Do Hedge Funds hedge? Explain and assess the strategies Hedge Funds adopt in order to fulfill their objectives. Illustrate your analysis with reference to the rescue of Long Term Capital Management (1998)

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Introduction

In this term paper I will explore the principles of hedging and the taxonomy of hedge funds before determining if hedge funds formally hedge. The concept of hedge funds is sometimes thought as a misnomer as there is no consensus classification of them and I will explore common traits of what are thought to be hedge funds in this term paper. I will show that hedging is not necessarily for pure risk-avoidance and speculation has become part of traditional hedging. Section 1 will discuss hedging as a concept or trading methodology whilst section 2 will explore the taxonomy of hedge funds. Finally, section 3 will illustrate the formation and liquidation of Long Term Capital Management (LTCM) in regards to the hedging principles. It seems hedging now acts a portfolio choice with a speculative nature and that the downfall of LTCM was due to overly risky speculative betting.

Section 1 - Hedging as a concept

Hedging is the act of minimizing risk by offsetting the position of an asset in one market by using another market (Bailey 2005). Typically in the past hedging was used for commodities but now has evolved to become a major part of financial markets. The risk may be completely offset (perfect hedge) or there may be some risk not covered (risky hedge). A futures contract is a standardized contract between two parties agreeing a price of an asset today for a specified future date. For the purpose of this term paper, I will be considering the use of future contracts for hedging purposes but there are many other instruments such as options and swaps commonly used in hedging.

Perfect hedges are usually difficult to obtain for several reasons including that the use of the hedge instrument may be imperfect or the exact hedge instrument may not exist. A perfect hedge is similar to arbitrage in the sense there is no risk (theoretically) and one may not need an initial capital outlay. Bailey (2005) comments ‘ arbitrage refers to all the actions that investors take to secure gains without committing any capital and without bearing any risk’. Hedging in this sense can include arbitrage but the motive may of course be different than just risk-avoidance. However, hedging as illustrated above is not necessarily for negative purposes as Stulz (2009) notes ‘ hedge funds seek inefficiencies in the capital market… bring security prices closer to fundamental value’. Regardless, it is difficult to understand the motives of a hedge fund and its manager.

Risky hedging, the more common form of hedging seeks to minimize risk by choosing a certain amount of the hedging instrument to optimize a particular hedge ratio. Typically, a perfect hedge is difficult to obtain so in this sense, most hedges are ‘risky’. The pure hedge ratio is the level at which one can minimize the risk associated with the underlying asset but does not take into account the trade off between returns and risk. This is known as a portfolio choice. How much risk should be traded off for additional returns is dependent upon a speculative component when calculating the pure/optimal hedge ratio (this varies according to an investors risk preference). This may indicate the difficulties in risk minimization or the ‘choice’ to speculate. Hedging, augmented, now belongs to the theory of portfolio selection where one may speculate for an abnormal profit[1]. Working (1962) extends the

[1] See Bailey (2005, pg 371-378) for a formal approach to perfect and risky hedging.

definition of hedging outlined previously into more complex categories and argues that pure-risk avoidance hedging (perfect hedge) is largely‘ nonexistent in modern business practice’.

An example of a risky short hedge is as follow. A farmer plans to sell 10,000 bsh of Corn in December. To reduce uncertainty of the price in December, the farmer seeks to hedge his Corn to guarantee a price in December by using futures contracts. Hence, he will sell some amount of futures contracts that if the price of corn falls by December he can recoup his loss in the futures market. Therefore, the farmer has hedged the corn but this relies on the fact that there is some correlation between the spot and futures contracts prices.

The use of stock index futures is also another common method to hedge a portfolio of shares against the market. In this case the amount of hedge instrument purchased relies on a model of stock returns such as the CAPM or APT. These methods may use beta as a way of determining the optimal usage of the hedge instrument. However, in the above example, the hedge is inherently risky as models of stock prices only produce estimates rather than actual figures and with any hedge, the exact instrument may be hard to obtain.

