WHITEPAPER: HEDGING SCRAP PRICES FOR VESSELS

R. M. GLAWION

Abstract. Scrap steel prices are highly volatile. Furthermore, Ship Owners tend to scrap their vessels in falling freight markets when oversupply is building. Hence, it might make sense for ship owners insure themselves against market fluctuations. We can provide a new financial product which not only fills this gap and allows for securitization of the scrap price but also for the calculation of closed project returns when buying vessels on the secondary market. Case studies are provided to illustrate the mechanics of this new approach.

Contents

1. Background - Hedging

Advanced readers may skip directly to section 2.

1.1. What is Hedging and its Importance.

Hedging is considered as a financial strategy which reduces the risk. It is very simple to understand but still unpopular among the beginners in the market. The aim of hedging is to reduce the losses from unexpected fluctuation arising in the market. It is the processor to retain your profit from both sides of the row.

When you plan to hedge that means you are trying to reduce the risk, you can not prevent the event to occur but you can reduce the impact of losses.

1.2. Hedging Through Derivatives.

Hedging techniques generally involve the use of financial instruments known as derivatives. The two most common general classes of derivatives are options and futures.

An easy example will help to fix ideas: Say you own shares of John's Shipping Corporation (ticker: JSC). Although you believe in this company for the long run, you are a little worried about some short-term losses in the shipping industry. To protect yourself from a fall in JSC, you can buy a put option (a derivative) on the company, which gives you the right to sell JSC at a specific price (strike price). This strategy is known as a married put. If your stock price tumbles below the strike price, these losses will be offset by gains in the put option.

One other classic hedging example involves a company that depends on a certain commodity. Let's say John's Shipping Corporation is worried about the volatility in the price of scrap steel. The company would be in deep trouble if the price of steel was to plummit, which would severely eat into their profits. To protect (hedge) against the uncertainty of steel prices, JSC can enter into a futures contract (or its less-regulated cousin, the forward contract), which allows the company to sell the steel at a specific price at a set date in the future. Now, JSC can budget without worrying about the fluctuating commodity.

If the steel price falls below the price specified by the futures contract, the hedge will have paid off because JSC will earn money by receiving the higher price. However, if the price rises, JSC is still obligated to sell for the price in the contract and would have been better off not hedging.

In conclusion, hedging not only works in the Stock Market but it will save you in every field, since it will decrease your risk level.

IMPORTANT

Hedging is not the same as speculating, which involves assuming more investment risks to earn profits.

2. Purpose of our Product

The purpose of our product is twofold. First, we provide a tool to lock in a certain steel price when market prices are high. Figure 1 gives the motivation for a hedging tool like the one we offer. It displays the time series for both world trade and the scrap steel price. One observes that both time series move together closely, especially (and even worse) if world trade plummits the correlation is even higher. For example during the great recession in 2008 the scrap price for steel follows the downfall in world trade immediately and additonally, the downfall is actually more severe.

The explanation for this mechanism is simple. If world trade decreases, charter rates also decrease due to oversupply on the shipping market. Hence, ship owners start to scrap their ships and thus, there is an oversupply of ships on the scrap markets and prices for scrap steel begin to plummit. To protect ship owners from a situation like this our product allows to lock in a price *before* it falls. Hence, it not only decreases the volatility of shipping portfolios but also allows for higher rates of return. See section 3.1 for a case study.

