



INSTITUTO
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**LOOKING FOR HONOUR AND GLORY: HOW HEDGE
FUNDS TRY TO PREDICT AND PROFIT FROM
FINANCIAL CRASHES**

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MASTER IN BUSINESS ADMINISTRATION

Supervisor:

Prof. Rui Manuel Meireles dos Anjos Alpalhão, ISCTE Business
School, Department of Finance.

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“Per Aspera Ad Astra.”
Latin saying

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Abstract

Financial crashes tend to be the bogeyman of adults. They show-up unannounced, can be scary, and not often, leave people worse than they were before. Nevertheless, not everyone loses when a crash happens. In fact, during the last two crashes some hedge funds were having their best returns ever. It's by acknowledging this and wanting to know how they did it, that's this work starts. Hence our main research question: how hedge funds attempt to predict and profit from financial crashes?

In short, the methodology relied heavily on an exhaustive literature review and findings juggling both quantitative data (read newspaper articles, SEC reports, 13k filings, books, etc) and qualitative data (measure returns and AUM performance).

By doing so, we came to the conclusion that there isn't any secret recipe to make money while everyone is losing. In fact, there are several, ranging from:

- a) Antifragile funds: take asymmetric risks that a crash will happen every year.
- b) Spot-on funds: those who through their research skills happen to predict the crash and adapt accordingly.
- c) Silver platter funds: those who through external reasons happen to come across intel about a potential crash, do their research, and adapt accordingly.

History shows us that crashes have been cyclical and there's a likelihood they will keep happening. Other studies have shown that missing the worst days of the stock market is better than just guessing the best days. As so, we hope that by showing how these hedge funds did it, to pass along some helpful ideas to academia, investors and everyone who loves finance.

Keywords: Hedge funds – Financial Crashes – Financial Markets – Investing

JEL classification: G110; E320

Resumo

Os crashes financeiros tendem a ser o bicho-papão do mundo dos adultos. Aparecem sem aviso prévio, podem ser assustadores, e não frequentemente, deixam as pessoas pior do que eram antes. No entanto, nem todos perdem quando um crash acontece. De facto, durante os dois últimos crashes, alguns *hedge funds* reportaram os seus melhores retornos de sempre. É assumindo isso, e querendo saber como o fizeram, que este trabalho começa. Daí a nossa principal questão de investigação: como é que os *hedge fund* tentam prever e lucrar com as crises financeiras?

Em suma, a metodologia baseou-se fortemente numa análise exaustiva da revisão de literatura e dos resultados, alternando entre dados quantitativos (ler artigos, relatórios da SEC e os 13k, livros, etc.) e dados qualitativos (medir os retornos e o desempenho dos AUM).

Ao fazê-lo, chegámos à conclusão de que não existe nenhuma receita secreta para fazer dinheiro enquanto todos perdem. Na verdade, existem várias, desde:

- a) Fundos anti frágeis: assumem riscos assimétricos de que um crash vai acontecer todos os anos.
- b) Fundos certos: aqueles que, através das suas capacidades de investigação, conseguem prever o crash e adaptam-se em conformidade.
- c) Fundos *silver platter*: aqueles que, por razões externas, se deparam com informações sobre um potencial crash, fazem a sua investigação, e adaptam-se em conformidade.

A história mostra-nos que as crises financeiras têm sido cíclicas e há uma probabilidade que continuem a acontecer. Outros estudos têm demonstrado que falhar os piores dias do mercado bolsista é melhor do que apenas presenciar os melhores dias. Como tal, esperamos que ao mostrar como estes *hedge funds* lucraram, que o mundo académico, os investidores e todos os que gostam de finanças, possam tirar algumas ideias úteis.

Palavras-chave: Hedge Funds – Crises Financeiras – Mercados Financeiros – Investir

Classificação JEL: G110; E320

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Glossary

ERM – Exchange Rate Mechanism

S&P 500 – Standard and Poor 500, the stock market index that tracks the performance of 500 companies.

BSPP - Black Swan Protection Protocol

CAGR - Compound Annual Growth Rate

PSCM - Pershing Square Capital Management

CUM – Capital Under Management

AUM - Assets Under Management

SEC - Securities & Exchange Commission

FED – The U.S central bank, also known as Federal Reserve

CDS - Credit Default Swap

SPE – Special Purpose Entity

CDO – Collateralized Debt Obligation

MBS – Mortgage-backed-security

LEAPS- Long-Term Equity Anticipation Securities

PBS – Black Scholes Model

ISDA – International Swaps and Derivatives Association

Introduction

“A June 2014 report from The Pensions Institute at Cass Business School, London, comes to the conclusion that the vast majority of active fund management is simply a waste of money.”

The harsh conclusion of a study available at sensibleinvesting.com (Blake et al., 2014)

This master thesis opens up with a fundamental question, backed up by its first quote, is investing a loser's game? Have we all been defrauded by the examples of hedge fund superstars who produce staggering returns while the majority of them do not even beat the S&P 500? Perhaps, but even if that's the case, this master thesis aims to prove something deeper. Not only it is possible to win at the loser's game, but we can also do it under the direst circumstances that markets face: Crashes

Therefore, this work's purpose is set in motion by the fact that some hedge funds do profit from financial crashes, not of, a subtle, but yet fundamental difference. Why? When there are profits “from,” there is an element of prediction attached to it. They have not profited by accident, or because they carried out their typical investments, as someone would expect, and associate that to good management or luck. On the contrary, throughout history and its crisis, a minority of hedge funds were actually ready for the hit. 2020 was no different. When the United States government declared a national lockdown and everyone started to panic, financial markets were not safe from despair. As a result, stocks worldwide were falling, companies started to fire some of their employees, businesses went bankrupt, essentially everything was going to shambles, but not some funds, some of them were profiting and showing their best returns ever.

Given this context, our main premise and research question shows his relevance when considering how devastating crises can be. Not only do many countries take years to recover (Bogle, 2008) but they also happen a lot more frequently than most people would like to think (Mirowski, 1990). That being said, this study is not a mere question of wanting to profit while everyone is losing. It's not even an ethical dissertation on whether

these hedge funds are right or wrong. It's about being able to survive and thrive while everyone expects you to fail.

Defined our premise, context and relevance, in order to have a concrete study and a solid conclusion by the end of this thesis, we must dive deeper into the idiosyncrasies of some financial crashes. Consequently, when considering case-studies, our focus will be directed into the period of 2007-2008 (subprime crisis) and the Corona crash (2020). Nevertheless, thanks to our sub-set of questions and objectives some general lessons can be taken into the future.

That being said, by now our question is already well explained. After all, how are hedge funds attempting to predict and profit from financial crashes? Interesting enough, there is a myriad of articles and subsequent studies regarding crisis and financial modeling focused on predictions. Still, there is almost nothing regarding conditions ex-post, meaning, those who master these two dynamics, how do they do it? It would be naïve to address this question as it is, many hedge funds do not disclose their methods or strategies. Therefore, we had to establish a sub-group of questions and objectives that serve the purpose of guiding us through this work, they are:

1. Are mathematical models effectively able to predict crashes?

Objective: Understand if it is possible to predict a crash through mathematic models. And if so, how exactly.

2. Through what financial instruments are hedge funds able to profit from financial crashes?

Objective: Going beyond the theory and dive into the practicality of the main premise. This means, trying too to understand precisely how do hedge funds profit from financial crashes. At this stage, we are already going past the questions of prediction.

3. What sort of strategies regarding investing can one use to protect himself from financial crashes?

Objective: Besides being able to predict (or not) any sort of financial crash, with this goal in mind, we go a step further than the previous one. At this stage, we try to understand how do hedge funds prepare themselves to deal with crashes. It sounds

similar to understand how do they profit, but one thing is to win, another one is to be ready to win.

4. When looking at the stock market, how fast do stocks recover? An insight on robustness and fragility.

Objective: With this goal in mind, we try to understand if a crash's aftermath plays any role in these hedge funds' performance. Do not forget that returns are measured (most of the time) yearly. Perhaps the crash only tells us half of the story that we need to know.

5. Can we expect crashes to go on forever?

Objective: By the end of this thesis, one might be inclined to think, well, if crashes are cyclical, is this bounded to happen again? The answer will come in the end, as our goal is to understand if those hedge funds are the protagonists of an endless loop condemned to repeat itself.

To navigate through these questions and subsequent objectives is not an easy task. The answers will not show themselves immediately, new doubts might emerge, debatable conclusions will definitely not please every reader, but alas, for some, that is exactly the reason why this thesis is worth being written. Therefore, by the end of this introduction, here is what one will encounter.

Chapter 2 starts the literature review, most often presented to serve as an overview regarding the main ideas, what has been said about the topic at hand, and its surrounding questions. Nonetheless, introducing ideas without continuity and a logical flow adds little to no value. Therefore, in this section we intended to do things slightly different, how? By establishing a theme narrative between the authors and concepts.

To understand the end, we must realize where the beginning is. As a result, the first sub-chapter, named “The beginning: who are the players?” provides the reader with an overview of who exactly we are writing on. What are the basics of a hedge fund? What kind of hedge funds do exist? How do they operate? What sort of asymmetries are associated and what are their respective implications? All of this will be addressed.

In the second sub-chapter of the literature review, named “The beast’s roar: Anatomy of a Crash” the main goal is to understand and dissect what sort of event this work deals with. Some of the issues addressed are concerned with the different types of crashes, the different phases underlying them, how frequently do they happen and their implications into the future.

Having our protagonists and the event well explained, we are now finally ready to address our research question. Bearing that in mind, the third sub-chapter of the literature review is called “The quants domination over crashes”. Why is that? First of all, it is crucial to define the term “quant”. It usually refers to a person who works in finance and masters the art of quantitative methods. He/she most likely will end up having a well-paid job to do things that barely anyone understands. That’s their magic, Wall Street and the most prominent banks all depend on financial models created by these individuals, who like every analyst, occupy most of their time forecasting stock movements, returns, valuations, virtually anything that could generate a hedge over the competition. Our answer might be here, and perhaps these are the people forecasting financial crashes. To get to a conclusion, in this section we will analyze their work at “taming” the beast that roars, meaning, how reliable some of these models truly are.

It is not too difficult to understand, even for those who are not quants, that the job of those individuals relies (basically) on two principles: Quality of information and that markets are inefficient¹. For ages, the financial theory around models has not considered a few things outside their realm of possibilities. Uncertainty has often been confused with risk, risk management with risk-taking, and absence of evidence with evidence of absence. Why does this matter? It damages the first principle, without information worthy of being analyzed, we might be deceiving ourselves. Maybe the world is more random than we think.

¹ Otherwise, crashes would not happen, who in his right mind would set himself to failure?

Nonetheless, we have not forgotten the second principle, that markets are inefficient and hence crashes happen. Of course, Professor Eugene Fama will have something to say about that.

None of this analysis will come at the cost of reproducing knowledge without reflection, and because of that, in the end there will be a brief conclusion setting the tune for what comes ahead. If it had to be named, it could be something such as “the gap unfilled.”

The questions that will most certainly arise from this thorough literature review will be dealt with a chapter ahead, not forgetting that first comes up the “Methodology” of our work. Here, it will be explained how certain data and information was acquired. In brief, how this thesis came to be what it aspires to become.

Moving ahead to our findings and discussion, they will be disclosed in a chapter called “The findings and further discussion: Winners from crashes.” It will be shown how we concluded that attempting to predict and profit from crisis is not something reserved to the ordinary hedge fund. In fact, by looking specifically at two major crashes (2008 and 2020) and four hedge funds that profited massively from these events, we found out something which he deem relevant. Funds that are able to thrive under such conditions could be classified into three categories, each one of them considering their own methods.

To conclude our study there will be a final reflection warning the limitations faced, suggestions for future research and the implications of this work. Moreover, to really end with a must-take-away, in the last sentence the reader can except a piece of advice regarding future investments.

Literature Review

Although it has been stated during our introduction what the reader should expect from now on, a fair warning is never too much. While considering the multitude of options when it comes down to organizing and structuring a literature review, the main ones being chronological, thematic, methodological and theoretical, only one made sense once contemplating this work's nature. It had to be thematic. Why?

First of all, the absence of a vast literature directly concerned with our main research hypothesis leads us to believe in two possible conclusions: either there is no interest in this topic and scholars neglected it (let's assume that is not the case for the prestige of academia) or it is simply connected to several issues. We are inclined to believe in the second scenario. There are simply too many things going on when reflecting about hedge funds profiting from crashes. Those "things" mentioned are our main topics of this section. The nature of hedge funds, crashes, the quants, randomness, all of that matters. None of this is static, something to be approached by simply looking at dates, models, techniques or be satisfied with just theory. It demands a logical flow between (seemingly) unrelated topics, and the only style that guarantees that is the thematic one.

Having defined our style and his reasons, the literature review should and must be something more than just reproducing knowledge. Bearing this in mind, by having this section divided into several different themes, we are better suited to reflect on each subject critically. This sets the mottos of our overall work, contribution and reflection.

- **The Beginning: Hedge Funds Nature and Strategies**

“In 1990 some 530 hedge funds managed about \$50billion in assets: by the end of 2009, more than 8,000 hedge funds were managing 1.6 trillion.”(Ibbotson et al., 2011)

In spite of the hedge fund industry growth since the nineties, if one would conduct a social experience and just randomly stop at any street, in any given time, and bluntly ask “Excuse me Sir/Mam, can you explain what a hedge fund is?” the answers would probably range from: explaining what a mutual fund is, a minority getting the question right and the rest would just politely refused to answer (this last group probably composed by hedge fund managers). Which begs the question, what do they exactly do? How are hedge funds structured? Who invests in them? Are they even worth it?

Let’s start with the basics; the word hedge comes from the sense of protecting something. To gain a hedge essentially means building up defenses, reduce potential risk in the face of uncertainty and be better off in the future (Taleb, 2018). Everyone does it to some extent on a daily basis, reflect on this example for a second and you will see it: Imagine that every day, on your way to work, you catch the 10 am train to arrive at 10:30 am, nonetheless, that train is usually full, and it has happened in the past not being able to get on, but that’s okay, nothing much was happening at work anyways. One day you get a phone call saying that you have a meeting at 10:30 am with a big client down in your offices, so do not be late, your boss asks you. Will you still decide to catch the 10 am train, knowing there is a chance of arriving late? Or will you wake up slightly earlier in the morning and catch the 9:30 am train? Just to make sure you arrive on time. Well, if you have decided to catch the 9:30 am train, that’s hedging. The second term that frequently appears is the word “fund”, hence the misunderstanding between hedge and mutual funds. The best way to look at this might be with an analogy, imagine funds as pools of money and managers as lifeguards, responsible for guarantying that no kid (investors) ends up drowned on their watch. This is the essence of a fund manager job, someone who raises capital from different people, is able to collect a decent amount of it, and is now responsible for investing that money in exchange of a good return (Ibbotson et al., 2011). If he does not succeed and let his investors drown, he might not be able to get another pool to watch ever again.

Nonetheless, the exact way of how different managers can invest their money sets the tune to differentiate mutual funds from hedge funds. Mutual funds by nature are constrained to only invest with money they have from their investors, buy stocks and rarely charge bonus fees (i.e dependent on performance) (Garbaravicius & Dierick, 2005). By contrast, hedge fund managers, besides buying stocks, can also hold short positions, borrow money, charge performance fees (usually 20% on top of a 1% management fee) and use derivatives (Ackermann et al., 1999). If these nuances seem dull and rather meaningless, let's look at these two examples and analyze the behavior of a hedge fund and a mutual fund:

Example A: A hedge fund named "Alea jact est" has just bought stocks of Dropbox valued at 18 dollars per share. At the same time, a mutual fund named "Ad Astra" did exactly the same thing. A couple of months later the stock price of Dropbox soars to 30 dollars per share, both funds believed the price is overvalued and have a meeting with their analysts in order to figure out their next move. What can they do?

Answer: While a mutual fund can only sell the stock and collect a decent return, the hedge fund is able to sell the stock, and because he believes it is overvalued, at the same, is allowed to short Dropbox shares and profit in two different occasions. Is it riskier? Yes, that is one of the reasons why from this example we are able to extract another important lesson, only investors who satisfy specific requirements, and are now considered "sophisticated", are able to invest in hedge funds (Ibbotson et al., 2011). By contrast, everyone is able to invest in mutual funds (Ackermann et al., 1999).

Example B: The same hedge and mutual fund, in the mist of the sub-prime crash, and totally crushed by withdrawals of money, wish to increase their returns so that they can attract more investors and hence capital. They are so desperate that they hire a financial expert for guidance, what can he tell these funds? Both have a pool of a money around 500 million and a 5% return rate.

Answer: If the mutual fund managers are smart enough, they will be careful regarding services fee from this financial expert, because in all honesty, there is not much that they can do besides one thing: hire better managers. On the other hand, the financial expert will have a worthy advice to the hedge fund managers: Use the benefit of borrowing money. Why? It can improve their returns by simply resorting to the wonders of accounting. How? If this hedge fund borrows another 500 million from JP Morgan, who charges 1 million per hundred in interest fees, it will be worth it, let's do the math.