Section 2 – Taxonomy of Hedge funds

The concept of hedge funds and hedging are two concepts, which although are related, are not necessarily inclusive. It would make sense that a hedge fund performs traditional ‘hedging’ but this isn’t necessarily the case. Defining a hedge fund is

difficult with many authors have given various definitions[2]. According to Coggan (2011) 'No country had adopted a formal legal definition of the term'. Nonetheless, there exist some common traits on what might define a hedge fund. They are usually private pools of capital, they are generally illiquid, they are lightly regulated, they have flexible investment strategies that may include alternative investment classes, they can borrow or use leverage and they operate on a fee basis with their managers earning a typically asymmetric commission based on performance. Unlike mutual funds though, hedge funds are usually more flexible in their investment strategies and their usage of hedging strategies[3]. The objectives of a hedge fund could vary from minimizing risk or to maximizing returns by using a mean-variance perspective for example[4] but differ manager-to-manager, strategy-to-strategy.

Section 2.1 Hedge fund regulations

The legal environment of a hedge fund is also important as Hedge funds usually provide a higher rate of return then their regulated counterparts, mutual funds. There is a strict charter of who can invest in a hedge fund. Typically it is institutional investors or high net wealth individuals as they are expected to be able to endure the risky nature of potential strategies. Unlike mutual funds which deal with the general

[2] Stulz (2007), Ang, A., Gorovyy,S.,&Van Inwegen,G.B. (2011), Fung and Hsieh (1999a)

[3] Stulz (2007) give examples of the performance of mutual funds against hedge funds against stock indexes and show that mutual funds follow close to stock indexes but after fees they return less whilst hedge funds return just as good as an index but with less volatility. Also see Fung and Hsieh (1997), (1999a)

[4] Fung and Hsieh (1999b) provide empirical use of mean-variance analysis and show that their M/V analysis results are close to what hedge funds actually do suggesting that hedge funds pertain to a M/V approach.

public, hedge funds do not therefore organizations such as the securities exchange commission (SEC) do not impose regulations on them. Fung and Hsieh (1999a) note to avoid restrictions from the SEC ‘ a hedge fund cannot have more than 35 non-accredited investors’. The Federal Reserve also imposes vey few restrictions on hedge funds due to the fact that hedge funds are not categorized as banks. The above examples of light regulation illustrate the potential for aggressive, complex and diverse strategies.

Section 2.2 Categorizing hedge funds

Coggan (2011) separates most funds into four broad groups consisting of equity, arbitrage, directional and event driven funds. Economic and pricing models are essential to predict asset prices and play an underlying role in almost all strategies. It is reasonable to assume that models such as the CAPM, APT and Black-Scholes-Merton models are some of the models used to estimate asset prices, which helps in determining the price or value of asset prices.

An *Equity or stock funds* are those that mainly deal with equities such as stocks but can include treasuries and other assets. There are several different strategies amongst equity funds, which include long/short funds for example, which initiate textbook style hedging and arbitrage strategies but also may conduct speculation as well. The long/short fund strategy follows a logical approach used at standard asset management funds. A fund manager will adjust exposure to the market by going long on undervalued stocks and short on overvalued stocks for example. Coggan (2011) notes that ‘ one obvious reason the long-short sector is home to so many funds is, like ice-cream, it comes in many flavours’. The quote suggests that the hedge fund

strategy can be further split into a number of other strategies that can target geography, industry or even beta-level for optimal equity allocation. On occasion a manager will adjust market exposure with short and long positions sometimes to achieve market neutrality. This is akin to traditional hedging and arbitrage.

Within the *arbitrage category*, fixed-income arbitrage is popular. This strategy looks at secure treasury bonds as well as conventional corporate bonds. The aim here is to profit, however small, in interest differentials. Looking back at the term structure of interest rates, a manager may be trying to second-guess the shape of the yield curve. A manager will try and profit from the misalignment of different term bonds calculated using price determination models, as they would expect a readjustment, allowing a proportionately small profit. For this reason, funds, which concentrate on fixed income arbitrage, are usually highly leveraged. The estimating of the narrowing of yields is known as convergence arbitrage. As highlighted, speculation plays a key role in predicting any arbitrage position. A model can be used which would suggest a 'normal' differential and any movements from this suggest an arbitrage opportunity. Statistical arbitrage is another variation in this category and relies on highly quantitative methods to earn high turnover on slight statistical discrepancies.

Directional funds are those that benefit from judging macroeconomic situations. Specifically, global macro funds are usually some of the largest with the likes of George Soros known as ' the man that broke the Bank of England ' after a speculative attack on the pound sterling from his hedge fund, Soros fund management. In this event, Soros could be argued to be a risky individual, maximizing potential returns from the speculative component of the hedge ratio. Fung and Hsieh (1999a) refer to

macro funds as ‘catch all’ funds as they usually trade with any kind of asset or instrument on a global scale. These funds are involved in all types of hedging tactics but benefit from calculated speculation. From the offset, it appears that funds such as these require intuition from the managers rather than a more formal, methodological strategy.