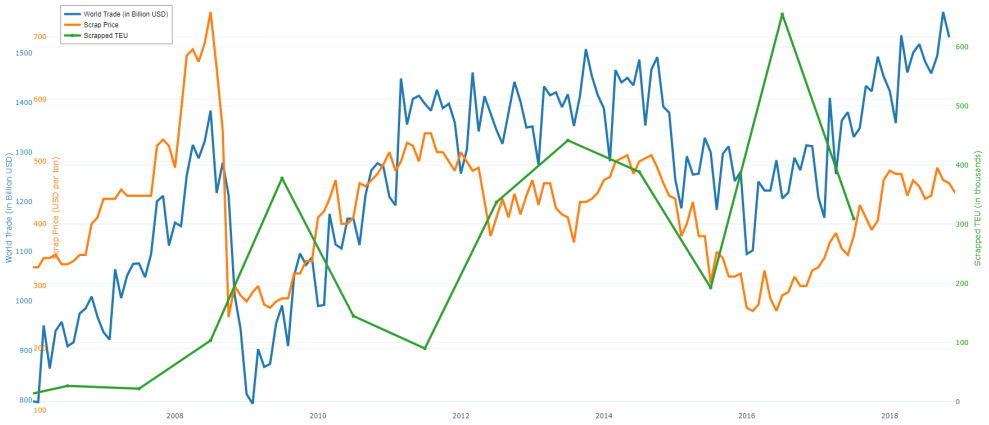

FIGURE 1. The joint evolution of world trade, the price for scrap steel and the number of TEU being scrapped in that year. Source: `https://www.wto.org/english/res_e/statis_e/statis_e.htm` and `https://www.demogate.com/prices`.

Second, our product allows the computation of a closed project return. Suppose you are a CFO of a shipping company and you want to buy a twenty-year-old ship on the secondary market which will be scrapped in five years. With our product you now cannot only hedge your freight rates, but also the scrap price. This allows the calcuation of a closed return in advance. A detailed example is provided in section 3.2.

2.1. **The Market for Steel Scrap.** The most important commercial markets are Bangladesh, India, Pakistan, Turkey and China. The price movements for scrap steel are highly volatile and shown in Figure 3.

From those markets, the Turkish market is the most important one for EU customers, because it provides HKC-certified scrapping, which is required by EU regulations.[1] Hence, the product uses the LME Steel Scrap[2] future, which is based on the monthly average index price of the "Platts TSI HMS 1/2 80:20 CFR Turkey". Each contract has a size of 10 tones and has contract period from 1 out to 15 months.

2.2. **Scrap Price vs. Demolition Price.** We cannot hedge the exact scrap price, since it depends on ship specific assets like the engine, gears, cranes etc. However, Figure 4 shows that both prices historically move together very close and feature a correlation of nearly 90%.

[1]HKC has not entered into force yet, even though some more ratifications can be expected in near future, and as such it legally doesn't exist. However, it provides the right way forward for all stakeholders. EU-SRR has entered into force in 2013 and is to be applied by the end of this year for new ships. Existing ships being EU-flagged or any other ship above 500GT visiting an EU port are obliged to have a IHM onboard from end of 2020. Source: `https://www.gsr-services.de/pdf/SAFETY4SEA_sept_18.pdf`
[2]See: `https://www.lme.com/Metals/Ferrous/Steel-Scrap`.