1. The hedge fund has 500 million dollars and a 5% return, this means that without resorting to borrowing, by the end of the year they should have 525 million dollars ($500 \times (1 + 5\%) = 525$).
2. If the hedge fund now has 1000 million dollars thanks to that loan, and with a rate of return of 5%, they will now generate 1050 million dollars gross ($1000 \times (1 + 5\%) = 1050$).
3. By the end of the year, when the money has to be returned to the bank, meaning 1050 million dollars minus the 500 million borrowed, this will leave the fund with 550 million. However, they still have to pay 5 million dollars in interest rate fees (remember, it was 1 million per hundred), which means 550 million minus 5 million, leaving the hedge fund with 545 million dollars in total. This represents an end year balance of 545 million dollars, which has just increased the rate of return from 5% to 9% ($500 \times 9\% = 545$) without changing the investment strategy. More money to be managed simply meant more returns.

Bearing in mind these two examples, it should not come as a surprise the fact that hedge funds tend to outperform mutual funds (Blake et al., 2014) when it comes down to returns. While the first one might just pick some stocks and except beta to do his work, the second usually brings added value to the table, the alpha. And hence, hedge funds are much more complex than mutual funds, they carry more risk, but as more potential return as well. Nonetheless, not everything is perfect in the world of high returns and heaty commissions, in fact, studies have shown that the more capital under management the hedge fund has, the more transaction costs it occurs, hence, the lower returns can get (Ackermann et al., 1999). In fact, hedge funds with a high number (over 1 billion) of AUM have to take more

risks on average if they desire to remain profitable, on the other hand, because they seek market inefficiencies and tend to have complex strategies, investors might withdraw their money at the first sign of losses. Therefore, contrary to popular belief, greed is exactly what most hedge fund managers avoid in order to remain active. Otherwise, if they get carried away by the idea that their own money is not on the line, they forget that their reputation is. In fact, some hedge funds promote skin in the game by having managers and staff to invest in the fund, on the hand, it is not uncommon to see hedge funds reject new investors, so that they are able to pursue their strategies without tempering the returns (Stulz, 2007).

Having covered the investment approach of hedge funds, it is interesting to see how their structure is aligned with such interests. Because most of them are limited partnerships rarely exceeding one hundred investors, they are extremely unregulated and tend to have their headquarters and in safe heavens, as we can see below. (Garbaravicius & Dierick, 2005).

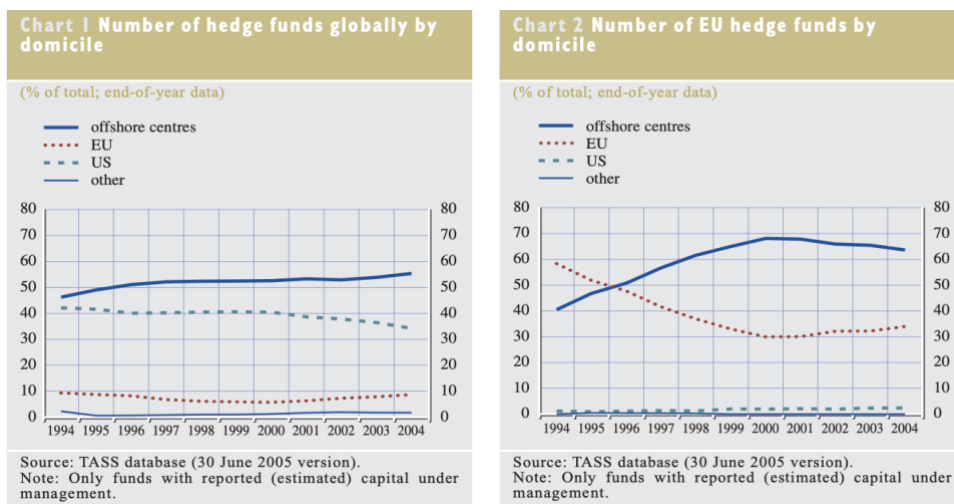


Figure 1 Hedge Fund headquarters

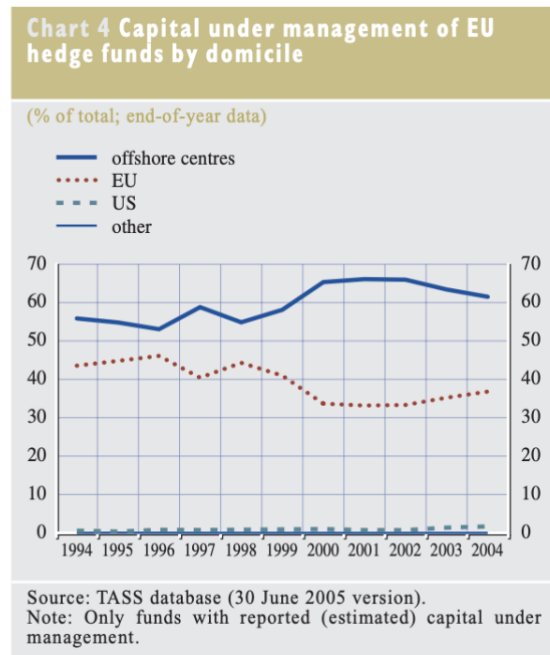
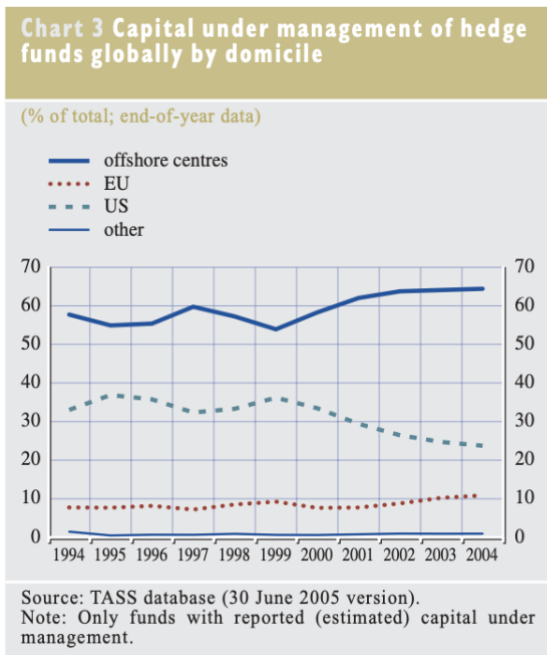


Figure 2 Hedge Fund CUM and respective location

Nevertheless, by just observing these two charts we can conclude that despite the fact that most hedge funds domicile is actually in offshore centers, the location of managers is mainly spread throughout Europe and the United States. Meaning, decisions are not being made where the money actually is (Garbaravicius & Dierick, 2005).

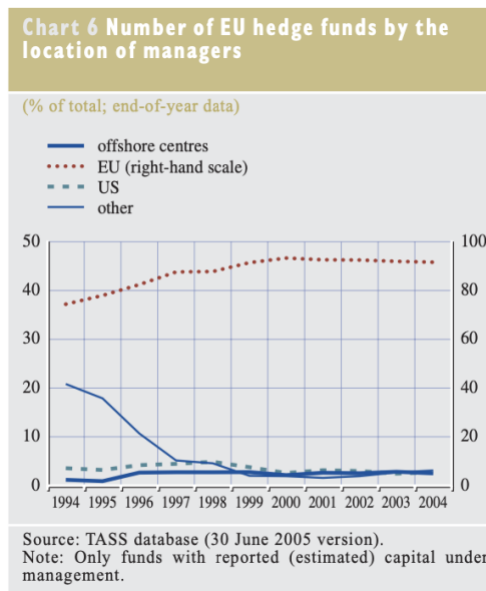
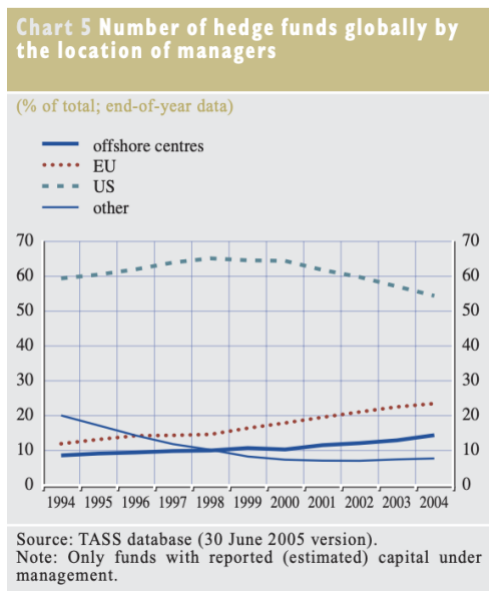


Figure 3 Location of Hedge Fund Managers

This dissonance between the location of managers and the hedge fund domiciles, although the good weather of Bermudas and the Cayman Islands is convincing (both locations are typical offshore centers) is far more strategic. In order to understand, we need to look at the hedge fund classical structure and strategies.

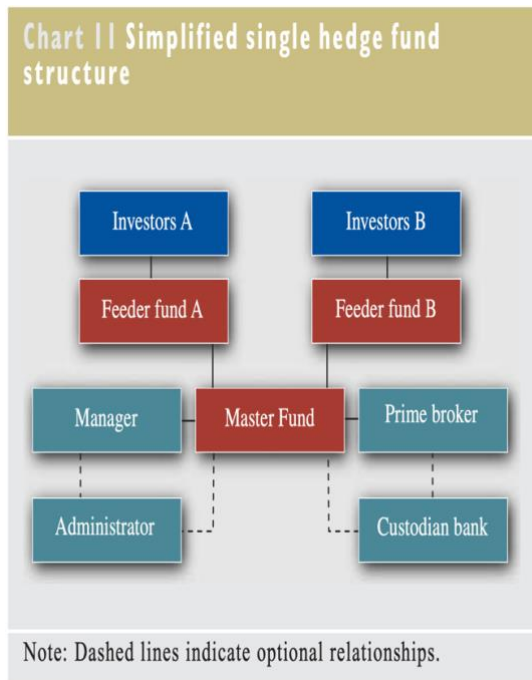


Figure 4 - Hedge Fund Structure

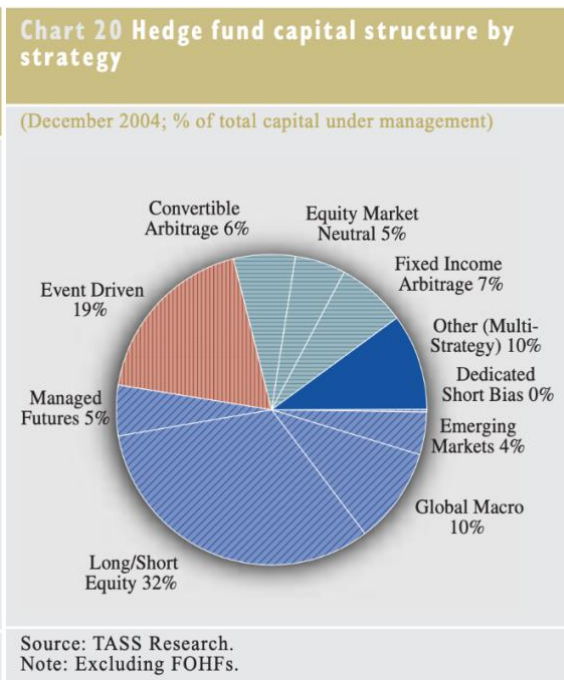


Figure 5 - Hedge Fund Strategies

What most hedge fund managers have come to realize is that structuring can be far more important than the trades actually made, due to tax and return efficiency. The underlying plan is the following: imagine that I want to startup a new hedge fund in Portugal, Feeder fund A, and I was able to convince several investors to invest in me, leading to AUM totaling one hundred million. If with that money I have a return of 15% (15 million) I'm able to avoid taxes by just having another fund in Bermudas, who just by coincidence charged 15 million in "consulting fees" to my hedge fund back in Portugal, hence, if Feeder fund A does not have profits, there are no taxes to be paid (Garbaravicius & Dierick, 2005). However, this master fund, now with 15 million dollars, because it is a fund, wishes to invest their money back, but where exactly? Back to me. Usually, the money is sent between a custodian bank (where the money is stored) and the prime broker (an investment bank).

Another common reason why hedge funds are located in offshore centers it is because of their nature. They are not companies by itself, they are partnerships. Why is this relevant? Managers often have liability within these partnerships, which allows them to convert the fund revenues into their assets. And if all of the sudden they are holding assets rather than cash, the eventual taxes to be charged in the future will be on “capital gains”, not corporate tax, usually much higher (Stulz, 2007).

Despite all of this, hedge funds at their core must deliver returns, and hence, over the year's different strategies where designed, they could be summarized in four main categories: Event Driven, Global, Global Macro and Market Neutral (Ackermann et al., 1999).

The first one is focused on the daily/weekly information that markets might provide, usually company announcements, such as mergers and acquisitions, financial reports who exceed (or not) expectations, federal investigations, anything that has the potential to be relevant and cause volatility. On the other hand, a global approach can be divided into three sub-sections: (i) International, when a fund decides to invest in stocks all over the world, (ii) emerging, when is concerned with high-growth potential markets exclusively (such as Indian ETFs for example) and finally, (iii) regional, when a hedge fund clearly dictates that it wishes to invest only in a particular area of the globe, for example a hedge fund that for any reason, wishes to invest only in Portugal and Spain. A Global Macro Fund only seeks to do macro-analysis and profit from it, either by derivatives that follow inflation rates, GDP growth or interest rates worldwide. The last strategy, market neutral, is divided into three categories as well, they are: long/short stocks, which occur when a manager is thinking in the long term, holds positions sometimes up to years and shorts at the same that he buys with the purpose of reducing risk, studies have shown this is the most profitable (on average) strategy (Ibbotson et al., 2011). The last two sub-set of strategies inside market neutral are focused on arbitrage. They are either fixed income strategies, focused on the acquisition and short of T-bond bills, or convertible, when a manager goes long on convertible securities (Ibbotson et al., 2011).

- **The Beast's Roar: Anatomy of a Crash**

"Cash combined with courage in a time of crisis is priceless."

-Warren Buffet

The implications that come with crashes do not make this subject something joyful to study at first sight. After all, the implications are out there, massive unemployment, bankruptcies, banks refrain from lending money, interest rates increase, you name it. Hell on earth economically speaking is happening when a crash comes to life (Bogle, 2008). Which begs the question, what is a crash in depth? Does it matter? What are the consequences?

Let's start from the beginning, a crash in its essence must obey at two least two characteristics: It has to carry a huge downturn in the financial markets and it needs to be consistently spread over several indices and stocks (Claessens et al., 2013). For example, if someone decides to invest one hundred thousand dollars in Apple stocks and they fall 30% on the next day, that might be a tragedy for most people, but is it a crash? Not quite, because that's was something particular to Apple. On the other hand, if the S&P500 (where Apple is included) drops 30% in a single session, due to the overall repercussion, that is a crash. One of the first authors to actually look at this in a systematic way was Professor Charles Kindleberger, who found almost like a pattern within each crash, this ultimately led to his book title. (Kindleberger, 2011)

1. **Mania:** Each crash starts with a stage of total euphoria and consistent growth at a larger scale, stocks are going up, loans are being given out, house prices are increasing, the party is booming and no one is asking questions;
2. **Panic:** Eventually, as with every party, regardless how good they are, it comes a time where the best decision to be made is to head home. In this stage of economical growth, defaults start to appear, some large chunks of stocks are being sold, houses are put for sale, something is happening, and people feel it;

3. Crash: You can interpret this as the “acknowledgement” phase. Everyone already knows that a crash is happening and mass sprees of sell off are occurring, which only causes prices to go down at a higher speed;

Charles Kindleberger was really a genius and one of the first scholars to dive into this subject and document what crashes really are. Nonetheless, things have evolved since he wrote his first book and we can now categorize crashes into two dimensions, both quantitative and qualitative (Claessens, 2013) (Bogle, 2008). So as to speak, a crash is not just a crash, it can come (and it will) in several forms, the main ones are the following:

1. Currency crisis (quantitative) which are often characterized by crashes where the main root is obviously linked with a currency. A good example to bear in mind could be the black Wednesday in 1992, when Britain was forced to leave the Exchange Rate Mechanism in order to save their economy. ERM could no longer be adjusted with the country needs, who needed to cut interest rates to fight inflation (Fox, 2018);
2. Sudden stops (quantitative) can be characterized as the decline of any capital flow without anticipation. As the name indicates, it tends to be a fast crash, usually associated to countries and macro tendencies;
3. Foreigner debt crisis (qualitative) happen when a country defaults on his obligations, the reason why this is a qualitative crisis its due to the fact that most of the time these situations can be (almost) exclusively explained with political reasons. A few examples are France during 1500-1800, who defaulted eight times, or Greece in the aftermath of the 2007-2008 crash;
4. Banking crisis (qualitative) happen when banks fail request for bailouts, otherwise they will declare bankruptcy and could damage the entire financial industry. A good example again would be the 2007-2008 crash, while Lehman Brothers closed doors, banks such as Goldman Sachs and the insurance company AIG got bailed out thanks to the American government.

