Understanding Hedging
and its Life Applications

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Abstract

Understanding how hedging works is vital for anyone or any business to protect their investments. The task of learning it is not made easier by the fact that there is a whole multitude of ways in which you can hedge your funds. Our goal in this research project is to simplify the concepts, give real-world examples, and relate it back to business analytics topics we have learned in this class. In order to explain the concept of hedging we relate it to sports betting and then discuss the importance of risk management. The case study goes over how airlines use the practice of "fuel hedging." Finally, we go over the disadvantages and challenges that could follow when implementing hedging.

The Concept of Hedging

We plan to discuss and analyze hedging in certain commodity markets; we must first describe and explain it in terms our peers would be more familiar with. We will use the concept of hedging within sports betting as an analogous representation to hedging in other industries because sports betting wagers are "financial instruments that exhibit similar characteristics to traditional financial securities" (Lamb & O'Brien, 2017). Another benefit of using sports betting comparison is that "sports bettors can [engage] in risk management [strategies], [were] hedging [is] applied, just like traditional financial securities" as well (Lamb & O'Brien, 2017).

But what is hedging? Furthermore, why is it an important concept to understand outside of the sports gambling industry? Hedging is a risk management strategy that aims to lessen the threat of potential losses due to market instability; that does not mean that you cannot prevent the event that would cause the losses. However, you can reduce the risk associated with it. Within the gambling context, this works by placing another wager with an outcome that is the direct

opposite of whatever the original wager outcome is. For example, one could wager that a specific team would win against their rival opponent in a game but let us say that we receive new information that the probability of that first team losing the game has increased. In order to hedge, one would place a hedging bet on the rival team to counter the risk of losses on the other bet. This hedging behavior is one of the reasons why we chose sports betting because both sports wagers and financial instruments may "value that changes as new information is [obtained]" (Lamb & O'Brien, 2017).

When people choose to hedge, they are insuring against the impact of adverse events on their finances. This does not prevent all negative events from occurring. However, if adverse events occur and are properly compensated, their impact is mitigated. Hedging investment risk means the strategic use of financial instruments or market strategies to offset the risk of adverse price movements. Hedging requires continuous trades in securities with negative correlations.

Ultimately, the decision to hedge or not and which hedging strategy to use depends on the individual person or company. Some are more willing than others to accept higher levels of risk to pursue higher potential returns. In contrast, others prefer to take a more conservative approach and prioritize the protection of their assets. We are trying to answer the fundamental question: Are companies making the most of their risk-return trade-off? Do companies want to invest more capital and reduce risk, or would they instead prefer to remain unhedged and bear the higher risk?

How Business Analytics Comes into Play

When one is looking at how business analytics applies to the concept of hedging there are many implications. We can employ analytics to come up with the most efficient hedging procedures and optimize our strategies as per the economic situation. Hedging can become a very useful tool, especially in the aspect of business analytics. For instance, hedging strategies provide value to companies that are focused on managing the amount of risk and improving the market value of firms. Therefore, hedging can be used as a means of reducing the cost of certain resources that a company utilizes to solidify the amount of profit with the least risk. This concept of minimizing risks involves the analysis of data through various tools and regression providing managers with useful information to make decisions on minimizing losses/risks. Not only does hedging help to decrease the costs of certain resources for a company but this as a result leads to a decrease in taxes. The analysis of data through hedging will also help managers improve underinvestment problems and improve investment opportunities for companies by analyzing data that minimizes risks. Therefore, if a manager or company is looking to improve their overall production and efficiency hedging may become a useful tool that can help to minimize the risks of a loss. Overall, hedging is a very useful means of providing managers with invaluable information to minimize the risk of more consistent profits and fewer chances of a loss.

Why is Hedging Important?

Energy enterprises are greatly at risk due to fluctuations in the price market of various products and commodities. Hedging all or a proportion of a producer's; oil or gas, cotton, coffee, currency even interest rates based on the needs of corporations could save them against price

risk, regardless of technique, can lessen the amount by which the producer's profitability devalues in a commodity market.

Hedging is used by several companies to avoid underinvestment problems and financial challenges at the corporate level. Underinvestment problems occur when firms don't make investments in projects with little risk. Instead, they decide to take on dangerous ventures to boost earnings for the benefit of the investors. Loan creditors are not compensated for the greater risk they have accepted when this occurs. As well put by Ashwath Damodaran “Management should do what they’re good at running their company rather than speculate on commodity price and act like traders”.

Commodity Hedging

Hedging tactics are used by organizations to decrease their exposure to different hazards.

It is done all the time when it comes to pricing commodities. The commodity that is primarily hedged more is coffee. With the concept in mind, we will apply it to hedging within commodities markets. Commodity hedging is the same conceptual risk management strategy as described earlier. However, it involves financial contracts to protect against potential losses from movement within the price of the underlying physical commodity. This strategy can be accomplished using various financial tools, i.e., futures contracts, options, or others. The end goal is still to reduce the impact of price volatility on the profitability of a business that uses the commodity. For example, a coffee-producing company may enter into a future contract to sell a certain amount of coffee at a fixed price in the future to protect against the possibility of a decline in coffee prices. Thus, ensuring that the company can sell its coffee at a predictable price, even if the price of coffee falls, reducing its financial exposure.

Case Study of Hedging in Airline Industry

The cost of fuel for airline planes has a huge influence on the amount of money they may generate. Fuel accounts for anywhere between 20% and 40% of total expenditures, depending on the airline's location and business plan, making it one of the biggest overheads for every airline. Airlines have been feeling the squeeze as fuel prices have increased dramatically in recent months; at least momentarily, it is difficult to pass on this large increase via higher ticket pricing.

