



**Carlos Quijano 1290 Of. 101
Montevideo, Uruguay
Postal Code: 11.100
<http://capitalcastle.com/>**

ADV Part 2A Brochure date: May 10, 2015

If you have any questions about the contents of this Brochure, please contact us at info@capitalcastle.com.

This brochure serves as a replacement to Part II of Form ADV Uniform Application for Investment Adviser Registration, which gives information about the investment adviser firm CapitalCastle Investment Group Ltda. and its business for the prospective Clients. This information has not been approved or verified by any governmental authority. Registration of an investment adviser does not imply that the adviser possesses a certain level of skill or training.

Additional information about CapitalCastle Investment Group Ltda. is also available on the SEC's website at www.adviserinfo.sec.gov. CRD number (#174738).

Item 2 – Material Changes

CapitalCastle Investment Group Ltda. (or simply CapitalCastle) is a newly registered investment adviser with the Securities Exchange Commission (SEC). Therefore this Brochure is a new document and there are no material changes to be reported. In the future, this Item will discuss only specific material changes that are made to the Brochure.

In accordance with the SEC Rules, Clients will receive a summary of any materials changes to the Brochure, and any subsequent versions of the Brochure within 120 days of the close of CapitalCastle's fiscal year, which is December 31. We may also provide updated disclosure information about material changes on a more frequent basis without charge. Currently, anyone may request the Brochure by contacting us at info@capitalcastle.com or simply downloading it from <http://capitalcastle.com/>

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Item 4 – Advisory Business

CapitalCastle Investment Group Ltda. (the “Investment Adviser” or simply “CapitalCastle”) is a newly federal covered Investment advisory firm that started as a private investment club in 2011, with the objective of giving to its members an investment vehicle where they have control over their capital, based on the principle that successful investors have a deep knowledge of how their investments work, how the profits are made and more important, the principle that investors must have control over their investments. Another fundamental element of the philosophy of the club, that remains as a pillar in CapitalCastle’s Investment philosophy and corporate culture, is the belief that the vast majority of investors will not achieve financial goals in the long term, mostly because of their tendency to invest and act in the same way or direction that most of other market participants do, they go with the crowd. Our approach focuses on taking contrarian positions to what we consider conventional wisdom on how to invest. We have developed this philosophy through the years and combining the expertise of each partner of the firm, based on our own investments, on experience but mostly because traditional investing have only proved to lead the majority of investors into financial mediocrity at best or even worst, financial problems. The model was successful and it attracted new members for the club, which eventually derived in the decision of offering the investment advice to the new members.

The principles of the club remained after the official formation of the investment adviser. We offer customized advisory services helping our clients to allocate their capital at the same time we teach our principles so each investor know exactly why CapitalCastle recommends each investment. CapitalCastle offers mainly a managed and segregated accounts structure, looking also to engage the client into the management of the investment by receiving updates about the basic principles of our strategy, or our most recent research summaries, at the same time our portfolio management team invests the money in the account; this tries to engage the client with the investments decision and increase the level of education about finance and investing. We also offer several events, conferences, and courses where the directors of the Investment adviser transmit to the clients the nature of the financial investments, and give them tools so they can make better decisions through their career as investors. CapitalCastle also offers advisory services to clients using pooled investment vehicles such as investment companies.

CapitalCastle charges to the clients based on their financial status in a highly personalized agreement and in accordance with the policies of the firm: To high net worth individuals, with experience in investing, pooled investment vehicles and institutional investors a management fee plus a performance fee. To our clients with limited experience and capital our standard procedure is to charge a flat monthly fee based on the size of the account.

CapitalCastle Investment Group Ltda. Is a Uruguay based limited liability company, owned by 3 partners (owners with 25% or more of the company): Pablo Mayans Cirigliano, Juan Di Feo, and Nicolas Galarza Ricci, all citizens of Argentina.