Nonetheless, understanding how crashes happen and can be defined does not make things necessarily easy to understand. In fact, as we can notice from point three and four, the 2007-2008 crash could be seen as several crashes due to the overlap phenomenon. In fact, recent studies have showed (as we can see below) that when a crash happens, different type of crashes will occur within (Claessens et al., 2013). One may conclude from this point: A crash never comes alone.

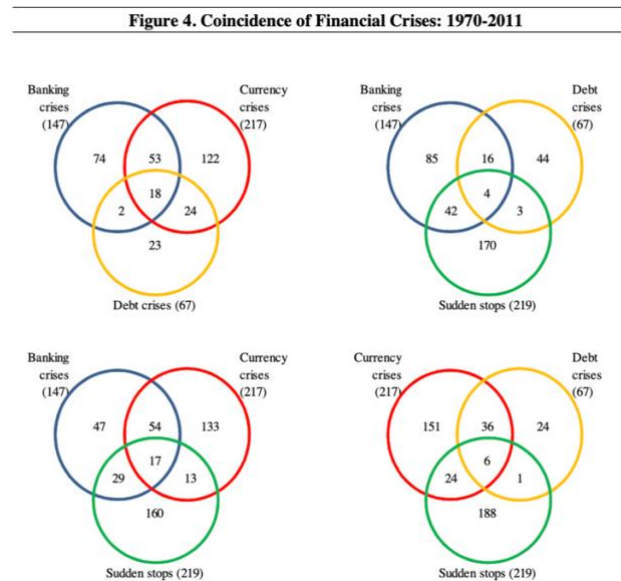


Figure 6- Crisis overlap

Nonetheless, even at this point one could argue (and with a solid point), does it make any sense to study crashes? This question could be deconstructed in two different ways: relevance and consequences. First off all, exhaustive studies on risk and portfolio management have proved two things: crashes tend to not only have bigger impacts than positive uptrends, but also the major swings in markets tend to happen in markets already declining (Faber et al., 2011). In the image below, the finds are staggering.

FIGURE 5
MISSING THE BEST AND WORST DAYS, VARIOUS DATES

Country	# of Days	# of Years	Annualized Return	Miss 1% Best Days	Miss 1% Worst Days	Miss Both
Australia	13278	52	6.79%	-1.40%	17.56%	8.56%
Canada	8761	34	7.73%	-1.55%	20.46%	10.11%
France	10477	41	6.51%	-4.20%	19.79%	7.75%
Germany	12932	51	4.06%	-7.47%	17.90%	4.86%
Hong Kong	10110	40	12.61%	-6.80%	38.06%	14.28%
Italy	9766	38	5.28%	-6.41%	20.90%	7.50%
Japan	15296	60	5.52%	-5.27%	18.97%	6.82%
New Zealand	10158	40	4.90%	-2.86%	14.63%	6.16%
Singapore	10607	42	7.83%	-3.37%	21.33%	8.74%
Spain	9056	35	6.33%	-4.99%	19.97%	7.20%
Switzerland	10451	41	4.41%	-4.70%	16.32%	6.19%
Taiwan	12207	48	9.70%	-3.90%	26.87%	11.17%
Thailand	8800	34	7.78%	-7.63%	25.93%	7.93%
United Kingdom	10583	41	7.70%	-2.79%	19.94%	8.26%
United States	21530	85	4.63%	-7.36%	18.92%	5.30%

Source: Global Financial Data

Figure 7- The Impact of Missing the 1% best/worst market days

As we can observe, regardless of borders and markets, missing the 1% of the worst days (crashes) always result in a bigger impact to a portfolio than just missing both or just the best days. Hence the idea, not only crashes are relevant, but they are even more relevant than the best days of the markets. Why? Studies focused on behavioral finance have proved something fascinating: people tend to react to losses in a deeper way than they tend to react when markets move upward (Olsen, 1998). After all, Charles Kindleberger was correct in describing the second phase of a crash with the word “panic”. People are more prone to sell than they are to buy.

Nonetheless, none of this was actually relevant if crashes only happened once in a one-hundred years. However, unfortunately to some people, the number of crisis has dramatically increased since the seventies, almost doubled in fact (Claessens, 2013). This major shift of paradigm led governments to be caught during a storm, and most of the times, their reaction is quite poor and scrutiny quite high. In fact, most countries can only do four things when facing a crash: cut spending (also known as austerity), reduce debt (by other words, forgive debt), redistribute wealth and print money (Dalio, 2018). None of this actually solves a crash per-se, all of them are just measures to ease the situation in an attempt that markets eventually find their own way. Cut spendings does not inherently restart the economy, it just stops the madness from spreading by getting consumption levels lower (Kindleberger, 2011).

Reduce debt does not help creditors, one of the main drivers of a strong economy, who are left with money to collect. Redistribution of wealth is equally inefficient in the long term, since it does not create wealth. Last but not least, printing money only boosts the economy artificially, if real consumption does not follow, most likely a recession will follow the crash (Schiff & Downes, 2009). We might even end in a loop that economists call “hyperinflation”. Nevertheless, the consequences do not stop here. Studies have proven that crashes can reduce fiscal income up to 10% less, house prices might fall over 15/20% and equity prices go down as much as 40% (Claessens et al., 2013). All of these might point to a question, if crashes happen more frequently than we think, if they are more powerful than upward movements and carry out extreme results, what can we do about it? Can we predict them? Some have tried, as we shall see in the next chapter.

- **The Quants’ Domination Over Crashes**

“A key problem in financial mathematics is the forecasting of financial crashes: If we perturb asset prices, will financial institutions fail on a massive scale?”(Orús et al., 2019)

Not many words can be more powerful for someone who works in finance as this one: return. It is often used to measure the performance of an analyst, an asset, a portfolio, and ultimately, a manager. However, in order to achieve a return worthy of hefty bonuses, one needs to be an expert in one thing: forecasting. It is the fundamental skill of any manager, and obviously, many fail at this art. The plain sight truth that many refuse to acknowledge is this one: some hedge fund managers have the same accuracy at predicting which stocks go up and down as your next-door gypsy who reads your hand and estimates your future wealth. Both of them have more in common than it seems: they are terrible at predicting and will make you poorer. Fortunately, some hedge fund managers have a different approach, they have gauche themselves in a quest to defeat a giant called Professor Eugene Fama, who stated that markets are efficient and perhaps there is no point in predicting. If that alone does not speak volumes of their bravery, they went even further and have chased the hardest ties, crashes, why is that? As we have seen, the biggest swings happen in markets already declining, and for these situations some managers have

armored themselves with two weapons: quantum computing and logarithm scenarios. Have they won? Are crashes predictable?

Let's start with understanding Eugene Fama's reasoning with regards to prediction. Known by his theory, the efficient market hypothesis, he states the following: stock prices reflect all available information, therefore, both technical and fundamental analyses are pointless. (Fama, 2013) He also argues that this happens in at least three different levels, they are:

1. Weak Form

When past information reflects 100% the true value of a stock. In this scenario technical analysis would be extremely pointless, while fundamental analysis could work.

2. Semi Strong Form

When new public information is quickly incorporated in the fluctuation of a share price. In this scenario, technical analysis could work as you might make money with the delay of new information. Imagine a company announces amazing Q1 results and the stock price will only reflect in a couple of hours, you could buy the stock before handed and make a profit later on.

3. Strong Form

When the stock prices reflect all the available information, meaning, no one has a hedge. In this scenario both technical and fundamental analysis is pointless over the long run.

The true depth of Eugene Fama statement can only be understood once we admit the following, if he is right, then the entire hedge fund industry is just a big scam and those who happen to “predict” crashes just got lucky enough for having positions against the market at some given time. Which begs the question, is it true? Did quants lose to Eugene Fama? Recent studies have focused the forecasting of crashes into two main areas, those who are trying to do so with the help of log-periodic oscillations, and those who are trying with quantum computing.

Let's start with the first ones, what exactly is the method of log-periodic? In essence, it tries to capture the critical point of a market or stock (his all-time high before a crash) by establishing several parameters of variance and past performances. Does it work? In theory and on simulated scenarios it does, which is amazing. Unfortunately, in real life, that's not the case. (Laloux et al., 1999). As proved several times, in scenarios as in real markets, where there is simply too much information to be processed and unpredictable events, the log-periodic power law doesn't seem to work. The most notorious examples happened with CFM (a fund management company) who, by using the LPPL, predicted a crash of Japanese Bonds in 1995, instead they jumped 2%. On other instance, Renaissance, one of the biggest quant funds ever (and very successful) also seems to struggle during crashes (Celarier, 2021). In other instance, the authors of the article we are quoting also predicted that the S&P 500 would fall 13% during March 1998, instead, it jumped 5%. (Laloux et al., 1999). The point is, LPPL has the chance of working ex-ante, where every data that matters can be compiled, it can also work in closed environments, i.e, simulated scenarios with tons of assumptions, nonetheless, in real life, it stands as fortune telling. Beware though, this doesn't mean we can't track red flags, fortunately, they exist, and we will set it later on.

There is still hope for quant funds, and it's called: quantum computing. The big question is: Does it work? Fortunately, it does, nonetheless, it is a highly limited technology. To illustrate my point, imagine the following: A network of just 20-30 institutions, all of them interlinked through some degree of ownership (hence the name "network") and suppose one of this companies is close to defaulting. To detect a meaningful perturbation, with the current processors, it would take more than 13.7 billion years to do so...I am not sure if there are stock options with such maturity.(Orús et al., 2019).

- **The great gap unfulfilled in traditional literature review: Hedge funds and crisis**

It seems there is a “blind spot” in academia regarding hedge funds and crises. Although these two topics have already been studied quite thoroughly, so far, one has made the link between the protagonists and the events. There is not a single article written about the 2008 sub-prime crash and the funds who registered triple digits returns during that year. There are plenty of thesis about the effects of covid on businesses (which I beg to ask: does that even make sense only after just two years since it happened?) but we haven’t found one about Universa Investments, that just made three digits return in 2020.

Nonetheless, a sharper mind could pose the objection that there is no such gap. Who knows, although these funds are profiting during crashes, that could just be a coincidence, right? Could be, nonetheless, as we are going to see during the next chapters, the financial instruments used to profit during crashes were targeting a upcoming crash, that was the investment premise. In fact, if such crash did not occur, some funds could have registered tremendous losses. Which now leads to another question, could it just be luck? After all, those funds who predicted crashes and failed, are not the reflection of this thesis, and our work could be just a big survivorship bias. Is it?

We will leave answers to those questions in the end.

So far, in essence, our aim was to explain the gap, as after approaching the end of the literature review, the urgency of the theme is clearer. Not just because this topic could be interesting (we believe so), but in fact, it is during these moments of crises that some hedge funds show their peak performance.

The Methodology

- Introduction

I was once told that the perfect recipe for a successful master thesis relies on a simple equation: a balance between your interest on a topic and the information available. Unfortunately, I didn't follow that advice.

Instead, I chose to write about something I couldn't find answers to, something that I was passionate about and would add value to my life and career. Otherwise, what good could come from this? Certainly, something resembling a random school project, a push for a good grade and a piece of work forever tucked in a shelf back at my place. As such, this methodology might not be the most orthodox/traditional one, but it worked out in the end. How?

To better understand how everything comes to life, we will explain each decision process, step by step, in small chapters, them being:

1. Research philosophy

Goal: positivism vs interpretivism and which method(s) we went for the research questions.

2. Research strategy

Goal: explain how and why the case-studies were used.

3. Research Time horizon

Goal: explain the reason for a longitudinal analysis in favor of a cross-section.

4. Research Sampling Strategy

Goal: explain why we decided to use a non-probability sampling rather than a probability sampling.

5. Research Data Collection Methods

Goal: explain which methods were used to extract the information being showed and analyzed.

- Research Philosophy

In order to cover not only the research question, but also our subsequent answers, we had to use a mix between positivism and interpretivism. Both of them being briefly defined below:

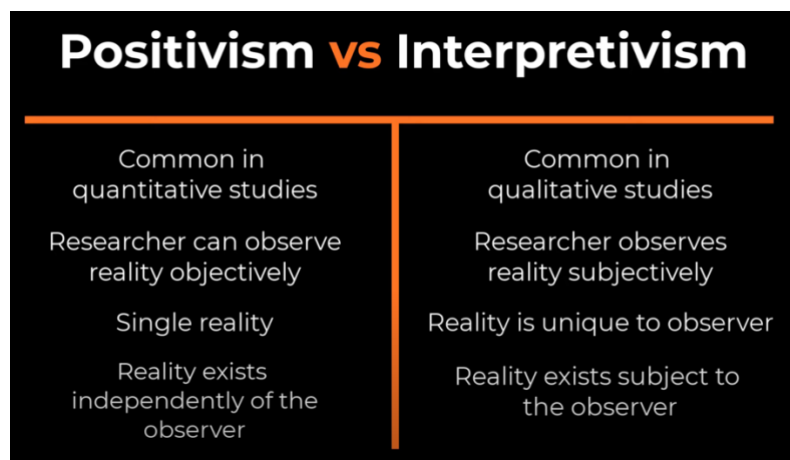


Figure 8- Positivism vs Interpretivism
Source: Grad Coach

For the question regarding if mathematical models are able to predict financial crashes, we based our work mainly on positivism. By extracting articles describing attempts to (dis)prove some of the models in question, and looking at the past performance of quant funds, some more promising than others. Like for example when Long-Term Capital Management filled for bankruptcy after the debt crises of Russia, or how Renaissance Technologies (one of the most profitable quant funds in the world) performs during crashes.

The following two questions (what financial instruments hedge funds used to profit from the last two crashes, and how they protect themselves on hindsight) was a mix of both positivism and interpretivism, let's look closely.

To understand the financial instruments that hedge funds used we had to resort to positivism and interpretivism. The first method to identify the trades that generated fascinating returns, and in some cases even replicate them on Excel, the latter method to get the right info and interpret it correctly at first.

Regarding how they protect themselves, in some cases (when the fund is highly quantitative) we used positivism, since there's a philosophy clearly outlined and unique. On others, funds who are not "crash hunters", we used more interpretivism to extract broader ideas.

Finally, regarding how fast stocks recover and if we can expect crashes to last forever, this points were addressed during the literature review (to which we used both positivism and interpretivism, like for example when defining the four type of crashes, a framework that could be highly subjective to some) and the same goes to stocks recovery, either we look solely at the literature review (where we explain what happens to your returns if you avoid crashes and the best days of the market) to the example of the 9/11.

- Research Strategy

Perhaps of the most important points of our methodology. Finance being a perfect mix of both theory and practice, so it was our strategy, that we will explain below in a two-step process.

1. The framework

Basically, the holy grail of this thesis ends in a single question: How do hedge funds try to predict and profit from financial crashes? To answer this question everything culminates in a framework developed upon years of reading books about hedge funds (alpha masters and market wizards to name a few) and crashes (honorable mention to Charles Kindleberger). There was no secret besides exhaustive research on the topic and an original idea.

Eventually, it became obvious there was neither a unique way nor a clear answer. In fact, because hedge funds are so dynamic and flexible when it comes to their strategy, that we came up with a unique framework to categorize those who profit with the crashes.

2. The case studies (proof-of-concept)

To show how the framework works and who's who, we came up with the idea of showing real-life examples of hedge funds that profited during crashes. Not just because they are interesting, but also, to put our idea to test (the proof-of-concept) and exemplify how to assign to each category the funds that will profit in the next crash.

- **Research Time Horizon**

To capture how crashes happen, their impact on markets and how hedge funds have been involving, selecting a specific point in time (read: cross sectional analysis) wouldn't be enough to get clear answers.

As a result, the focus for the literature review was broadly based on a longitudinal analysis. We went all the way back to the first crashes, studied how frequently they happen, and if they can be categorized. For hedge funds it was basically the same, in order to understand the industry, it was necessary to go all the way back to 80/90s and see how AUM have been growing, where are they located, as well as the number of hedge funds out there.

Nevertheless, for the case-studies, the approach selected was cross sectional, mainly due to two reasons:

1. It was important to show in reality which/how hedge funds profited from crashes, so it only made sense to talk about the biggest ones
2. The older the crash, the more difficult would be to get valuable information. As a consequence, interlinked with our first point, we gave a spotlight to the 2007/2008 subprime crash and the Corona Crash (2020).

- **Research Sampling Strategy**

Similar to the constraints faced during our time horizon, the sampling strategy followed the same route. For the literature review it was important to have broader data that could capture the impact of crashes and the hedge fund industry as a whole. As such, when we look at the average return of hedge funds, or what happens if you miss both the best/worst days of the stock market(s), it only made sense to focus on a normal distribution, totally random and representative. Otherwise, it would have been impossible to extract broader conclusions.