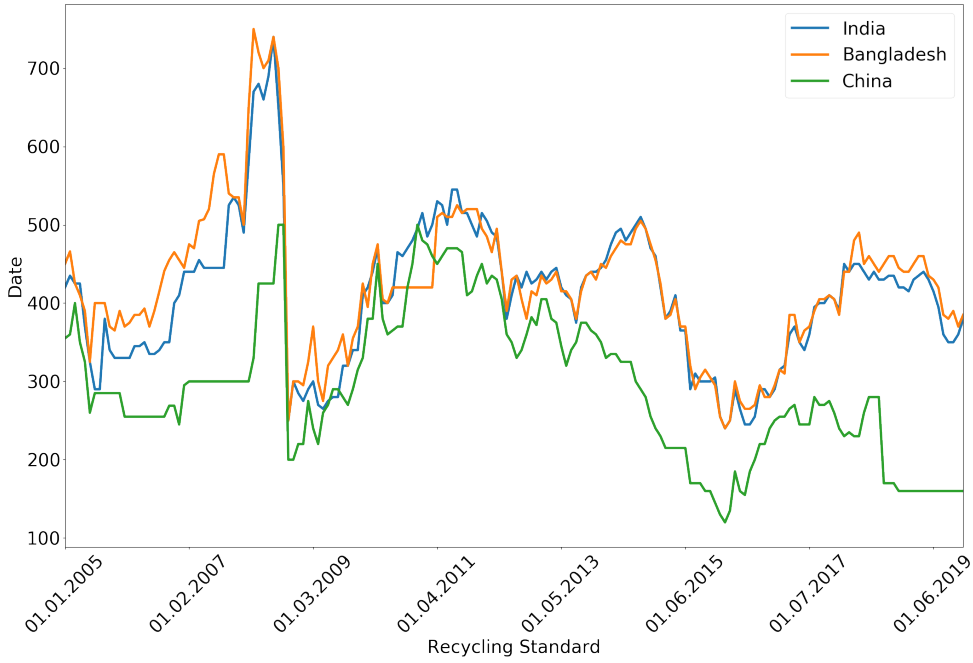

FIGURE 2. Scrap price evolutions in India, Bangladesh and China. Source: `https://www.demogate.com/`

Hence, it is possible to hedge most of the demolition value by hedging the exposure on the spot market for scrap steel.

3. Case Studies

At this stage, we restrict our attention to what might be termed hedge-and-forget strategies. We assume that no attempt is made to adjust the hedge once it has been put in place. The hedger simply takes a futures position at the beginning of the life of the hedge and closes out the position at the end of the life of the hedge.

The case studies treat futures contracts as forward contracts (that is, it ignores daily settlement). However, without loss of generality an adjustment known as ‘‘tailing the hedge’’ that takes account of the difference between futures and forwards can be implemented to avoid overcome this issue.

3.1. **Case Study 1: Hedging a Fleet.** Suppose a fleet consisting of 200 vessels. 20 of them are above 20 years old thus, have a high probablity of getting scrapped within the next 5 years. For simplicity lets assume they have a 100 percent chance of getting scrapped in exactly 5 years. Each vessel weigths 50,000 tons. Hence, the exposure of the company owning the fleet is $20 \cdot 50{,}000 = 1{,}000{,}000$ tons of scrap steel. Further, the price of scrap steel at the moment is 380 USD/ton resulting in an USD exposure for the firm of $1{,}000{,}000 \cdot 380 = 380{,}000{,}000$ USD.

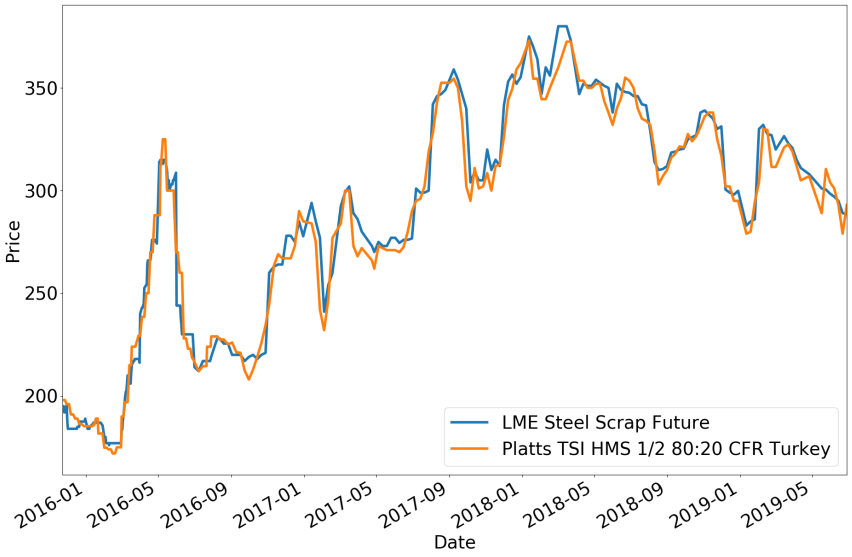

FIGURE 3. Evolution of the LME Steel Scrap Future and the Platts TSI HMS 1/2 80:20 CFR Turkey. Source: `https://www.lme.com/Metals/Ferrous/Steel-Scrap#tabIndex=3` and Thomson Reuters Datastream.