Our advisory services are based on the same strategies and concepts that all the owners apply to their own investments. We specialize in quantitative investing where we apply statistical and proprietary models developed through the years, to the clients' portfolios looking to make active adjustments to the positions in order to decrease the long term volatility and seeking the market neutrality through diversification of strategies. This means that we look to have returns completely uncorrelated to the common market investment benchmarks, just like the S&P 500 Index.

The level of activity in the accounts depends on the objectives of the client, and they are strictly taken into consideration when creating an investment plan for the account. The frequency of the adjustments can be as closed to each other as 10 per day, to a minimum of 1 per month. Thanks to these adjustments, and using derivatives we create income for the portfolio that offsets the possible drawdowns (depreciation of the account's value from a previous maximum value) and increases the effect of the positive volatility.

We offer to our clients a full time team with expertise in mathematical finance and statistical investing models, to execute trades on behalf of our clients. That is why we offer mainly discretionary management services.

Because of the principles of our strategies our clients may not impose any limitation to the type of securities we use to build their portfolios, however they will understand every investment and adjustment we make thanks to our educational support.

Please contact Nicolas Galarza Ricci, Chief Compliance Officer, if you have any questions about this Brochure. Additional information about CapitalCastle is available on the Internet at www.adviserinfo.sec.gov. You can search this site by a unique identifying number, known as a CRD number. The CRD number for CapitalCastle Investment Group Ltda. is #174738.

Description of Advisory Business

CapitalCastle manages accounts for every person looking to diversify an investment portfolio by adding quantitative and active investing vehicles at the same time that adds expertise to the decisions about capital allocation thanks to our work to educate clients in the principles that we believe, lead to success in investing.

Most of our clients are, without being limited to the following, (1) high-net worth persons or legal entities that have speculative capital for the principle purpose of investing; or (2) are foreign investors willing to invest in the U.S. financial markets; or (3) Any persons or legal entity looking to diversify an investment portfolio by including long term, non-speculative investments based on a quantitative approach to the portfolio creation; or (4) Any person or legal entity looking to create a long term investment plan for a specific event such as retirement, inheritances, education payment, etc. CapitalCastle's investment program (described below and in Item 8 of this Brochure) focuses

on the global derivatives markets, applying our proprietary financial models to achieve uncorrelated returns with respect to common market benchmarks, and in line with the objectives of the client, taking into account return needs and expectations, and risk tolerance.

CapitalCastle will create a customized investment plan for the potential client before signing an Investment Advisory Agreement, and will apply all the tools available to the firm in order to meet those goals, and equally important, to keep the client's portfolio inside the determined risk limits.

Legal concepts that apply to the advisory agreement

Investment account assets shall consist of (i) all such cash and investments of the Client as the Client may place under the supervision of CapitalCastle from time to time, plus (ii) all investments, reinvestments and proceeds of the sale thereof, including, without limitation, all dividends and interest on investments, and all appreciation thereof and additions thereto, less depreciation thereof and withdrawals therefrom (the "Investment Account Assets"). Although most of our clients choose the "segregated accounts structure" this concept applies also to pooled investment vehicles.

In its full and absolute discretion and without any obligation on its part to give prior notice to the Client, CapitalCastle shall have sole, complete and full power and authority to invest and reinvest all of the Investment Account Assets in such securities as CapitalCastle in its sole and absolute discretion shall consider to be in the best interest of the Client.

In connection therewith, CapitalCastle shall have sole, complete and full power and authority to: (i) issue orders for the Managed Account to a broker or dealer; (ii) instruct the Custodian to exercise or abstain from exercising any option, privilege or right held in the Managed Account; (iii) monitor the correct collection of income on the Managed Account by the Custodian; and (iv) take any other action with respect to securities or other property in the Managed Account as needed to serve the best interest of the Client. CapitalCastle shall further be free to make investment changes regardless of the resulting rate of portfolio turnover, when it, in its sole discretion, shall determine that such changes will promote the investment objective of the Managed Account.