Nevertheless, for the case studies it was different, we went for a non-probability sampling for the sake of practicality. Most hedge funds are obliged to disclose their returns and positions each quarter once they reach half a billion in AUM, the famous 13F filing. However, this doesn't mean they are forced to reveal either their strategies (why are they doing x instead of z) neither the financial instruments that they have used. As a result, we decided to focus on the hedge funds who:

- a) disclose information beyond returns and positions
- b) manage billions of dollars and have boosted enormous returns

Otherwise, we could have the framework, but without the proof-of-concept side. One might argue though, that this way of researching might lead to a “framework bias”, a bit like the survivorship bias or the question of the egg and the chicken, who came first? The framework or the case-studies? Both did, they are twins, branches from the same tree. Finance being a highly practical field, if we had developed a framework without hedge funds to assign and categorize, wouldn't that be useless? On the other hand, if there weren't any hedge funds profiting from crashes, we wouldn't even have a framework in the first place.

Furthermore, we believe that with this sample, there's no veil of ignorance at place, as they don't mold the framework per se, it's three categories and four case studies. Meaning, whoever profits from a crash in the future, will most likely fit under one of the three categories we have come up with.

- **Research Data Collection Methods**

Regarding the nitty-gritty of our work, by now it's clear it was a mix of quantitative and qualitative, depending on the topic at hand and how to better explain it. Nevertheless, going in detail, we will now explain step by step the two techniques used:

1. Thematic and content analysis

Used during the literature review to explain what a hedge fund is and how their typical structure looks like. In addition to this, the same ruled was applied to crashes. At this stage, we mainly extracted information from google scholar, b-on, emerald publishing and other academic journals. During the obtained results, although journals and other academic resources were used, we also had to resort to a lot of newspaper articles and books, due to the literature gap regarding this topic.

2. Descriptive statistics

Used broadly during the literature review when referring to the impact of crashes and if financial models were able to predict such crashes. Nevertheless, it was mainly used during the obtained results section, mainly to measure the hedge fund returns:

There's no secret here, the data collection method was reading more than 45 different 13F fillings of hedge funds to extract their annual returns and the dynamic of AUM over time. One more interesting thing that we did, because without it our work could be incomplete, was calculating the CAGR of these hedge funds and compare it to the performance of the S&P 500 (the common benchmark) and the differences if an investor had invested a million in a hedge fund or the S&P 500. To do so, we resorted to the website 1 stock 1, that measures annual returns, yahoo finance and newspaper articles specialized in this topic.

The findings and further discussion: Winners from Crashes

Is investing a loser's game? For ages investors have been drawing parallels between the stock market and casinos. After all, it seems that in both people tend to lose their patience and occasionally their money (I'm being nice and just sticking with that). Some even go a step further and shout "the market is rigged" or "the house always wins". Although there might be some truth to it, our aim is to prove that not everyone has to be on the losing side.

Having said this, if the question above might seem familiar, thank you for reading our work attentively, that's precisely the opening question of this thesis. We are now at that stage of bringing answers forward and contribute with new ideas, so as a guide for the next chapter, here's our road map:

1. The hedge funds under our scope will be categorized under three categories, according to two criteria's, they are:
 - a) their investment strategy
 - b) how they came to know about the upcoming crash
2. Because finance only matters when theory comes to life, we will be focused on four different hedge funds that had asymmetrical returns (between three and four digits) while markets were tanking.
3. The "playground" of these hedge funds that profited during crashes are just two, the most recent and biggest ones: The sub-prime crisis (in 2007) and the Corona Crash (in 2020).

As a brief introductory card, below are the hedge funds under our scope and their respective returns on their trades made during crashes:

Date	Fund	Invested	Profit	Return
2007	Cornwall	1M	80M	8000%
2007	Scion	550M	2690M	489%
2020	<u>Universa</u>	UN	UN	4000%
2020	PSCM	27M	2600M	9665%

Figure 9- Hedge Funds profiting from crashes returns (all values in USD and millions)

- Antifragile funds

The Case of Universa Investments (2020)

“It’s a mistake to try to be all things to all people and hedge all tails at the same time. If you try to be all things to all people, you end up being nothing to anybody”

- Mark Spitznagel, CIO and Founder of Universa Investments

Universa Investments came to life when a goat cheese farmer met a professor of finance. If this sounds like the beginning of a joke, then the punchline is worth billions. Having said this, one can not really grasp how Universa profits from crashes without first getting to know their origins.

Everything dates back to the eighties, Mark Spitznagel was only sixteen years old and already a trader of futures at the Chicago Board of Trade (Pengelly, 2011) where he learned a fundamental lesson when it came down to investments:

1. Learning how to take a small loss is learning how to avoid a big one

It was only many years later, while studying for a master at the Courant Institute of Mathematics, that he met Taleb, a professor back then, he realized he wasn’t alone. How so? Together, they have decided to create the first hedge fund designed to not only protect investors from crashes, but also to profit from them (Bennett, 2015). The fancier approach it’s called “BSPP”, Black Swan Protection Protocol, a term coined by Taleb (Gara, 2020b). In essence, a Black Swan can be applicable to all walks of life, if it fulfills three characteristics simultaneously. They are: (Taleb, 2007)

1. It’s so rare that it’s perceived as almost impossible.
2. The impact must be meaningful and dramatic.
3. People will attempt to explain it as if it was predictable.

Looking at these, we can have countless black swans' examples for almost everything that matters, and financial markets are no exception to the rule. Usually, the primary example tends to be 9/11. It wasn't possible to predict unless the reader was a Taliban, the impacts were also dramatic for all accounts, politically speaking it was the spark for the war against Afghanistan and the aviation center and legislation around it changed forever. The financial markets also felt the heat almost instantly (Gomes da Silva, 2017) and of course, fans of conspiracy theories attempted to explain it as if it was possible to predict. Just to dig a bit deeper when it comes down to finance, the impact on a few stocks and respective index can be seen bellow:

Antes e depois do 11 de setembro de 2001

Empresa	10 Set. 2001	27 Set. 2001	27 Nov. 2001
Microsoft	57,58	49,96	63,74
DELL Computers	22,57	18,04	26,48
Disney	23,58	17,55	21,07
Johnson & Johnson	55,62	54,88	60,01
General Motors	51,58	41,16	48,24
Valores em USD			
Índices			
Dow Jones	9605	8681	9872
Nasdaq	1695	1460	1935
Valores do Índice			

Dois meses após o 11 de setembro de 2001, as ações tinham já recuperado dos mínimos. O crash foi uma oportunidade!

Figure 10- Impact on the stock market before and after the 9/11

Albeit the recovery just a couple of months after on a few stocks and indexes, the impact is undeniable. One might ask then, did Universa profited from such a crash? No, they didn't exist yet. In fact, Spitznagel and Taleb only partnered for the first time in 2004, when they started "Empirica", a very successful hedge fund that ran until 2008 with double digit returns (Bennett, 2015). Unfortunately, the fund only lasted four years despite their return, as Taleb was diagnosed with a serious health issue, which prompted him to retire early.

Universa came to life during the mist of the sub-prime crises, with Spitznagel having a more critical role, while Taleb remained as a scientific advisor. As such, the fund launched their operations with more than 147 million dollars under management, while it currently stands at \$15B, according to their latest 13F filing.

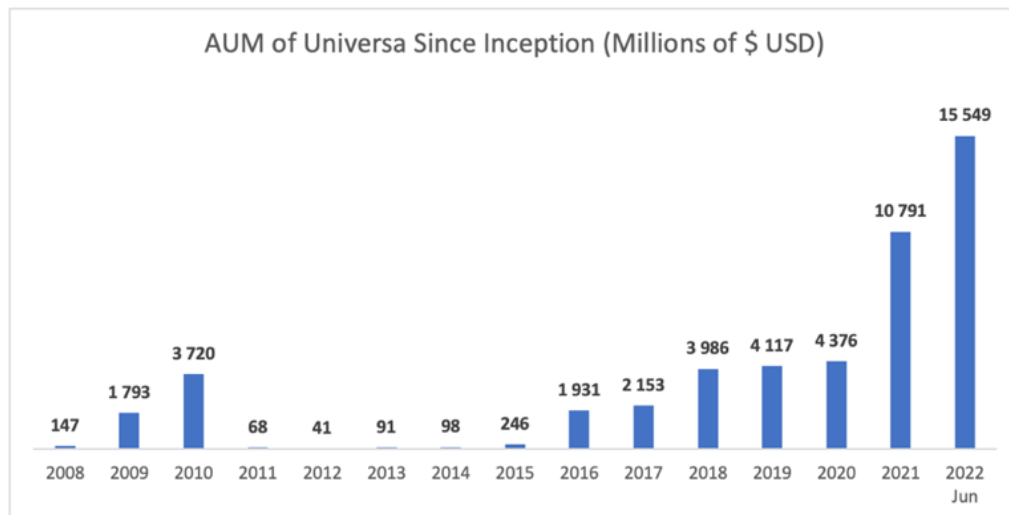


Figure 11- AUM of Universa since Inception (in millions of \$ USD) according to their 13F filing

Despite the fact Universa came to existence in 2008, their first big shot only came on August 2015, when the Dow Jones fell by almost 1,000 basis point. While the markets were panicking, Universa reportedly made a billion in a single day, while managing only c. 200 million dollars, a staggering 500% return (Chung, 2015). (Which we can later see the impact on their AUM from 2015 to 2016).

However, their biggest breakthrough to this date came during the Corona Crash. With everyone at home due to lockdowns, and the worldwide economy in a freezing state like never seen before, the major indexes and the stock market had to react. Take the SP 500 as an example, the common benchmark for hedge funds, it fell by more than 30% in a single month.



Figure 12- SP 500 Performance during the peak of covid-19

What results were expected from hedge funds during these circumstances? Regardless of which mainstream strategy they were following, the average returns during the Q1 of 2020 were minus 7,43% (Aurum, 2020). And what about Universa? For the second time since their inception, they had a crash to take advantage of, and this time, it wasn't a flash crash like the one in 2015. As such, the fund lived up to his promise and reported an impressive 4144% return during the Q1 of 2020 (La Roche, 2020). Which now begs the question, how?

Universa's investment strategy is easy to understand, people just don't use it due to our human nature, vastly interlinked with an appetite to keep winning and a considerable degree of impatience (just look at their AUM from 2010 to 2015). The financial instruments are the following:

1. Out-of-the-money put options on Indexes and very specific stocks (Farrel, 2011). Universa to make money over the long-run (since crashes don't happen every year) needs to have in place investments with asymmetric risk-reward dynamics. Meaning, if they are wrong the losses are meaningless, but if they are right, the returns are no less than 3-4 digits.

Stocks for example, don't provide such asymmetries that easily. Imagine someone in 1998, Amazon just had their IPO and they believed it was the next big thing, in fact, they believed in it so much that they still hold their stocks in 2022. If they were my friends, I would tell them to forget the -50% YTD performance and focus on the big picture, they are rich. But now imagine this person was wrong, and Amazon was among the companies that two years later was wiped out during the dot-com bubble? Exactly, we should still be their friends, but they lost all their money.

Options on the other hand are divided into two categories, a call (the right to buy) and a put (the right to sell), in the middle there's the strike (the price at which you can either buy or sell).

A quick example: Tesla stock is now trading at 147\$ and you believe the stock still has room to fall. Which means, you can buy a put option at 135\$, so if the stock goes down to 90\$, while everyone must sell at 90\$, you can sell at 135\$ and make money. Things get even more interesting when stock options have their own intrinsic value. How? They are usually attached to an expiration date, a given timeframe that gives you the right to exercise them. A put option for a stock trading 145\$ set to expire in two days, with a strike price of 130\$ is worthless (hence the term: out of the money), it should be cheap. Who on their right mind thinks a stock can decline 15\$ in two days? Well, imagine you bought them, and the CEO of that company does something stupid, the stock declines from 145\$ to 137\$ and all the sudden you are not crazy, your put options growth is. Take the example of Tesla put options pricing below, because our example is actually a real case.

Options Prices ⓘ				
Expiration Date: 23 Dec 2022				
Calls			Puts	
Last Price	% Change	Strike	Last Price	% Change
9.40	-53,74%	130.00	1.53	410,00%
5.91	-62,95%	135.00	3.05	369,23%
3.37	-70,70%	140.00	5.50	307,41%
1.73	-77,53%	145.00	8.82	230,34%
1.51	-78,73%	146.00	9.65	216,39%
1.31	-79,75%	147.00	10.20	200,00%

Show all options prices

Figure 13- Tesla Put Options value after the stock declined from 145\$ to 137\$ in a single session

Nevertheless, it's far easier to profit from a crash when you are exposed to the entire market rather than a single company for example. That's why Universa put options are more focused on indexes, the main one being the S&P 500. They consistently look for undervalued put options with minimum risk and maturity dates up to 6 months, so in case there's a crash, they implode in value. If not, because they were so cheap, their losses are meaningless in the greater picture.

2. Out-of-the-money call options on commodities (Farrel, 2011)

To make even more money and be on the other side of the risk, because a crash doesn't always carries negative returns in the market, Universa also plays with call options on the world first real assets: commodities.

Why that? Regardless of what type of crash are we talking about, one of these commodities must suffer an impact: gold (either because people are scared and went back to safe heavens), natural gas and oil (because a war between energy powerhouses started) or beef (because a shortage of food occurred), it's almost impossible to overtake this assumption due to the spillover effects of the markets. Take the example of the recent war in between Russia and Ukraine, not only the main indexes are negative on a year-to-date perspective, but natural gas futures also peaked at a 102% return, while options were valued at more than 1000%.

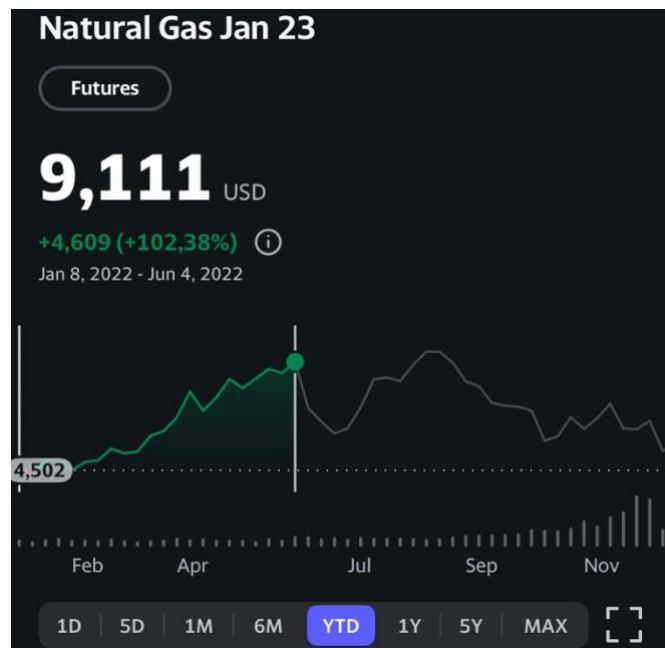


Figure 14 Natural Gas Futures 2022 year-to-date performance

3. (Bonus) A real-life example of a trade made by Universa

In 2015 Universa investment reports contained audited trades by independent third parties, with the purpose of better explaining their philosophy. As such, we believe this one speaks to their core.

In the beginning of October of 2015, the S&P 500 was roughly trading at 1200 and Spitznagel sensed that a crash could occur. Following their strategy, he decided to buy put options with a strike price of 850, set to expire in just 4 weeks. Guess their cost? Exactly, cents, more precisely 90 cents each.

Nevertheless, on October 10th, the S&P had a sudden drop and went all the way down to 900, not far from the strike price and with 3 weeks still to go. As such, the markets reacted and the put option of Universa was now worth \$60 each. Eventually, the fund cashed out at \$50 and could now dine happy with a 5455% return. (Bennett, 2015)

In the end of the day, Universa investment team is focused on two goals: a) an overwhelming amount of research to better read the economy and b) find cheap call/put options out-of-the-money. (Spitznagel, 2013)

So, to answer our second criteria: Does Universa know when the next crash is about to happen? Of course not, in fact, their reports show that on roughly 100 trades, they lose money on 95 (so don't be too impressed by the example) (Spitznagel, 2020). What's so special about them is their investment strategy, focused on hedging the tails. They are Antifragile by definition.

Antifragile funds are then our first designation. These are funds that profit from crashes because their investments are asymmetric in terms of risk. Meaning, they must be willing to lose money for years (although meaningless amounts) and then profit big during a crash due to their strategy, which is essentially the same every year.

One might now argue, due to the school of thought of John Bogle and others, what about the long-term? What's Universa CAGR? Does it beat the market? If not, I admit that this thesis and Universa investment strategy are the same: pointless.

Nonetheless, Universa returns on a CAGR metric show that in fact, while making all of your money (or the majority of it) in one go can be terribly boring, it does beat the market. Their CAGR since inception is around 76%. Nevertheless, and for a more honest analysis, if we exclude their latest 4144% return and only measure the CAGR from 2008 to 2018, then it's 12.3%, still above the S&P 500 lifetime CAGR of 10.67% and 11,8% during 2008 and 2018 (including dividends) (B. Berkowitz, 2022).