Finally, *Event driven funds* are similar to some macro directional funds. They rely on business or economic event such as company mergers, distressed debt and sometimes play an active role in business; an activist funds. The activist funds play an aggressive role in business where a fund manager may see an opportunity in industry, obtain a stake then cause some sort of action such as a break-up of a firm, takeover or merger. Event driven funds are driven by speculation but in a different sense then estimating a stock price change. They frequently look deeper into the social or management structure of firms to anticipate a merger for example in to the hopes of an arbitrage opportunity.

It should also be noted that many hedge funds have a variety of strategies whilst otherwise tend to focus on one particular strategy. Indeed, there are hedge funds, which invest in other hedge funds to create a diversified portfolio or strategy. Performances of hedge funds vary depending on strategy and Eichengreen et all (1998) using data from 1994-1997 show that the mean return can vary from 29.6% for sector specific funds to a low of 7.1% for short-selling only funds. Volatility also varies from 16.3% in the global macro funds down to 2.1% for market neutral funds.

Section 3 - LTCM beginning and aftermath

LTCM was a hedge fund management firm active between1994-1998. It was known for having 2 Nobel laureates on its board, Myron Scholes and Robert Merton, known for the Black-Scholes-Merton model as well as other high profile individuals. John Meriwether, the founder of LTCM, sought more open, unregulated trading and thus moved into the hedge fund industry after a spell at bond trading at Salomon brothers, collected a total of $1.3 billion in funds for the start-up of the fund. In the 4 years leading up to 1998 LTCM had returns of 19.9%, 42.8%, 40.8% and 17.1% respectively. The key strategy at LTCM was fixed income arbitrage using a market neutral position, where LTCM speculated on the arbitrage opportunity in the pricing of corporate and government bonds whilst remaining highly leveraged. Due to the changes of the basis point gap, LTCM could profit from both parts of the trade, a profitable risk-avoidance hedge it would seem.

LTCM started diversifying their asset pool in early 1997 into several different areas. These assets usually possessed more risk and were much more illiquid. Following, the 1997 Asian financial crisis, using their price determination models, LTCM managers believed that the spread between short and long term bonds was excessively large and it would return to a smaller gap. The 1997 crisis lingered on and Russia unexpectedly devalued the ruble. Considerable amounts of LTCM's assets were illiquid and Russia didn't fulfill their derivative contracts (legally), which caused a widening of spreads of many different types of bonds as investors pursued quality over illiquidity and risk. LTCM's equity fell substantially from around $4 billion to just over $600 million.

LTCM advised the Federal Reserve of New York for financial aid and was slowly broken down until 2000 when it was completely liquidated. During the 1997 the speculative component of LTCM's hedging strategy had become increasingly large. Edwards (1999) notes that one of the reasons that the Federal Reserve and other major banks supported an aid package was because the highly leveraged nature of LTCM and its overly speculative hedging strategy carried systemic risk and further repercussions on overall market liquidity. Nonetheless, during this period, LTCM was one of the most successful hedge funds on Wall Street.

3.1 LTCMs strategy shortcomings

LTCM started diversifying their portfolio in 1997 by purchasing less liquid and riskier assets such as Danish mortgage securities and emerging market bonds. Possibly due to the expectation of high returns, it would seem that LTCM increased the speculative component of their optimal hedge ratio on their strategies. Around the same time, LTCM thought that the bond differentials would narrow which didn't materialize. An over-reliance on models of determining the prices of the bonds may have led LTCM managers to make inaccurate decisions. Although, a model is necessary for calculating whether a price is undervalued or overvalued, it is an imperfect device, which can only yield estimates. Take for example the Black-Scholes-Merton model. Some of the key assumptions are constant volatility and that asset prices follow a geometric Brownian motion. Empirical studies show that asset prices have thicker tails then a geometric Brownian motion and implied volatility can produce 'smiles' and 'smirks' rather than a flat line when estimated, causing biases in estimations. An over reliance on such models may have contributed to the losses experienced by LTCM.