3.1.1. *What the product does.* The advantage of our service in this example is twofold. First, we inform the constumor that the price for scrap steel is far above its long-term average. We initially set up a level of 15% to 20% about its long-term (3-years) average. However, customers can vary this level and also set-up multiple thresholds which generates a signal from our service to draw their attention.

Second, if a customer receives such a signal he can decide whether he wants to lock in the current price or not. If he decides to lock in the price our service sets up a hedging portfolio of the desired volume. Of course, it is possible to only hedge a fraction of a fleet. In our example the owner of the fleet could also decide that he just wants to hedge half of his exposure, i.e. 500,000 tons of scrap steel.

3.1.2. *How it works.* In this setting suppose the owner wants to hedge away all of his exposure. In this case we can set up a *short hedge* for him. A short hedge is appropriate when the hedger already owns an asset and expects to sell it at some time in the future.

To illustrate what might happen, suppose the price path in Figure 5 for the spot price of scrap steel:

Now suppose the price of scrap steel evolves according to the red path, i.e. the spot price in 5 years proves to be \$280 per ton of scrap steel. The company realizes \$280 million for the ships under its sales contract. If it owns a future contract which maturity

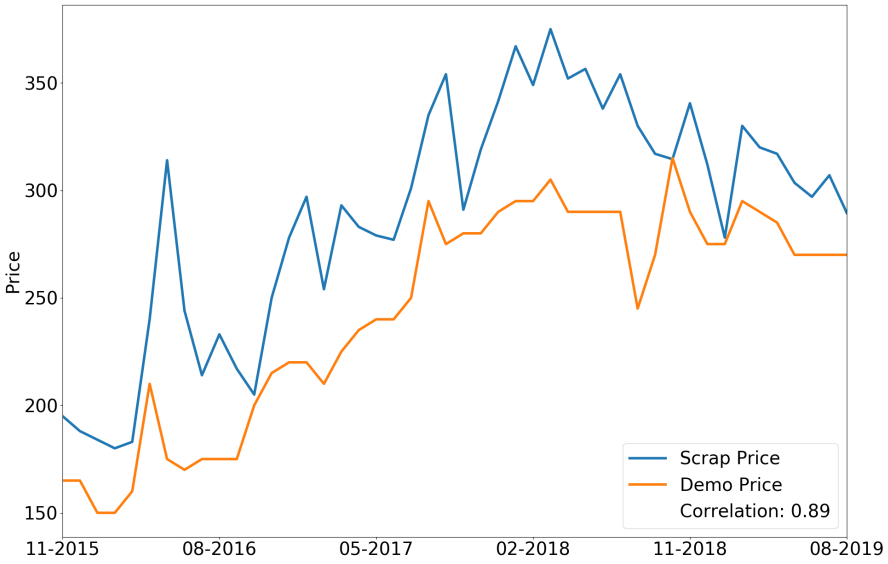

FIGURE 4. The historic price movements of the price for scrap steel vs the historic evolution of the demolition prices per ton.

is on the date of the sales deal its price should be very close to the spot price of \$280 on that date.[3] The company therefore gains approximately

$$\$380 - \$280 = \$100$$

per ton of steel, or \$100,000,000 in total from the short futures position. The total amount realized from both the futures position and the sales contract is therefore approximately \$380 per ton of scrap steel, or \$380 million in total.

For an alternative outcome, suppose that the price of scrap steel in 5 years proves to be \$390 per ton (green outcome in Figure 5). The company realizes \$390 per ton for the scrap steel and loses approximately

$$\$380 - \$390 = -\$10$$

per ton on the short futures position. Again, the total amount realized is approximately \$380 million. It is easy to see that in all cases the company ends up with approximately \$380 million which is the initial scrap value (exposure).

3.2. **Case Study 2: A closed Project Return.** In this case study suppose you want to buy a 20 year old vessel and use it for 5 more years until it gets scrapped. Its datasheet looks as follows: Futher, the current scrap price is \$350. You use our proposed product,

[3]See (Hull, 2003, Ch. 2) for a proof.