- **Spot-on funds**

The Case of Pershing Square Capital Management (2020)

“During the past ten days, we have taken steps to protect the portfolio from downward market volatility. (...) Our approach to addressing this concern has been to acquire large notional hedges, which have asymmetric payoff characteristics; that is, the risk of loss from these hedges is limited, while their potential upside is many multiples of our capital at risk”

- *Bill Ackman CEO and Founder of Pershing Square Capital Management letter to his investors. addressing the 27 million investment that would turn into a profit of 2.6 billions just 30 days after.*

Bill Ackman and Pershing Square Capital Management come from a different breed than the likes of Universa. Less philosophical and more hands-on, but bonded by the same performance during the 2020 Corona crash: They both profited from it.

Nevertheless, the way in which they did it couldn't be more different. Hence PSCM being our first example of what a spot-on fund is, a new designation that the reader will better understand at the end of this chapter.

As such, the best way is to start by introducing PSCM and the man behind it. Bill Ackman is no stranger to the hedge fund industry, as such, he opened his first fund back in 1992, called Gotham Partners, when he was only 27 years old (Gara, 2020a). With 3.2M USD raised as his initial capital, Ackman was able to detect undervalued stocks and beat the S&P 500 for more than 7 years straight, always achieving double digit returns. At the peak, Gotham had AUM over \$500M USD, until Ackman forgot he was a hedge fund manager. Because he had promised quick returns to his investors, and with a stint of short positions that weren't paying off in the short-term, most of his investors pulled out, placing him in a position with no assets to manage and a forced liquidation. (To his credit: the majority of his investments came to be right, such as the short to MBIA back in 2003. Sensing a potential bubble in the real estate market, he opened his position at \$50 USD, and the stock eventually dropped to 10\$ USD in 2007-2008, not fast enough though).

Not willing to give up, Ackman quickly came up with PSCM in 2004, and to avoid errors from the past, he outlined the following investment strategy (Gramm, 2016):

1. Focus on companies with a lot of real estate assets, like restaurants and hotel chains.
2. Never own more than 8-10 stocks at the same time
3. Target companies where the top shareholders are passive investment funds
4. Buy enough shares of those companies to get a seat on the board
5. Implement changes aimed to improve the operations of such companies
6. Wait for the stock to increase and sell at a profit

Ackman's principles actually came to yield interesting results and attract a lot of investors, as we can see.

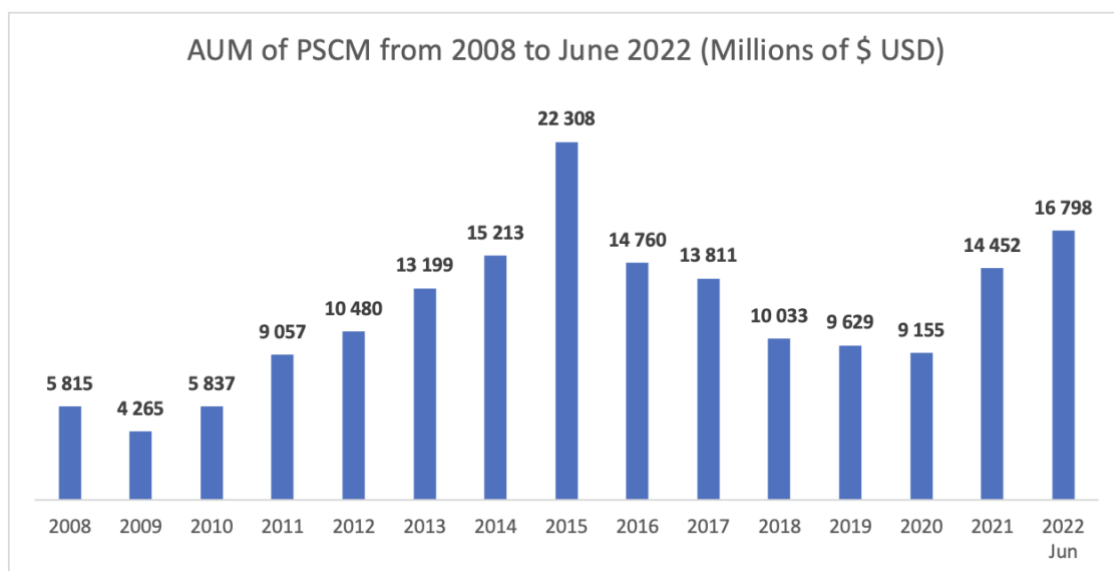


Figure 15- PSCM AUM from 2008 to June 2022

Among his best investments that mirror these six principles is Wendy's. A chicken-burgers chain in the US with more than 300 stores, Ackman bought 9.9% of the company for \$30 a share in 2005. Once in the lead, he decided to implement a series of changes, ranging from menus, an expansion strategy and even a spin-off called "Tim Hortons", which ultimately lead the company stock to reach \$50 after just a couple of years, to which he sold. In essence, you could call him an "active investor" (Gramm, 2016).

Nevertheless, a series of bad investments were also recorded since 2015 onwards, resulting in a staggering decline of more than 50% PSCM AUM. Ackman started to

witness ghosts from the past now with a refreshed face, including the failed rebuilding plan of J&C Penny (where he reportedly lost more than \$600M USD), Herbalife failed short, Valeant failed pricing plan (which reportedly costed him \$ 4B USD) and the failed reconstruction of Chipotle (Franck, 2018). His amazing returns since inception were now shaking after four years of negative performances.

Year	S&P 500 returns	1M USD Invested	PSCM returns	1M USD Invested
2004	10,9%	1 109 000	43%	1 426 000
2005	4,9%	1 163 341	40%	1 994 974
2006	15,8%	1 347 149	23%	2 443 843
2007	5,5%	1 421 242	22%	2 981 489
2008	-37,0%	895 383	-13%	2 593 895
2009	26,5%	1 132 659	41%	3 647 017
2010	15,1%	1 303 690	30%	4 730 180
2011	2,1%	1 331 068	-1%	4 678 148
2012	16,0%	1 544 039	13%	5 300 342
2013	32,4%	2 044 307	10%	5 809 175
2014	13,7%	2 324 377	40%	8 156 082
2015	1,4%	2 356 919	-21%	6 484 085
2016	11,9%	2 637 392	-14%	5 608 734
2017	21,8%	3 212 343	-4%	5 384 384
2018	-4,4%	3 071 000	-1%	5 346 694
2019	31,5%	4 038 365	58%	8 453 122
2020	18,4%	4 781 425	70%	14 370 308
2021	26,89%	6 067 150	27%	18 250 291
CAGR		10,5%		16,2%

Figure 16- PSCM returns since inception vs S&P 500 returns

Nevertheless, if we analyze Ackman returns carefully, we can see that PSCM had a major comeback in the last three years (Reinicke, 2020a), even having his best year ever during covid, with a return of 70% (Hopkins, 2021). How is this even possible for a fund that invests mainly in companies such as restaurants, hotels, and so on? Well, if it wouldn't be impressive, there wouldn't be a chapter dedicated to spot-on funds featuring PSCM.

Truth is, everything comes down to a single trade, a trade so big and remarkable that generated a return of 9665% alone (Ackman, 2020). Ackman knew he couldn't miss a comeback, fearing that existence threat was on the line for PSCM after the recent performance of the firm.

As such, earlier January Ackman stumbled upon the news that a virus was spreading in China at a pace never seen before. After asking his analysts to study the subject a bit deeper to verify if they should take Covid seriously, by February Ackman was convinced

it was only a matter of time until it would hit Europe and the USA. Knowing that the first reaction from governments would have to be the same one as in China, meaning lockdowns, and the implications to the economy, it was time to adjust.

As a result, Ackman considered liquidating his entire portfolio at first (Reinicke, 2020b), but fearing that such radical strategy would have tremendous implications with his investors, he decided to buy credit default swaps on investment grades of corporate bonds. Why? Because the corporate bonds yields were at their lowest value ever. Meaning, they have never been perceived as safer as they were now.



Figure 17- ICE BofA Single-A US Corporate Index Effective Yield from 2018 to 2022

On March 2020 the Corporate Index Effective Yield was trading between 1.90% and 1.95%, a historical all-time-low that provided Ackman with a great opportunity, how so? The lower the yield value is, the less risk is perceived.

Either way, let us explain what a CDS actually is to make some sense of Ackman idea. Credit default swaps are actually very easy to understand: In essence they work as an insurance against an eventual default on debt that might go south (hence the name). The belief that a business was given money that he can't repay back. CDS, just like any insurance, have attached to them a premium and an expiration date. (René M. Stulz, 2010)

An easy example (analogy): Imagine a friend of yours come to you one day and says: "Jack has been through some rough times lately and he's strapping for cash. You know how it goes after a divorce, a guy always gets penniless. Anyways, I had to help the dude and decided to lend him \$5K, it's fine". Knowing Jack as you do, and because you know he's going through his third divorce, you know the dude he's never going to repay your friend, so you tell him: "I bet Jack will never going to repay you, wanna bet? I will give

you 100\$ each month (the premium) for every month that Jack doesn't default, but when/if he does, I wanna have 5k in return". You just placed a Credit Default Swap on your friend's loan to Jack.

Nevertheless, Credit Default Swaps also have an intrinsic value attached to their likelihood. Imagine now you bought your CDS against Jack for \$500 USD and overtime it's getting more and more likely we will default on your friend's loan. Well, you are not the only opportunistic on the street, a friend of yours, knowing what you did, one day turns to you, and says: "Do you wanna cash out now on your CDS against Jack? I will buy it for \$ 2000 USD". I will leave up to the reader to decide.

In real life, CDS also vary in value, regardless to what you are betting against. On the other hand, they also present a great advantage opposite to short selling: you know how much you can lose (something extremely important to Ackman) since you will never have to go beyond the premiums you are paying/ or will pay. (René M. Stulz, 2010)

Going back to the real trade:

Ackman ended buying CDS worth more than 1.6 billion dollars in premiums alone, that could increase in value dramatically if companies would start to default on their corporate bonds. Nevertheless, because it was a 5-year contract, the 1.6 billion is spread along time. In fact, Ackman only had to pay 324 million dollars a year, 27 million dollars a month. Meaning, if Ackman was wrong and covid would hit only in 2021 rather than in 2020, he would have paid more than 324 million dollars in premiums. (3,5% of his AUM at that time) to whoever provided him with the CDS option. Nonetheless, since the CDS he bought were at 0,5% premium, he was actually buying protection against 64.8 billion dollars! ($324/0,5\%=6480$). (Haroon, 2022)

To put things in perspective, it is estimated that at the time the corporate bond market had more than 6 trillion dollars in investment grade bonds. Meaning, Ackman was buying protection against 1% of the entire market. (Haroon, 2022)

Once Covid got to the US in early March and everyone was panicking, people started to deem these corporate bonds riskier than before (Celarier, 2022). All of the sudden, with lockdowns on sight, investors were questioning if businesses would produce enough cash

flow to repay the bonds, which triggered a mass sell-off and a shift towards US treasury bills, an asset perceived as safer. Considering the dynamic of risk/reward that we see in finance, if these corporate bonds are now seen riskier, their yields have to increase, which they did. In addition to this, considering that risk is now higher and default more likely, CDS also increase in value.

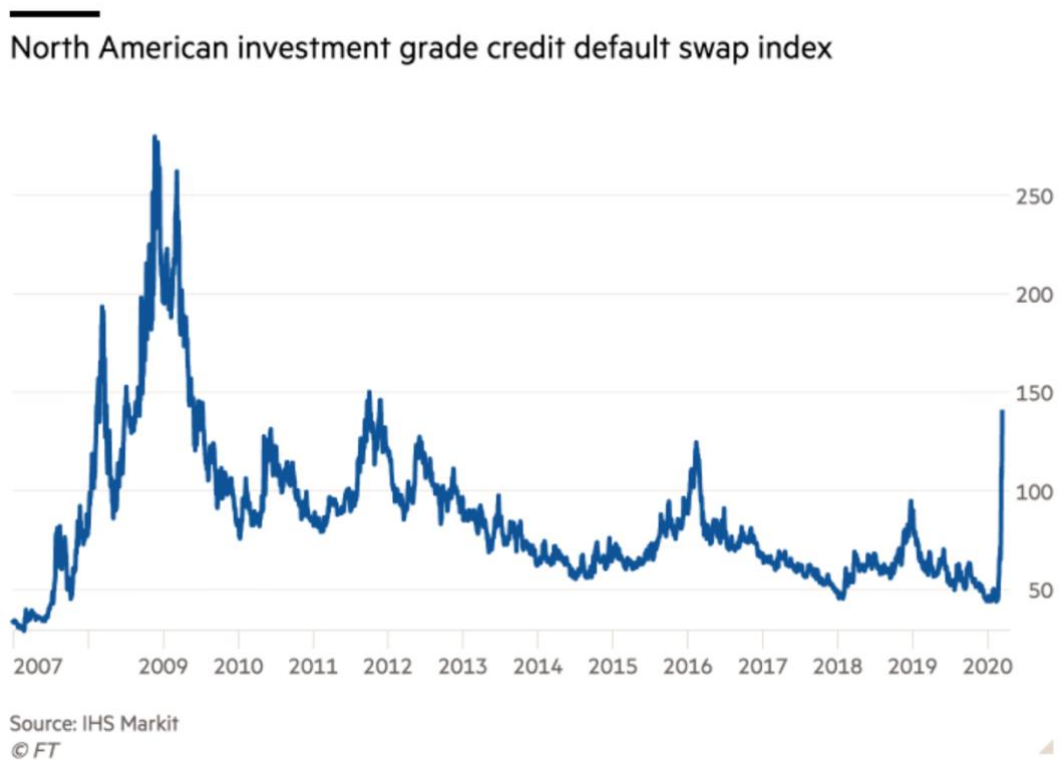


Figure 18- North American investment grade credit default swap index from 2007 to 2020

For PSCM it was great news (albeit a crash is always a crash), the CDS spreads jumped from 50 basis point to almost 150, tripling in value almost overnight.

In the end Ackman was right. He had the foresight to not underestimate Covid (unlike governments did) and protected his investors accordingly, closing his position at 2.7 billion dollars after just paying 27 million, the premium corresponding to February (Ackman, 2020). What else can we say, besides the fact he was spot on?

The Case of Scion Capital (2007)

“National bubbles in real estate simply do not happen”

- Alan Greenspan, FED Chairman from 1987 to 2006

Not often have governments and banks lied, missed judgement risk or judgements were bluntly incompetent. What we are about to see is the mix of all that multiplied by ten, a total lack of self-accountability that led to one of the biggest and avoidable crashes ever: The sub-prime crisis in 2007.

Nevertheless, some hedge fund managers had the foresight to not only see it, but profit from it. Michael Burry, founder and CEO of Scion Capital is one of those cases, with a return of 166% in 2007 (Huber, 2015), one of his trades was a short position on the real estate market that yielded 489%. How did he do it? I’m not going to hold the reader hostage, in a nutshell Michael Burry shorted mortgage-backed securities (Lewis, 2011). Confused? If so, let’s start from the beginning.

If the American dream included any assets, they would be mainly three: A house, a fancy lcd, and a car. The banks knew this from the start and provided people with enough liquidity (read: debt) to acquire these goods. When it comes down to acquiring a house the typical financial instrument is called: mortgage. (Vinokurova, 2018)

It’s not too hard to understand how the typical mortgage looks like, but it’s better to explain it, as it will change dramatically over the discourse of this chapter: The typical mortgage looks like this:

1. Say you want to buy a house that costs \$ 700K USD and need to loan money to go forward with the purchase. The banks are willing to give you a loan to acquire such a house (called mortgage) under three basic principles:
 - 1.1. Your loan has a maturity date, say for example 30 years;
 - 1.2. During those 30 years you have to repay the \$ 700K loaned to you (this amount is called “principal”);

- 1.3. Aside from the principal, people are expected to pay “interest” during those 30 years, which is basically a service (lending money) fee that comes with the loan. The difference between the sum of the principal and the interest’s payment, minus the principal, tends to be the profit of a bank on a given mortgage.
2. If it ever goes south and you default on your loan, the banks usually take the house as a collateral.

This process repeats itself countless times in America, as most people do not buy a house 100% financed with their own equity. What then happens in reality is that, in some cases, these mortgage bonds are then sold by commercial banks to investment banks (Diamond, 2016), due to:

1. Instant profit (they don’t have to wait 30 years)
2. No more risk (the uncertainty if someone will continue to repay his loan vanishes overnight).