It could be argued that if LTCM had formally hedged its bets then there would have been less risk associated with their hedges. But LTCM benefited from a typical hedge position and profited on both legs of a hedge. LTCM had also diversified their portfolio indicating careful risk management. Fung and Hsieh (1997) mention that within the fixed-income arbitrage, a portfolios exposure to a credit spread should be controlled as even after diversifying a portfolio ' strategies may have limited effect in mitigating the tail-exposure to credit risk'. The fixed-income strategy at LTCM may have been vital in their eventual downfall as it has credit risk both in its leveraged nature and the type of asset (bonds) it is based on. A strategy such as this most likely relies on economic, risk and price models substantially. The principles of the strategy meant that losses could accumulate fast on both legs of a trade just as you can profit form both legs.

The issue then turns to risk management. Was the risk strategy used at LTCM accurate? Jorion (2000) highlights weaknesses in the risk management system at LTCM, which may have contributed to the excessive risk taking. The author states that risk was undervalued and mismanaged according to their models. He also shows that the VaR model, adopted at LTCM, for predicting risk probability was also poorly calibrated, not taking into account liquidity for example. Jorion (2000) mentions that the VAR model utilized at LTCM relied on short-term history and risk concentration, which may have caused biases in measuring actual risk. This means that the arbitrage strategy adopted by LTCM resulted in gains but it relied on 'bets' of extreme events

not happening. LTCM speculated that an extreme event wouldn't occur rather than accepting it as a possibility in their model. [5]

The key issues with LTCMs strategy were the excessive speculative nature of there hedging strategy. Coupled with high leverage, an unpredictable event [6] caused massive negative returns. The strategy of the LTCM moved far away from hedging and into excessively risky speculative gambling.

Conclusion

My analysis of hedging principles and hedge fund strategies has led me to the conclusion that hedging in its risk-avoidance nature is largely non-existent in hedge funds. If we extend the definition of hedging to account for arbitrage and speculation in particular, then hedge funds do hedge. One cannot separate the motives of hedging, arbitrage and speculation, which causes difficulty into what a fund may actually be intending. For a hedge fund to consistently 'beat' the market it is without a doubt that they must speculate to some degree. The case of LTCM objectified the speculative component of risky hedging in which a fund necessarily speculates. Hedging in this sense can be no different from a speculative gamble, which sometimes may be rewarded with profits and other times with losses. There seemed to be several hedging and risk management principles implemented by LTCM so perhaps the downfall of LTCM was purely due to a chance event. But I do not think this is the

[5] Mackenzie (2003) notes that whilst some arbitrageurs left the market, LTCM remained which may suggest differing risk models adopted across firms in the industry. Perhaps the risk management by LTCM was responsible for their high returns but ultimate failure as well.

[6] A 6 standard deviation event according to Fund and Hsieh (1999a)

case. There strategy of fixed-income arbitrage required careful risk management and the failure of managing a strategy that required high leverage and relied on speculation led to their ultimate downfall.

Bibliography

Ang, A., Gorovyy, S., & Van Inwegen, G. B. (2011). Hedge fund leverage. *Journal of Financial Economics*, *102*(1), 102-126.

Coggan, P. Guide to Hedge Funds, Profile Books, 2008.

Edwards, F. R. (1999). Hedge funds and the collapse of long-term capital management. *The Journal of economic perspectives*, 189-210.

Eichengreen, B., D. Mathieson, B. Chadha, A. Jansen, L. Kodres, and S. Sharma. 1998. Hedge Fund and Financial Market Dynamics , Washington, DC: International Monetary Fund (Occasional Paper No.166).

Fung, W., & Hsieh, D. A. (1997). Empirical characteristics of dynamic trading strategies: The case of hedge funds. *Review of financial studies*, *10*(2), 275-302.

Fung, W., & Hsieh, D. A. (1999a). A primer on hedge funds. *Journal of empirical finance*, *6*(3), 309-331.

Fung, W., & Hsieh, D. A. (1999b). Is mean-variance analysis applicable to hedge funds?. *Economics Letters*, *62*(1), 53-58.

Jorion, P. (2000). Risk management lessons from Long Term Capital Management. *European financial management*, *6*(3), 277-300.

MacKenzie, D. (2003). Long-Term Capital Management and the sociology of arbitrage. *Economy and Society, 32*(3), 349-380.

Stulz, R. M. (2007) “Hedge Funds: Past Present and Future” Journal of Economic Perspectives, vol. 21(2), pp. 175–194.