 20 lots of January Billet swap futures on the CME at $600/mt
- Sell CME January Billet swap futures position at the new price of $700/mt
- **Financial profit or loss: $700 - $600 = $100/mt**

### Physical

- Sold 20 lots of Billet to customer at $600/mt for January delivery
- Physical market price has also risen to $700/mt, therefore, had you not agreed a fixed price you could have sold billet at the new price.
- **Physical “Profit” or “Loss” = $100/mt**

> The Financial profit achieved by hedging has compensated for the “loss” of profit on the physical side which means you have secured your $50mt premium which is what you wanted to protect at the outset.

**It is now June and the price for billet has fallen to $500mt**

### Financial

- Bought 20 lots of Billet swap futures through CME ClearPort at $600/mt
- Sell Billet swap futures position at the new price of $500/mt
- **Financial profit or loss: $500 - $600 = ($100/mt)**

### Physical

- Sold 20 lots of Billet to customer at $600/mt
- Physical market price has also fallen to $500/mt, therefore, had you not agreed a fixed price you could have sold billet at the new price.
- **Physical “Profit” or “Loss” = $100/mt**

> The Financial loss incurred by hedging has been compensated for by the physical profit which means you have secured your $50mt premium which is the outcome you wanted at the outset.
Benefits of Hedging:

- Protect yourself against price volatility
- Lock-in profit margins and protect against any adverse price movements
- Improved ability to budget
- Guarantee cash flow
- Benefit from lower cost of financing as you have a fully hedged position
- Secure long-term client business
- Hedging offers you a competitive advantage
- Collateralize inventory
- Improve credit rating

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<tbody>
<tr>
<td>Steel Billet, FOB Black Sea (Platts) Swap Futures</td>
<td>SSF</td>
<td>&lt;0#SSF:&gt;</td>
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Hedging Scenario
HMS Scrap, CFR Turkey (FSF)

A steel mill purchasing scrap on a fixed price basis to protect against a rising Scrap price.

- It is November – A Turkish steel mill is concerned that the price of Scrap will rise in the coming months resulting in increased production costs. The mill, which produces HRC, is concerned that it may not be able to pass along any rise in the price of Scrap to its clients due to increased competition in the HRC market.
- The mill contacts its broker and asks for a price quote to hedge 10,000mt per month of CME Group HMS 80/20 Scrap, CFR Turkey swap futures.
- The broker quotes a price of $400/mt per month.
- The Turkish steel mill decides to lock in his price of Scrap at this price for a twelve month period by hedging through CME ClearPort.
- The Steel mill and its scrap supplier agree to buy/sell scrap reference the CME Group monthly average HMS 80/20 Ferrous Scrap, CFR Turkey (Platts) swap futures.

It is now January and the price for scrap has risen to $450mt

> The Financial profit achieved by hedging on the CME Group has compensated for the additional cost of physical scrap. The Steel mill has been able to protect itself from the adverse impact of a rise in the price of Scrap which was the intended outcome at the outset.

It is now June and the price for billet has fallen to $350mt

> The Financial loss incurred by hedging has been compensated for on the physical side as the price for scrap has also fallen by $50/mt. The mill has therefore achieved the outcome intended in November when the hedge was purchased.

Note: it is essential that the steel mills physical contract is linked to the CME Group’s contract; HMS 80/20 Ferrous Scrap, CFR Turkey (Platts) Swap Futures. Linking a physical and a financial contract to different indices and products may not lead to the desired outcome as price variations can occur between reported prices and differing scrap varieties.
Benefits of Hedging:

- Protect yourself against price volatility
- Lock-in profit margins and protect against any adverse price movements
- Improved ability to budget
- Guarantee cash flow
- Benefit from lower cost of financing as you have a fully hedged position
- Secure long-term client business
- Hedging offers you a competitive advantage
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<tr>
<td>HMS 80/20 Ferrous Scrap, CFR Turkey (Platts) swap futures</td>
<td>FSF</td>
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<td>FSAA</td>
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The Virtual Steel Mill: Hedging Along the Supply Chain

Hedging Scenario
European HRC, Ex-Works Ruhr Germany (NFS)

A German steel mill selling forward on a fixed price basis to secure a contract while locking in profit margin

- It is November – A German steel mill has an automotive client who would like to buy 100,000mt of HRC per month for twelve months beginning in January.
- To secure the deal the steel mill must agree to supply HRC on a fixed price basis.
- It costs the steel mill €450mt to produce HRC.
- The current price for HRC referenced on the CME Group is €500mt which would provide a €50mt profit.
- Both the steel mill and the automotive client are happy to agree a contract to buy and sell 100,000mt per month of HRC at a fixed price of €500mt as referenced on CME ClearPort.
- The steel mill is concerned that an adverse price movement might adversely impact against his forecast €50mt profit margin. The steel mill decides to lock-in this profit margin by hedging through CME ClearPort.
- The German steel mill contacts its broker and agrees to buy 2,000 CME Group EU HRC swap futures per month at a fixed price of €500mt basis the CME Group European Hot Rolled Coil, Ex-Works Ruhr Germany (Platts) swap futures.

It is now January and the price for European HRC has risen to €600mt

<table>
<thead>
<tr>
<th>Financial</th>
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<tbody>
<tr>
<td>Bought 2,000 of January HRC swap futures through CME ClearPort at €500/mt</td>
<td>Sold 2,000 of HRC to customer at €500/mt for January delivery</td>
</tr>
<tr>
<td>Sell CME January HRC swap futures position at the new price of €600/mt</td>
<td>Physical market price for HRC has also risen to €600/mt, had you not agreed a fixed price you could have sold European HRC at the new price.</td>
</tr>
<tr>
<td>Financial profit or loss: €500 - €600 = €100/mt</td>
<td>Physical “Profit” or “Loss” = €100/mt</td>
</tr>
</tbody>
</table>

>The Financial profit achieved by hedging has compensated for the “loss” of profit on the physical side which means you have secured your €50mt premium—which is what you wanted to protect at the outset.

It is now June and the price for European HRC has fallen to €450mt

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<tbody>
<tr>
<td>Bought 2,000 of June HRC swap futures on the CME at €500/mt</td>
<td>Sold 2,000 of HRC to customer at €500/mt</td>
</tr>
<tr>
<td>Sell CME June HRC swap futures position at the new price of €450/mt</td>
<td>The physical market price has also fallen to €450/mt. Therefore, had you not agreed a fixed price you could have sold European HRC at the new price.</td>
</tr>
<tr>
<td>Financial profit or loss: €450 - €500 = (€50/mt)</td>
<td>Physical “Profit” or “Loss” = €50/mt</td>
</tr>
</tbody>
</table>

>The Financial loss incurred by hedging has been compensated for by the physical profit which means you have secured your €50mt premium which is the outcome you wanted at the outset.
Benefits of Hedging:

• Protect yourself against price volatility
• Lock-in profit margins and protect against any adverse price movements
• Improved ability to budget
• Guarantee cash flow
• Benefit from lower cost of financing as you have a fully hedged position
• Secure long-term client business
• Hedging offers you a competitive advantage
• Collateralize inventory
• Improve credit rating

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<td>European Hot Rolled Coil, Ex-Works Ruhr Germany (Platts) swap futures</td>
<td>NSF</td>
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<td>U.S. Midwest Domestic Hot-Rolled Coil Steel Index futures</td>
<td>HR</td>
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<td>HRO</td>
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