When this happens, the commercial banks profit immediately and the investment banks do something quite interesting, which is:

1. They bundle all the mortgage bonds together in what is called a “Special Purpose Entity”. Basically, a fancy term for a special company.
2. Later on, the interest/principal that these mortgage bonds generate will be the revenues of this new company.
3. Furthermore, they “cut” this company into almost endless lots of shares that can later be sold to investors as a security. (Vinokurova, 2018)

What we just described is the essence of a mortgage-backed security. The interesting thing about these SPE is that, unlike other companies, it’s easy to understand to what we are dealing with. It’s real people with mortgages associated to their houses, so what’s the risk? Well, some people will eventually default due to lack of payments, a bit like when a company has account receivables on their balance sheet and already knows “at least 10% is not going to repay me”. When this happens, the more people default, the less returns the investors will have.

Obviously, there are degrees of risk associated with the mortgage bonds, everyone has a different income, assets, and so on. A person that generates an annually income of \$ 300K USD and has a mortgage worth \$ 1.5M USD, has a different risk profile from another person, with the exact same mortgage bond, making only \$ 100K USD annually. Because of this distinction, these SPE companies divide the mortgage bonds into several categories, and mix them all together in tranches, in what was later on called “collateralized debt obligation”(Engelmann, 2010), below being the typical example:

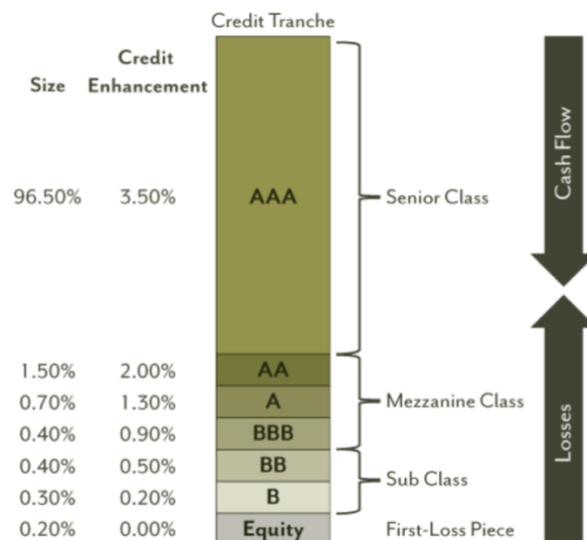


Figure 19- How a typical Collateralized Debt Obligation of mortgage-backed-securities was supposed to look like in 2007

Considering that is expected from the banks that they only lend out money to people able to repay their obligations, most tranches were filled with “Triple A” mortgages. On these mortgages, the default expectations were less than 1% (Huber, 2015), and because they were usually 90-95% of the whole tranche, investors were probably looking at the safest investment in the world.

The demand for these products also saw a tremendous spike back in 1984, in what was latter called: “Secondary Mortgage Market Enhancement”, which allowed pension funds and insurance companies to buy these types of products (Vinokurova, 2018). Not only they were deemed as super safe, since they are mortgages, but the tranches also made of thousands of mortgages at the same time, the perfect diversification.

Nevertheless, all of this paved the way for funds like Scion to profit from a crash. If we analyze this dynamic thoroughly, all of the sudden the banks lost any skin in the game. How?

Well, they had every incentive in the world to grant as many mortgages as they could. It was the perfect win-win situation, because later on, they would get rid of the risk of defaults by selling these loans to investment banks. The same banks who later on repackage the loans into mortgage-backed-securities and sell it to investors. In fact, not only was the demand for mortgages so high, that banks also started to come up with new ways to make sure they could approve their loans internally (Lewis, 2011). Things such as: teaser rates (fixed low- rate during the first 5 years on a mortgage) followed by adjustable rates are just an example. To make things better, the interest rate itself got to new lows.

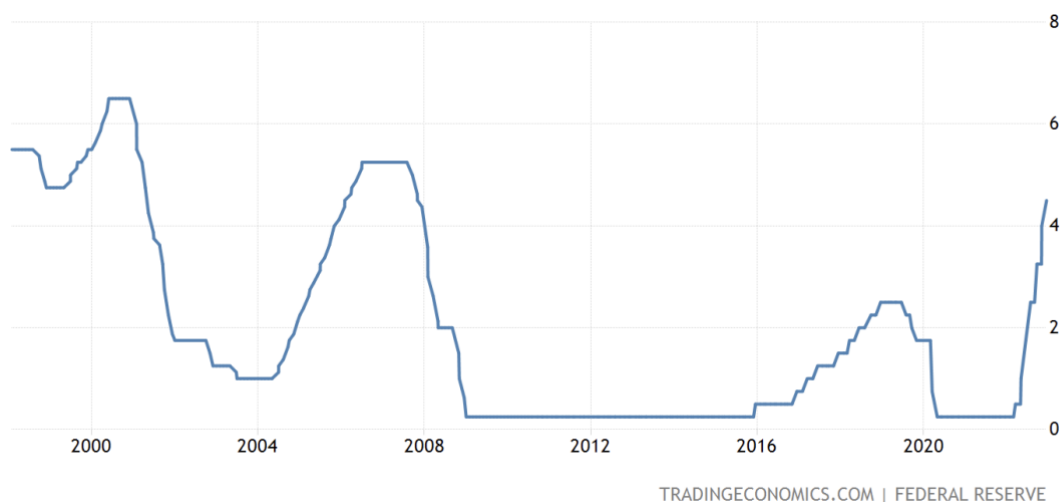


Figure 20 - US Interest Rate from 1995 to 2020

The FED, in the person of his chairman, Alan Greenspan, lowered the interest rate to all-time lows since the nineties. The interest rate went from a high of 6% in 2001, to just 1% in 2003. If we now add teaser rates + adjustable rates + low interest rates, the sum had to be equal to: borrowing money is now easier than before.

Nevertheless, Michael Burry, unlike Alan Greenspan, started to believe in the possibility of an imminent crash in the real estate market. Mainly because it was driven by an artificial demand supported by debt, that eventually had to end when people would default

on their loans. To make things worse, and as it was expected, houses were increasing in value at an unusual speed, which only lead to bigger loans, hence, the potential for bigger defaults.

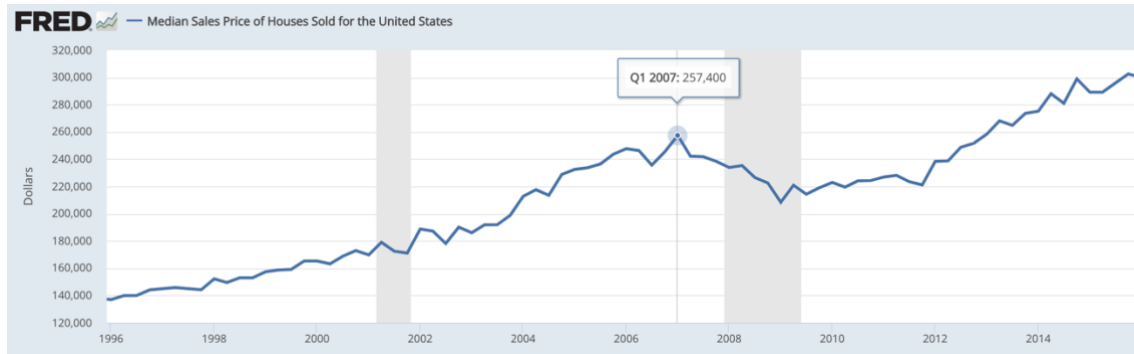


Figure 21 - Median Sales Price of Houses Sold in the USA from 1996 to 2014

The tipping point came in 2004, when he realized that because the MBS could be bought by insurance companies and pension funds, these institutions had to comply with a series of mandatory filings and regulations, be approved by the SEC and later on publish it out to the public. That's exactly what he did. He read documents no one seemed interesting in reading. By 2005, in what in turned to be many years later a leaked email from within Scion, Burry is seen asking his head of Equities to see potential MBS to short.

Once reading this mortgage bonds thoroughly, Burry realized that the market had to implode once the teaser rates ended. It was the trigger to increase the monthly payments to new highs that people would not be able to pay (Lewis, 2011). This event, Burry saw, had to lead to an inflow of new houses on the market and a sudden crash. As such, in early 2005 he predicted the crash would have to happen in 2007, and adjusted his position accordingly, by buying more than \$ 1.3B USD worth of credit default swaps (René M. Stulz, 2010) on CDO tranches ranging from B and BB.

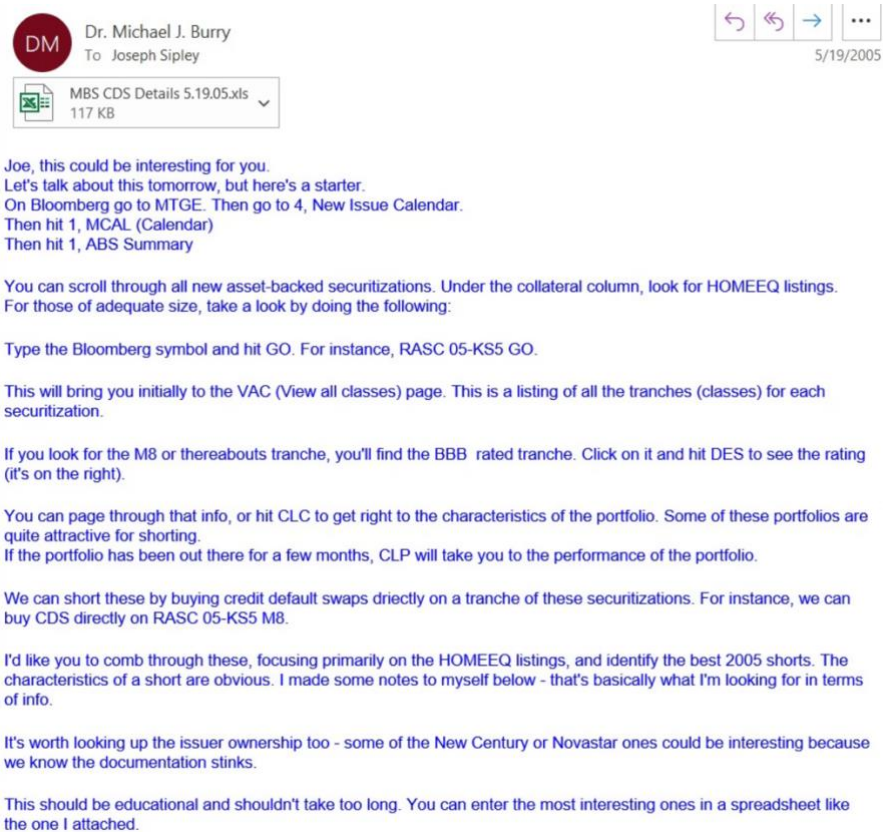


Figure 22 - Leaked email of Michael Burry telling his head of equities potential MBS to short

Later on, and despite the lack of faith from his investors tired of paying premiums (\$ 550M USD at the time), wanting to pull out in early 2007 (the crash only came in mid-August- September), Burry had to restrict withdrawals to save his position (Lewis, 2011). By doing so, he netted a profit of 2.6B and a return of 489% on that trade alone. Ultimately, saving his year and boasting an annual performance of 166% for Scion Capital.

Year	S&P 500 returns	1M USD Invested	Scion returns	1M USD Invested
2000	-7,5%	925 500	8,2%	1 082 000
2001	-11,9%	815 551	55,4%	1 681 861
2002	-22,1%	635 314	16,1%	1 952 304
2003	28,7%	817 585	50,7%	2 942 317
2004	10,9%	906 539	10,8%	3 259 205
2005	4,9%	951 050	7,8%	3 513 749
2006	15,8%	1 101 221	-18,2%	2 875 652
2007	5,5%	1 161 678	166,9%	7 675 403
CAGR		3,3%		32,3%

Figure 23 - Scion Capital returns from inception versus the S&P 500

Michael Burry eventually decided to close his fund during the first months of 2008, yet, his trade lives on as one of the best trades of all times. (Huber, 2015)

Reaching the end of this chapter, Scion Capital and PSCM, despite being a part by more than 11 years, both fit our framework of “spot on funds”. By definition, they are:

1. Hedge funds that know when the crash is going to happen. (given a fair interval)
2. The hedge fund managers know the answers to “how” and “why” the crash is going to happen.
3. Their strategy is not focused specifically on either being short, long or predicting crashes. They are highly adaptable and adjust their positions accordingly.

- Silver platter funds

The Case of Cornwall Capital (2007)

“Chance favors the prepared mind”

- Louis Pasteur, French scientist

Financial markets are the pinnacle of meritocracy. Regardless of gender, creed, color, it’s all about either being right or wrong. That’s precisely how Jamie Mai and Charlie Ledley made a killing trade in 2007 that generated them over 8000% in returns.(Lewis, 2011)

Everything goes back to just four years before the sub-prime crash. Jamie and Charlie were best friends that shared the same passion for financial markets. As a result, once both of them graduated, and after a few stints in private equity, they decided to put together their savings totaling \$ 110K and start a hedge fund from Jamie's garage. Their investment strategy was actually pretty simple, it unfolds like this: (Lewis, 2011)

1. They focused on trading stock options using a specific type of security called "Long-Term Equity Anticipation Securities" (short for LEAPS).

In essence, these LEAPS act just like stock options but with longer periods of maturity, usually up to 3-5 years.

2. The Black-Scholes option pricing model (which most banks and brokers use to price the fair value of an option) is flawed at his core (J. Berkowitz, 2005). It depends on a normal distribution when measuring the impact of volatility, type of option, underlying stock price, time, strike price, and risk-free rate.

This inaccuracies for example tend to show themselves by a great margin when companies are dealing with one-kind of events. It seemed like the markets got certainty all wrong. So, Jamie and Charlie spent their entire time redefining the Black-Scholes model and calculating what happens when someone changes the assumptions for a certain company.

3. As such, their strategy was aimed at asymmetric returns: when they lose it doesn't mean much, when they are right, their investment more than triples.

Let see an example: One of the first investment decisions of Cornwall Capital was to buy two-year LEAP call options at \$ 40 USD with \$ 3 (strike price of \$ 30 USD) on a credit card company called "Capital One Financial". Their due diligence said that the stock was mispriced, and so they went along on these contracts.

After two days the stock tanked 60% over fraud allegations and a SEC investigation. Jamie and Charlie however believed this was bogus, as their financials looked strong and accurate. Eventually they decided to buy more call options and invested big (for their standards) with \$ 26K USD. The idea was “if we are wrong, we lost over 23.6%, if we are right, it’s payday”.

Eventually the stock recovered as fraud allegations were dropped, and their LEAPS increased from the initial \$26K USD to over \$ 526K USD.

Among other investments publicly disclosed, are trades such as the one on United Pan European Cable. They bought long term call options for \$ 500K and later on sold them for \$ 5.5M USD.

Three years into their fund, the two friends were able to now have \$ 30M USD of their own money under management.

Nonetheless, the biggest trade was yet to come. Eventually, the pair of friends read on Grant’s Interest Rate Observer a trade idea about the real estate market having the potential to crash, while offering returns of 1:10. Coincidentally enough, during the same month, a friend of them, working for Deutsche Bank, told them about a colleague that sold more than \$ 200M USD on Credit Default Swaps of mortgage-backed securities to a hedge fund in California (Scion Capital). Charlie and Jamie were shocked to know this and after doing their own research, they decided to contact the Deutsche Bank person responsible for the sale, to know if they could get access to the pitch materials.

After doing so, and figuring it out that due to budget cuts, the SEC was understaffed when it came down to having people check and read all the MBS, it was time to short the real estate market. There were only two issues:

1. They didn’t had an International Swaps and Derivatives association license (basically an on-line platform only available to certain institutions where they can make high level trades. At the time the requirement was having \$ 1.5B USD of AUM)

2. They didn't had neither the money or the reputation to short B and BB tranches.

Eventually, they were able to find a solution for these issues, they were:

1. They had a retired friend that used to be trader in Singapore managing billions, which was kind enough to re-active his ISDA
2. If the banks weren't willing to take their money to short the B and BB tranches, the friends decided to take more risk and short some triple A MBC tranches.

The thing is: the tranches were usually 90-95% composed by triple A bonds, deemed as super safe, so although Cornwall was risking a lot, the potential for return was also higher. (In some MBC the return was 1:100). For the investment banks and other that believed in the ratings, this was seen as free money, a fools bet.

It wasn't. Charlie and Jamie followed the lead of Michael Burry and went even further, achieving a return of 8000%, turning \$ 1M USD into \$ 80M USD.

Their case is quite special, it didn't came through a realization neither just luck, although it happened to some extent. Reality is, sometimes following the lead is all it takes, hence the best way to describe this type of funds that profit with crashes is designated "silver platter". The criteria being a) the idea presented itself to them, they didn't came up with it, b) but did the research and c) adjusted their strategy.

Conclusion

If this thesis had to be summarized in a single idea, would be this one: hedge funds have the opportunity to develop almost any kind of investment strategies, because of this, there's no "unique way" to profit from a crash. In fact, we have come up with three categories where hedge funds could fit according to their profile. The so called "framework" we have been referring until now.