However, not all airlines have been as adversely affected by rising fuel prices as others. This is due to the practice of "fuel hedging," in which some airlines purchase a fixed amount of jet fuel at a predetermined price in anticipation of future delivery. Because the airline can plan its fuel budget for the upcoming season months in advance, its fuel spending is more predictable. Which helps them keep their earnings a little more stable and margins somewhat constant.

For instance, in 2022 According to a Bloomberg report from August, airlines with fuel hedging plans stand to save billions of dollars. Southwest Airlines and Air France-KLM claimed that their hedging strategies will allow them to save around $1 billion apiece. However, not all airlines cover their fuel costs; it's noteworthy that none of the US "big three" (American, Delta, and United) did prior to this most recent price increase.

For the data analysis, we used historical dataset of WTI to use as an oil price benchmark. On the other hand, we took the average industry free cash flow over the year and ran a regression on RStudio, we got the following results:[1]

[1] Kang, W., Perez de Gracia, F., & Ratti, R. A. (2021). Economic uncertainty, oil prices, hedging and U.S. stock returns of the airline industry. *The North American Journal of Economics and Finance*, *57*, 101388. https://doi.org/10.1016/j.najef.2021.101388

```
34
35  data_lm <- lm(Operating.Expenses ~ Oil_WTI, data=t1)
36  summary(data_lm)
26:1   Chunk 2
Console   Terminal   Background Jobs
R 4.2.2 · ~/
Residuals:
     Min       1Q   Median       3Q      Max
-190.644  -14.744   -3.649   13.280   61.927

Residual standard error: 23.23 on 1779 degrees of freedom
Multiple R-squared:  0.3663,	Adjusted R-squared:  0.3658
F-statistic: 354.8 on 1 and 1779 DF,  p-value: < 2.2e-16
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As a result, the industry was affected by changes in the price of oil; from the R-value, we may infer that these changes accounted for around 30% of their co-related movements. We came across a study (Kang, W. Economic uncertainty, oil prices, hedging and U.S. stock returns of the airline industry) which examined every element influencing the airline company's profits. Although significant, other elements are outside the scope of this paper because we are only interested in the commodity that is used by that industry for hedging. Nevertheless, the factors stated are the following:

Productivity Shock	Price Level Shock	Oil Price Shock	Jet Fuel Price Volatility Shock	Interest Rate Shock	Policy Uncertainty Shock	Stock Market Shock

What is interesting in this situation is that, of all the variables, oil prices have the greatest impact on their operating costs or revenue.

1.1 Benefits Instances in Airlines

Southwest Airlines and Air France-KLM were expected to save around $1 billion apiece as a result of their hedging strategies, according to a Bloomberg story from August. However, not all airlines cover their fuel costs; it's noteworthy that none of the US "big three" (American, Delta, and United) were covered until this most recent price increase.

Air France/KLM has hedged 72% of its fuel expenditures for the first three months of 2022 and 63% of its cost of fuel for the second quarter. The airline business paid $90 per barrel for the gasoline, which was a relative bargain in contrast to those times current barrel price, which was slightly around $170.

It is difficult to discern one company's product from a rival in an oligopolistic business, such as the airline industry. Players in an oligopolistic industry engage in non price competition. This is when the airline sector deviates from oligopolistic behavior. If a customer wishes to go from Miami to New York, he will have several alternatives and costs to select from. After all, most passengers consider an airplane seat to be an airline seat. Airlines created frequent flyer programs to give regular business passengers with free travel to be utilized for personal travel in order to promote brand loyalty. In addition, airlines such as American have explored different methods to promote brand loyalty. Extending leg space in their coach section, installing DVD players, and installing computer power outlets at passenger seats are just a few instances of efforts to gain loyal consumers. Because "most airline passengers seek cheap prices above all other carrier selection variables," and "the carrier with the lowest cost has a tremendous competitive advantage," brand loyalty only goes so far.

As a result, hedging benefits both the firm and the consumers. Businesses may acquire more fliers, and passengers can receive cheaper airline tickets.

Challenges of Hedging

No matter what, hedging will always come with a cost. Even businesses with a well rounded idea of risk management may ultimately face some issues with hedging. The most fundamental complication with hedging is that it is difficult for most people to understand. It takes years upon years of knowledge and experience to be able to benefit from hedging. Another disadvantage is that because you are spending more money in order to protect yourself, your profit will decrease. This occurs in any given situation when you hedge your funds. It does not matter whether you made the right call in trying to protect your investments. But this becomes a twofold blow if you made the wrong decision in hedging a commodity. For example, if you were to hedge a barrel of oil for $80 and the price goes down to $60, then you would be paying $20 more than what the current price is. Instead of saving money through hedging, you are now spending more of your funds. Your goal when facing the challenges of hedging is to "balance the benefits of protection against the costs of hedging" (Giddy, 2013).

Conclusion

Protecting your investments and making profit is every business's goal. Hedging is a strategy that can be utilized in order to make that goal become reality. Every corporation, day-trader, etc. must be willing to run the risk of investing their money and weigh out the extremes of all outcomes. While the market will always be unpredictable, hedging can be a tool that can save you from losing more of your money. We showcased the correlation between sports betting and hedging your funds. Our case study discussed how some airlines hedge the fuel they purchase so that they do not end up spending more on their expenses. Hedging may be tough to fully comprehend, but it is necessary to learn in order to save yourself and your money. Therefore, no matter how one views hedging, it can still be a very invaluable tool that companies, and managers can implement to improve their businesses' performance. In conclusion, in order to use hedging strategies correctly and in a manner that provides true business value to a company learning what and how to implement hedging strategies can be a very useful

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