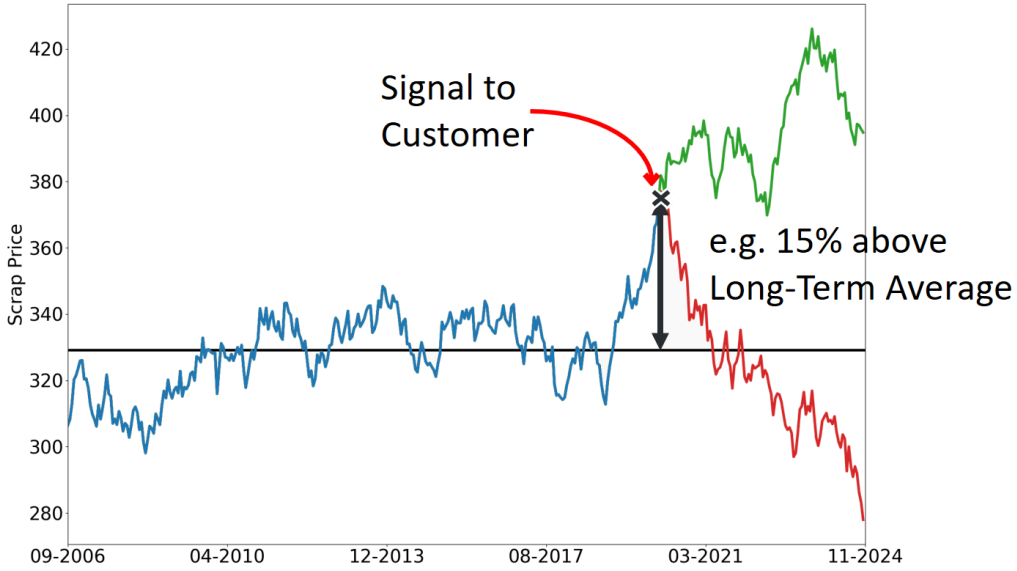

FIGURE 5. Possible price path for scrap steel. Today (2019) the customer receives a signal by our service which tells him the price for scrap steel is currently 15% above its long-term average. Hence, it makes sense to lock in the price today and secure it for the future.

Commisions	6.5%
Operating costs/day	$4.700
Interest rate	7.12 %
DWT	10,100
Charter Rate	$14,000
Operating days p.a.	358
Growth Charter Rate	2% p.a
Growth Operating Costs	3% p.a
Price	$12,000,000

so in 5 years it is certain to realise a scrap price of $350 per ton. Hence, we can calculate the Long Term Asset Value (LTAV) of the vessel according to Table 1:[4]

From that we deduct for a price of $12,000,000 the projects leads a return on investment of roughly $\frac{14,971,941.32}{12,000,000} - 1 = 24.7\%$, which can be locked in immediately with our product.

REFERENCES

Hull, J. C. (2003). *Options futures and other derivatives*. Pearson Education India.

[4]See: `http://www.long-term-asset-value.de`

TABLE 1. Caluclation of the LTAV

t	Operating Days	Gross Charter Rate/day	net Charter Rate/day	Charter gains p.a. (C)	Operating Costs/day	Operating Costs p.a. (B)	$\frac{(C-B)}{(1+i)^t}$
1	358	14,000.00	13,090	4,686,220.00	4,700.00	1,715,500.00	2,773,263.63
2	358	14,280.00	13,351.80	4,779,944.40	4,841.00	1,766,965.00	2,625,760.04
3	358	14,565.60	13,618.84	4,875,543.29	4,986.23	1,819,973.95	2,485,881.67
4	358	14,856.91	13,891,21	4,973,054.15	5,135.82	1,874,573.17	2,353,241.94
5	358	15,154.05	14,169.04	5,072,515.24	5,289.89	1,930,810.36	2,227,473.60
				ScrapValue		3,350,000	2,506,320.45
						$\Sigma =$	14,971,941.32