The winners from crashes: Hedge funds typical profile		
Antifragile funds	Spot-on funds	Silver platter funds
a) Time: Unware of when a crash is going to happen.	a) Time: Knows when a crash is going to happen.	a) Time: Knows when a crash is going to happen.
b) The reason: Unware of why a crash is going to happen.	b) The reason: Knows why a crash is going to happen.	b) The reason: Knows why a crash is going to happen due to external reasons (a weird trade that caught their attention, someone told them, etc).
c) Core investment strategy: Willing to lose small amounts of money for years, adjusting their strategy for risk mitigation, to be exposed to a crash and profit big when such event happens.	c) Core investment strategy: Seek value in stocks and other financial products with the goal of beating their benchmark consistently, most of time on an annual basis.	c) Core investment strategy: Seek value in stocks and other financial products with the goal of beating their benchmark consistently, most of time on an annual basis.
d) Investment strategy flexibility: extremely rigid and fixed for years, as this funds are crash focused.	d) Investment strategy flexibility: highly flexible and is adjusted by the hedge fund manager when he senses a crash will happen.	d) Investment strategy flexibility: highly flexible and is adjusted by the hedge fund manager when he realizes the information handed over is reliable.

Figure 24 - The winners from crashes framework (hedge funds)

Another relevant point from this work is the following: most hedge funds that profit during crashes are not just "surviving" the crash, they are thriving. Universa for example had a return of 4 digits, Scion was among the three digits, and PSCM performed 70%, the best year since inception. While most people are focused on the normal distribution side of life and markets, this thesis aimed for the tails, and tries to prove that not everyone has to lose during a crash.

On the other hand, hedge funds are not even the rote cause of crashes, they weren't the ones causing it (directly at least), neither amplifying them. For them, it's always just an opportunity to profit from what is perceived as inevitable or almost certain. Nevertheless, it's not so easy to everyone, as we have seen, occasionally some financial instruments (that these hedge funds used) are not 100% available to regular investors, as to buy and sell CDS above a certain value, it's necessary to comply with certain international regulations. (Remember the ISDA). Despite that, shorts and options are mostly available.

Furthermore, there were some limitations in our work. Sometimes writing about this topic made us feel like the usual retailer investor trying to beat Wall Street, the field is not plain. What do we mean by this? It is estimated that, in the entire world, only a handful of hedge funds profited during the 2007/2008 crash. Yet, if you type “Cornwall Capital options” on Google Scholar, the most read article it’s about a city in England and their energy storage options, while using a multi-decision criteria. As such, most of our research when it came down to the findings had to be, in its own way, unique. From reading dozens of newspaper articles, 13k filings compilations, SEC articles, and hedge funds letters to investors. (Which are not always public). Truth be told, the sample size to establish our proof-of-concept was also focused on a handful of hedge funds, because most of them do not make anything public. Even their websites, sometimes tend to be just a business card.

Jumping over this hurdle, for future research we would suggest future readers to wonder and reflect on this: How long does the average crash tends to last? We suggest this because during covid, although the S&P fell by more than 30%, it still bounced back high enough to end the year with positive returns above 20%. It was the first time in history this had happened. Nevertheless, the S&P contracted in 2022 and went back to -19,44%, ending the year with a negative result, as it “should” have happened in 2021. Was there a crash within a small crash? A correction? Being the first time that this has happened, would be interesting to look deeper. Also, for those who profit from crashes, or market downwards movements, 2022 was an amazing year for short sellers, just like 2021 was. (although short-lived).

Another interesting topic amid from this work, that we suggest for future research, could be this one: to look deeper into the reasons that make a hedge fund so successful. Why is that? People in academia and investment banks tend to stop at “less than (insert a ridiculous low percentage) of hedge funds beat the market, therefore, the average Joe is better off with Indexes”. What about the 1% that beats it consistently, year after year, over decades? How are they doing it? Surely it can’t be just luck, and it’s not a one-time crash/trade making the bread either.

On a final note, to whoever might end up reading this work: people tend to underestimate the frequency of crashes but it’s almost certain they will always come back to say hi. As such, be ready. We hope this work has contributed to that somehow. Thank you.

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APPENDICES

Appendix A – Bill Ackman letter to investors after the covid trade

Pershing Square Capital Management, L.P. Releases Letter to Investors

London, 25 March 2020 // - Pershing Square Capital Management, L.P. today released the following letter to investors:

Dear Pershing Square Investor,

On March 3, 2020, we disclosed that we had acquired large notional hedges which have asymmetric payoff characteristics; that is, the risk of loss from these hedges was limited, while their potential upside was many multiples of our capital at risk. We did so because of our concern about the negative effect of the coronavirus on the U.S. and global economies, and on equity and credit markets. Below, we summarize the events that have taken place since the initiation of the hedges that have led us to unwind them using the proceeds to increase our exposure to existing and new investments.

Since our purchase of the hedges, U.S. and global equity and credit markets have declined dramatically while our hedges have increased substantially in value. Furthermore, beginning last week various U.S. state governments have aggressively confronted the health and economic risks of the coronavirus through unprecedented state-led, non-essential business closures and shelter-in-place/stay-at-home implementations or “lockdowns,” (a word we don’t love, but we haven’t found a better one).

As the virus has worked its way west, the only method that has proven successful to stop the rise in infections, sickness, and death is a strong-form lockdown, first implemented in Wuhan, on Monday night in the U.K., and Tuesday in India. In the United States, California and New York went into lockdown first, and were followed by Connecticut, Delaware, Illinois, Indiana, Hawaii, Louisiana, Massachusetts, Michigan, Nevada, New Jersey, New Mexico, Ohio, Oregon, Washington, West Virginia, Wisconsin, with more likely to come soon. Others like Florida, Missouri, Pennsylvania, and Texas have initiated weaker-form lockdowns in parts of their states.

We believe it is inevitable that in order to halt the advance of the virus and preserve the ability of local, city, and state healthcare systems to deal with the volume of critical care patients, nearly all states will eventually initiate strong-form, non-essential business closures and stay-at-home regulations.

Some have argued that we should fully reopen the economy now, as the coronavirus kills mostly the old and immune-compromised, and a relatively small percentage of those infected. Beyond the ethical considerations of such an approach, it has become increasingly clear that the high percentage of younger U.S. citizens with co-morbidities – including obesity, diabetes, and hypertension, as well as those who take medications for other conditions that reduce immunity, and/or who smoke or vape – will have a substantially higher death rate than has been experienced in other countries. Furthermore, overwhelming the healthcare system will not only increase the death rate from the coronavirus, it will also magnify the loss of life from heart attacks, strokes, and automobile accidents as these trauma patients also lose access to overcrowded ICU beds and emergency rooms.

Because states cannot close their borders, a rolling program of state-led lockdowns is highly suboptimal as states in lockdown can be re-infected by visitors, and their exiting residents can infect other states when they depart in advance of the lockdown. When the Chinese government announced the lockdown of Wuhan, millions of Wuhan residents left in advance of the curfew, spreading the virus throughout

China and the rest of the world. As each U.S. state has announced its own lockdown, many of its residents have left, spreading the virus around the country.

Even though California and New York went first, they will not be able to safely reopen their states for business until approximately three to four weeks after the last state initiates its shutdown, as they would risk reinfection by residents entering from non-lockdown states. For this reason, we believe that the federal government will soon initiate a total-US shutdown with a defined reopening date about 30 days later. If the federal government does not impose such a lockdown, we believe it is likely that effectively all fifty states will do so eventually, with the additional delay costing many thousands of more lives, and much greater economic destruction.

You don't need to be a virologist, immunologist, or epidemiologist to understand why a 30-day nationwide lockdown makes sense. The coronavirus cannot live outside its host, the human body, for more than four or five days, and then, only if the virus is on plastic or metal. If we minimize human interaction for two weeks or so beyond the infection and viral shedding period of approximately two weeks, we can, therefore, vastly reduce, and eventually cap the growth in cases.

A 30-day, countrywide lockdown will have the additional benefit of helping the healthcare system and its supply chain catch up to the growing case load in order to meet the immediate needs of our hospitals and their patients. State governors like NY Governor Andrew Cuomo, with the support of the federal government, are heroically working to address this problem on behalf of our citizens. As New Yorkers, we are incredibly grateful for Governor Cuomo's leadership which will save many lives.

It is critical to have a defined lockdown period for the entire country. Most businesses can afford to, and will choose to retain their employees if they know that their business can reopen in a short, defined period of time as it is extremely time consuming, expensive and difficult to rehire high quality, trusted talent. This is even more true when the federal government provides financial support to these businesses during the lockdown. Unfortunately, the large job losses that we are seeing today are due to the indeterminate nature of the shutdowns that have been announced. It is the rare business that can afford to pay its employees for months without a date certain that they can reopen.

Upon completion of an enforced lockdown, the country can be reopened carefully as China has so far successfully done. The key to a successful reopening beyond the maintenance of social distancing, hand washing, mask use and other related practices is a broad-based testing regime and tracing program. This will enable the inevitable viral breakouts to be identified early and minimized with localized quarantines, reducing the impact on the overall U.S. economy and the need for future shutdowns. Until there is a vaccine, however, seniors and other at-risk members of the population will need to exercise a high-level of caution.

It has been extraordinarily challenging to fight the invisible enemy. We can fix this by using antibody blood tests to determine (1) who has been infected, is thereby immune and can return to work, (2) who is actively infected and needs to be quarantined, and (3) who is uninfected. Broad-based antibody-based screening will also give us an accurate estimate of what percentage of the population is actually infected allowing us to better estimate the percentage who become critically ill from the virus, who have limited if any symptoms, and a more accurate estimate of the death rate. Antibody blood screening tests have the advantage of being able to accurately and rapidly identify not only infected patients, but also those who have previously been exposed to the virus, but were not known to be

infected, either because they never developed symptoms, or had symptoms that were never correctly diagnosed.

Antibody tests can be deployed in a much more cost-effective manner to detect community spread, and with much greater accuracy and scalability than the current drive-thru, nasal swab PCR test. They require only a simple blood test and can yield results in hours rather than days and can be administered by Quest Diagnostics or Labcorp much like a traditional blood test. Imagine how differently and effectively we could have managed this crisis if we actually knew who was infected.

The Pershing Square Foundation just invested capital to help scale the manufacture of antibody testing kits produced by Covaxx, a newly formed subsidiary of United Biomedical Inc., a company with decades of experience in the development, registration, manufacture and distribution of viral testing kits and vaccines. Covaxx has already deployed over 100,000 COVID-19 antibody tests across China (Hubei, Beijing, Shanghai) and in the U.S. Covaxx is currently deploying its COVID-19 tests across San Miguel County, Colorado ([article link](#).) Covaxx believes it can scale its COVID-19 test to hundreds of millions of tests in relative short order. To learn more, please contact Mei Mei Hu at mhu@unitedbiomedical.com

The federal government and the U.S. Treasury have intervened in financial markets in an unprecedented fashion, and the Congress is on the brink of passing legislation which will help bridge the economy and our country's workforce and citizens during what we believe to be a temporary but massive economic shock. We are encouraged by the Treasury Secretary's and Administration's all-in approach to mitigating the damage to the capital markets, and for keeping financial markets functioning and open, which are critical for our economy and capitalism to work.

For all of the above reasons, we became increasingly positive on equity and credit markets last week, and began the process of unwinding our hedges and redeploying our capital in companies we love at bargain prices that are built to withstand this crisis, and which we believe will flourish long term.

On March 23rd, we completed the exit of our hedges generating proceeds of \$2.6 billion for the Pershing Square funds (\$2.1 billion for PSH), compared with premiums paid and commissions totaling \$27 million, which offset the mark-to-market losses in our equity portfolio. Our hedges were in the form of purchases of credit protection on various global investment grade and high yield credit indices. Because we were able to purchase these instruments at near-all-time tight levels of credit spreads, the risk of loss from this investment was minimal at the time of purchase.

We have redeployed substantially all of the net proceeds from our hedges by adding to our investments in Agilent, Berkshire Hathaway, Hilton, Lowe's, and Restaurant Brands. We have also purchased several new investments including reestablishing our investment in Starbucks which we sold in January. The proceeds of the hedges have enabled us to become a substantially larger shareholder of a number of our portfolio companies, and to add some new investments, all at deeply discounted prices. Even after these additional investments, we maintain a cash position of about 17% of the portfolio.

We continue to expect that markets (and our performance) will remain volatile, and therefore, new opportunities may present themselves that are superior to investments we currently own. This may lead us to sell certain of our existing holdings including investments we recently purchased. We may also choose to reestablish similar or different forms of hedges or raise more cash based on developments with the coronavirus and other market factors. In other words, we are more likely to have higher portfolio turnover in this environment.

We are in one of the most challenging periods of time for our country, and for the world. Thousands of people have or will soon become severely sick, and many will die. This is a tragedy that could have been prevented with better long-term planning, which should have begun more than a decade ago. I have always said that experience is making mistakes and learning from them. And learn from this we must.

Sincerely,

William A. Ackman

About Pershing Square Capital Management, L.P.

Pershing Square Capital Management, L.P. ("Pershing Square"), based in New York City, is a SEC-registered investment advisor to investment funds.

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Appendix B – Mark Spitznagel letter to investors after the covid crash



APRIL 7, 2020

UNIVERSA INVESTMENTS L.P.

INTERIM DECENNIAL LETTER



Dear Universa Investors,

As you know, it has been my habit to write a formal investor letter to you once every decade. Since it feels like we have experienced a decade's worth of panic and volatility in the month of March (with the S&P 500 down 26.2% at its lowest, and down 12.35% at the month's close), I decided to write you this "interim" letter—an addendum to my last Decennial Letter from about two years ago. It is a good time to reflect again on how we have performed for you as a risk mitigation strategy, if for no other reason than to give you some reassurance and even solace following one of the scariest months for markets on record. This historical perspective serves as a reminder that, going forward, there is every good reason to expect that protecting against large drawdowns with Universa should remain the superior risk mitigation strategy, saving you the needless costs and risks associated with most financial engineering and Modern Finance solutions, while providing superior "crash-bang-for-the-buck" should the crash continue.

And as a bonus, at the end I'll even share with you exactly what my trusty crystal ball is saying right now.

The straightforward performance to report on your specific account for the standalone Universa tail hedge (the BSPP) is as follows: **Based on your required invested capital at the start of the year, in March 2020 you experienced a +3,612% net return on capital; year-to-date you have experienced a +4,144% net return on**

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capital; and life-to-date on your investment, based on your total invested capital to-date, you have experienced a +239% net return on capital.

These returns likely surpass any other investment that you can think of over the period you have been invested with us. Kudos to you for such a sound “*tactical*” allocation to Universa.

Moreover, the standalone Universa tail hedge strategy’s life-to-date mean annual net return on invested capital (expressed as returns on a standardized capital investment since inception in March 2008, and using yours from your start date) has been +76% per year. (During this period, as a reminder, the SPX has gained 151%. Are we really such an “über-bearish” strategy?)

As you know from our constant stress-testing of your position, your exposure is structurally extremely nonlinear and convex to drops in equities—this is what makes us a “tail-hedge.” Notwithstanding that, we were able to monetize the bulk of the spikes in P&L that we experienced in March, as is our systematic process, while keeping your downside protection in place throughout, should the market continue lower—one of our tricks of the trade.

But, of course, Universa’s strategy (the BSPP) is a risk mitigation strategy, and this makes it so much more significant and potentially impactful than some tactical punt on last month’s crash or the next one to come. And it is more than just a random source of uncorrelated return (or “alpha”) in your portfolio. Rather, it is the strategy’s risk mitigation “portfolio effect” that really moves the needle, in a way that diversification (or “diworsification”) never can. As you know, I am a strong believer that, if a risk mitigation strategy merely slashes a portfolio’s risk at a cost of growth of capital in that portfolio—even if it raises the “mean/variance” of that portfolio—then it was simply ineffective and probably not worth doing. Afterall, what was the point? (Of course, this belief is surprisingly controversial and very much flies in the face of the central tenets of Modern Portfolio Theory.) A pensioner cannot eat “mean/variance.” The goal of risk mitigation must be to achieve the portfolio effect of raising the compound annual growth rate (CAGR), and thus the wealth in the end user’s entire portfolio, by mitigating risk in that portfolio. This has always been our focus.

As in my last Decennial Letter to you, we will show this portfolio effect by updating the performance of the hypothetical Universa “risk mitigated portfolio,” which pairs our actual net performance (monthly administrator-provided net returns, using yours from your start date, expressed as returns on a standardized capital investment) with an SPX position (a realistic proxy for the systematic risk being mitigated). The weightings between the two are 3.33% and 96.67%, respectively, as per the weightings we have always recommended for a fully “tail-hedged” Universa risk mitigated portfolio.

There is actually no other sound way to observe this portfolio effect, due to the nonlinear dynamics between our strategy, systematic exposures, and the compounding of the two within your portfolio. Covariances won't show it, nor will Sharpe ratios, nor any other metric—just portfolio CAGRs. (You may recall this as the Kelly criterion.)

Below is an updated summary (shown in what I have previously called the “risk mitigation scorecard”) of that portfolio's net performance. We also compare those results with net performances of similarly-constructed hypothetical “risk-mitigated portfolios” of seven other standard-bearers in risk mitigation (using different weightings to create a more apples-to-apples comparison by risk between these strategies, as described in my last Decennial Letter), as well as with no risk mitigation at all.

The Risk Mitigation Scorecard

Strategy	March 2020	CAGR			
		Since 2019	Since 2015	LTD (Since Mar 2008)	2008 (Mar-Dec)
Universa Tail Hedge (3.33%) + SPX (96.67%)	0.4%	16.2%	8.3%	11.5%	9.9%
CBOE Eurekahedge Tail Risk (3.33%) + SPX (96.67%)	-11.4%	5.2%	6.3%	7.7%	-29.4%
iShares 20Y+ Treasury (25%) + SPX (75%)	-6.8%	12.2%	7.3%	8.9%	-15.1%
iShares 3-7Y Treasury (25%) + SPX (75%)	-8.3%	6.9%	6.1%	7.2%	-21.1%
CBOE Eurekahedge Long Volatility (25%) + SPX (75%)	-2.3%	10.7%	6.1%	8.2%	-13.8%
Gold (25%) + SPX (75%)	-9.1%	8.4%	6.5%	7.4%	-25.4%
Hedge Fund Index (25%) + SPX (75%)	-10.3%	4.4%	5.6%	6.7%	-27.5%
CTA Index (25%) + SPX (75%)	-8.7%	5.6%	5.3%	6.6%	-21.5%
SPX (100%)	-12.4%	4.5%	6.6%	7.9%	-30.7%

A 3.33% portfolio allocation of capital to Universa's tail hedge added 12.7% to the return of an SPX portfolio in March 2020, added 11.6% to the CAGR of an SPX portfolio since 2019, added 1.7% to the CAGR since 2015, and added 3.6% to the CAGR life-to-date (since its inception in March 2008). The Universa risk mitigated portfolio has thus outperformed the SPX across *all* of these timeframes, accompanied by—or, more accurately, *because of*—far less risk (as evidenced by the March 2020 and the 2008 columns).

To put this in perspective, that value-added to the SPX portfolio CAGR life-to-date from a 3.33% allocation to the Universa tail hedge is mathematically equivalent to a 3.33% allocation to an annuity over that same period yielding 102% per year. Let that one simmer for a minute. We are not just another little incremental source of alpha within your portfolio; nor are we just some exotic alternative to a fixed income allocation.

Meanwhile, the other alternative risk mitigated portfolios all underperformed compared to the Universa risk-mitigated portfolio across all of these timeframes—despite the incredible run by high-duration bonds thanks to that whole crazy central bank bond purchasing thing.

Moreover, almost all of the alternative portfolios *subtracted* value, or underperformed the SPX alone, since 2015 and since 2008. The exceptions were “Long Vol” (which edged the SPX since 2008, required a 25% allocation to impact portfolio risk, and thus underperformed since 2015) and of course high-duration bonds. (Most would surely agree that high-duration bonds today are ironically a rather risky risk mitigation strategy.)

Not surprisingly, the “Tail Risk” index came in looking pretty bad as well since 2015 and 2008. No weighting for that would have added value in a portfolio over the long run (as it’s just not convex enough); the same goes for CTAs and hedge funds in general, as I’ve written about often. Thus, I have to agree with most people’s negative opinion on tail hedging. At Universa, we differ from run-of-the-mill tail hedging strategies more than we are similar, and from what I’ve seen of them I expect that to continue.

Whatever ostensibly low value most of these other risk mitigation strategies may have provided during the bad times of 2008 and 2020, that was more than relinquished by their extreme underperformance during the good times. That’s the catch to most risk mitigation strategies (and the plague of “diworsification”): they obviously only add value if the former outweighs the latter—and evidently it very rarely does. Remember, anyone can make money in a crash; it’s what they do the rest of the time that matters. The totality of the payoff is what creates the portfolio effect.

And, to answer the persistent skeptics of our strategy out there, let me point out that we certainly didn’t need the Q1 2020 market drop to add risk mitigation value. At the end of 2019, for instance, Universa’s life-to-date risk mitigated portfolio CAGR exceeded the CAGRs of all of the other risk-mitigated portfolios (including, most notably, high-duration bonds), as well as of the SPX alone, by from 2.2% to 4.2%.

We have managed to consistently achieve our aim of raising our risk mitigated portfolio CAGRs by lowering risk, pandemic or no pandemic. And, as I have said many times before, it has worked so well simply because of **the mathematics of compounding: the big losses are essentially ALL that matter to your rate of compounding,**

not the small losses—and not even the big or small gains. The big losses literally destroy your geometric returns and, equivalently, your wealth, through what I have called the “volatility tax.” For risk mitigation to be effective, it therefore must focus primarily on mitigating those big, rare losses (the tails). More specifically, **risk mitigation must have a very high “bang-for-the buck” in a portfolio when the chips are down in a crash, relative to the portfolio cost of that “buck” the rest of the time—a very “convex” (tail) hedge.** None of these other competing strategies have shown that.

Please don’t ever let a manager of an underperforming “diworsifying” strategy tell you that they lowered your portfolio’s volatility, and so it’s ok that they also lowered your returns. Please don’t let consultants tell you that either. Mean/variance is the smoke-and-mirrors narrative of the investment industry.

Looking ahead, the world remains very much trapped in the mother of all global financial bubbles. This is obvious, a given. Markets were priced for “perfection,” and now, following even more of the greatest monetary stimulus in human history (much of it in the span of just the last few weeks), they’re still priced for “really good”—still very expensive. So this is far from over; the current pandemic is merely *threatening* to pop the bubble. (And, as we all can plainly see, the powers that be are likely running out of ways to keep the bubble inflated.) Make no mistake, it’s the systemic vulnerabilities created by this unprecedented central-bank-fueled bubble, and the crazy, naïve risk-taking and leverage that accompanies it, that makes this pandemic so potentially destructive to the financial markets and the economy.

Is the bubble now popping? When I look deep into my magic crystal ball, it clearly says to me, **“There are no magic crystal balls!”** And, moreover, those who grandiosely tout their crystal balls need to be avoided in the interest of preservation of capital. Whose crystal ball saw this past quarter coming? Sure, the global pandemic risks were there for all to see (as our colleague Nassim Nicholas Taleb pointed out in his book *The Black Swan*, some 13 years ago), but no one can ever really see what’s next, what lies around the corner. Despite our performance, that has included us. One’s risk mitigation strategy must reflect that reality.

But if history and economic logic are any guide, if the pandemic doesn’t pop this bubble then, of course, it will be something else that eventually accomplishes this. That’s my Cassandra speech (again).

At the end of the day, think of Universa as your safe haven, your shelter from the unpredictable storm. But it’s not like staying holed up safely indoors (quarantined, as it were) whenever dark clouds gather (and somehow, they always seem to gather). It’s more like carrying an umbrella, allowing us to go about our business, rain or shine, no matter what financial storms loom.

We intend to serve as a risk mitigation strategy that allows you, our clients, to deliberately and responsibly take on more systematic exposure and ride the market bubble. Most importantly, to do so without the need for a crystal ball.

As we gaze into the abyss of the coming months and years, we needn't care what gazes back. We can be ready to accept the markets' uncertain fate, no matter what that fate may be. *Amor Fati*. This is the point of risk mitigation.

Cordially,



Mark Spitznagel

Chief Investment Officer

Universa Investments L.P.

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General Information Regarding Hypothetical and Other Performance Charts. Universa prepared the charts and figures in this presentation. They have not been reviewed or audited by an independent accountant or other independent testing firm. More detailed information regarding the manner in which the charts and figures were calculated is available on request. **Universa only managed the stand-alone Universa tail hedge (or “BSPP”) component of the “Universa Tail Hedge + SPX” or “risk-mitigated portfolio” hypothetical returns shown. Therefore, the performance results of the combined portfolio do not reflect Universa’s actual trading and may not reflect the impact that material economic and market factors may have had on Universa’s decision-making were it actually managing a combined strategy during those time periods. Any actual fund that Universa manages will invest in different economic conditions, during periods with different volatility and in different securities than those incorporated in the hypothetical and other performance charts shown. There is no representation that any fund that Universa actually manages will perform as the hypothetical or other performance charts indicate. An investor may lose all of its investment in a BSPP portfolio.**

Calculation of Performance of Various Risk Mitigated Portfolios. For the period from March 2008 through March 2020, the portfolio returns were based on hypothetical risk-mitigated portfolios pairing the S&P 500 Total Return Index and each risk mitigation strategy with the indicated weightings (rebalanced every calendar year end). Resulting annual performance figures were then tracked. All returns are based on official closing prices as of the end of March 2020 except the CBOE Eurekahedge Long Volatility, Cboe Eurekahedge Tail Risk, Barclay CTA and HFRI Hedge Fund Indices for which preliminary estimates have been used.

The stand-alone Universa tail hedge (or “BSPP”) component of the hypothetical returns on invested capital were calculated based on monthly administrator-provided actual return data (which is net of all fees and expenses) for a series of standard, representative investors through time, whose fund financial statements for each year through 2019 have also been audited, except for March 2020 for which preliminary estimates have been used. The returns include your specific performance from the date you started. Universa then expressed these returns as annual returns on a standardized 10% of “BSPP Notional Amount” (or 3.33% of “BSPP Protection Size”) capital investment at the start of each year (to standardize across different historical preferences of capital funding among different accounts).

To account for the time needed to fully implement or wind down a BSPP portfolio, monthly administrator-provided return data has always included an incremental 3-month lag for investor-directed notional sizing increases (applying the average of any intra-month increase to the entire month), and any variations as appropriate, as well as for investor-directed notional reductions (applying the full reduction after 3 months on month-end, unless the notional reduction was full and Universa accelerated it as appropriate). Lastly, the BSPP returns from March 2008 through August 2008 were generated in a separately-managed account for which there are no administrator statements or audits. Therefore, the calculation conservatively assumes a 100% loss on invested capital over that entire time period.

Actual Performance Results for Individual BSPP Funds Differ. The actual BSPP performance results shown differ from the actual performance results for other BSPP clients during those periods. Clients may specify parameters for the BSPP strategy related to systematic risk-budgeting and profit-taking, which can also result in performance differences. Further, it can take several months for Universa to fully deploy the BSPP strategy for new BSPP funds (especially those with significant Notional Amounts or Protection Sizes), and thus the performance during the periods before full deployment of the strategy does not reflect a BSPP strategy’s performance when fully invested. In addition, any client can at any time request one or more of an adjustment to a Notional Amount or Protection Size, purchase or sale of individual positions in a BSPP portfolio, liquidation of an entire portfolio, or withdrawal of excess margin, and some clients have restricted lists that limit the securities in which Universa can invest on their behalf. These decisions by individual clients lead to significant differences in performance among client accounts and thus it is difficult to select any BSPP fund during those periods that accurately reflects the performance of the BSPP strategy (without the effect of individual client decision-making). Universa believes, however, that the performance shown is a fair representation of an actual BSPP client’s performance during the period shown. Monthly performance information of other client accounts is available on request from Universa.

CFTC-Required Disclosure re Hypothetical Performance. Universa only managed the BSPP component of the “Universa Tail Hedge + SPX” or “risk-mitigated portfolio” hypothetical returns shown. Therefore, the performance results of the combined portfolio are based on simulated or hypothetical performance results that have certain inherent limitations. Unlike the results in an actual performance record, these results do not represent actual trading. Also, because these trades have not actually been executed, these results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated or hypothetical trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account or fund will or is likely to achieve profits or losses similar to those being shown.

Comparisons to Other Risk Mitigation Strategies and SPX. Universa compares the hypothetical returns of a portfolio combining the SPX with the BSPP to the hypothetical returns of the SPX paired with other risk mitigation strategies solely for illustrative purposes; the



investments in the BSPP strategy are entirely different from the investments in those other strategies. In addition, Universa's BSPP clients are likely to compare the performance of a stand-alone investment in publicly-traded equities (for which the SPX is a proxy) with a paired investment in the SPX and the BSPP, so Universa includes the performance of the SPX as well in this presentation. The SPX is an unmanaged, capitalization-weighted index of the common stocks of 500 large U.S. companies designed to measure the performance of the broad U.S. economy. In contrast, the BSPP strategy invests in options, futures (including options thereon) and other instruments as well as short sales, and includes a component designed to profit during months in which the SPX experiences significant declines. The SPX's performance reflects the reinvestment of interest, dividends and other earnings.

No Duty to Update. Neither Universa nor any of its affiliates assumes any duty to update or correct any information in this document for subsequent changes of any kind.

Appendix C – Who's who: Our crash winners



BORN IN: MARCH 5, 1971

MARK SPITZNAGEL

KNOWN FOR...

Running Universa Investments, a hedge fund focused on "tail-hedging" that yielded more than 4000% in returns during 2020.

EDUCATION AND BOOKS

New York University

Graduate degree in mathematics from the Courant Institute of Mathematical Sciences

Kalamazoo College

Undergraduate degree in mathematics from Kalamazoo College

Books published

- The Dao of Capital: Austrian Investing in a Distorted World, 2013
- Safe Haven: Investing for Financial Storms, 2021

PROFESSIONAL EXPERIENCE

CEO OF EMPIRICA CAPITAL 1999-2005

Alongside his mentor, Nassim Taleb, Mark Spitznagel started one of the first hedge funds focused on black swans, reaped profit from rare and impactful events. One of Empirica's funds reported gains of 60% during the dot-com bubble back in 2000.

CEO & FOUNDER OF UNIVERSA 2007- To date

-After Taleb retirement from the professional world of finance, Mark decided to start his own hedge fund. To date, the fund has a CAGR of 76% and 12.3% before the 2020 crash, both returns well above the S&P 500



BORN IN: MAY 11, 1966

BILL ACKMAN

KNOWN FOR...

Running Pershing Square Capital Management, and turning an initial investment of 27\$ million in 2.6\$ billions during the peak of Corona.

EDUCATION

Harvard University

Master in Business Administration from Harvard Business School

Harvard College

Undergraduate degree in social studies with magna cum laude from Harvard College

Thesis published

- Scaling the Ivy Wall: the Jewish and Asian American Experience in Harvard Admissions

PROFESSIONAL EXPERIENCE

CEO OF GOTHAM PARTNERS 1992-2003

After leaving university and a few stints in real estate, Bill Ackman opened up his first hedge fund focused on stocks and real estate. His first big bid was the attempt to buy the Rockefeller Center, to no avail. At the peak Gotham had more than 500M in AUM

CEO & FOUNDER OF PSCM 2004- To date

-Focused on active investing, Bill Ackman's core strategy involved not owning more than 10 stocks at the same time and being able to change the company's policies. His fund has had a CAGR of 16.2% since inception.



BORN IN: JUNE 19, 1971

MICHAEL BURRY

KNOWN FOR...

Being the CEO and Founder of Scion Capital, a hedge fund that ran from 2000 to 2007, and posted an annual return of 170% during the sub-prime crash.

EDUCATION

University of California, Los Angeles

Graduate degree in economics and pre-med

Vanderbilt University School of Medicine

Doctor of Medicine

Stanford University Medical Center

-Incomplete residency in pathology. In spite of this, Michael Burry kept renovating his licence as a doctor until today, meeting the continuously education requirements.

PROFESSIONAL EXPERIENCE

CEO OF SCION CAPITAL 2000-2008

Michael Burry started his hedge fund in 2000 after his stock picks blog became a sensation due to his methodology based on value investing. Before closing the fund in 2008, Burry registered a CAGR of 32.3% vs the 3.3% of the S&P 500 during the same time frame

CEO OF SCION A. MANAGEMENT 2013- NOW

-Markets can be addictive and so Michael Burry decided to return from his hiatus. Although his returns haven't been made public (Scion is now a smaller fund) it stands out his take on inflation back in 2021 and CME upcoming growth.



BORN IN: MAY 11, 1966

JAMES MAI

KNOWN FOR...

Running Cornwall Capital, a small hedge fund back in 2007 that turned \$1M into \$80M buying CDS against MBS.

BACKGROUND OF CORNWALL

The Origins

James Mai started his hedge fund from his dad's garage alongside his best friend Charles Ledley. Together, they put up \$100k and were focused on buying undervalued stock options.

In less than 4 years they were able to turn this sum into \$30 million, achieving an outstanding return.

Nevertheless, their biggest trade came in 2007, ending the year with more than \$120 of AUM, all of it being their own money.

UPDATE INTO CORNWALL

Charles Ledley

Decided to leave Cornwall with more than \$60 million and have a career break to focus on his family. After a couple of years, went back to work and returned to the hedge fund industry. Nevertheless, he has no online presence, declined interviews, and never went after fame. We honor that and decided to leave his face anonymous.

James Mai

-Still runs Cornwall to this day and after a CAGR of 40% on a 10 years spree, decided to open the fund to investors back in 2021