CapitalCastle reserves the right to advise Clients with respect to any other type of investment deemed appropriate based on the Client's stated goals and objectives. CapitalCastle may also provide advice on any type of investment held in a Client's Investment Account Assets at the inception of the advisory relationship or with respect to any investment for which the Client requests advice.

CapitalCastle does not guarantee any specific level of performance, the success of any investment decision or strategy that CapitalCastle may use, or the success of CapitalCastle's overall management of the Client. The Client understands that investment decisions made for the Client by CapitalCastle are subject to various market, currency, economic, political and business risks, and that those investment decisions will not always be profitable. Clients are responsible for notifying CapitalCastle of any changes to their financial situation or investment objectives.

Item 5 – Fees and Compensation

CapitalCastle’s fees are negotiable on a case-by-case basis and mutually agreed upon depending on the level and scope of services that you require. These fees can be any one or a combination of the following: asset based fee (percentage of assets), a flat dollar fee or a project based fee. The entire scope and rate of these fees are defined within the Investment Advisory Agreement.

Investment Management Fees are calculated and due quarterly and payable at the beginning of the quarter. CapitalCastle will invoice you directly for the services and you can choose the better way to complete the payment, from a variety of methods that CapitalCastle will inform opportunistically.

CapitalCastle’s Investment Management Fees are for advisory services only and are separate from compensation paid to independent money managers, custodians, record-keepers, mutual funds, brokers and other service providers as well as other fees which include taxes, trading fees and other transfer fees. CapitalCastle does not sponsor a wrap-program in which all of these services would be included in our fee. We believe that it is a best practice and matter of moral integrity to disclose all fees you have paid to our firm. We will disclose such payments and any other compensation created from our relationship with you. Detailed historical fee information for your account is available upon request.

Even though the fees charged to clients are negotiable and determined on a case-by-case basis, the basic agreement is based on the following:

Clients pay CapitalCastle a management fee (the “Management Fee”) based on a percentage of the value of the Investment Account Assets, as determined by the Custodian. The Management Fee will be negotiated with the clients before signing any Investment Advisory agreement and will be calculated at the end of each calendar quarter (March 31, June 30, September 30 and December 31). Payments of the management fee must be made during the first 5 business days after signing into the agreement, and during the first 5 business of each calendar quarter.

A pro rata Management Fee is charged to a Client with respect to any amounts permitted to be invested during any calendar quarter. The Management Fee is assessed pro rata in the event the advisory agreement is executed at any time other than the first day of a calendar quarter and with respect to any amounts permitted to be invested at any time other than the first day of a calendar quarter.

The management fee is a percentage of the value of the account, as it is defined in page 7, *Legal concepts that apply to the advisory agreement*.

Item 6 – Performance Based Fees and Side-by-Side Management

In some instances, CapitalCastle Investment Group Ltda. manages accounts that pay a regular quarterly investment management fee as described above as well as a quarterly fee based on a percentage of realized and unrealized profits (“performance fee”). This arrangement may cause an inherent conflict of interest as it may give CapitalCastle more of incentive to take greater risks or direct investments that are perceived to have higher return potential to the accounts that pay a performance fee versus the accounts that pay only a regular investment management fee. CapitalCastle attempts to mitigate this conflict by monitoring and enforcing trading guidelines. These guidelines are reviewed and monitored by the client as well as CapitalCastle’s investment professionals.

Performance Fee

If the Client is a Qualified Client, a performance-based incentive fee (the “Performance Fee”) is assessed with respect to the Investment Account Assets. This performance based fee is negotiable in a case-by-case basis; however the standard agreement will be based on the following:

The Performance Fee shall equal twenty percent (20%) of the excess, if any, of the Net Capital Appreciation (as defined below) of the Investment Account Assets over any Accumulated Net Capital Depreciation (as defined herein). The computation of the Performance Fee is to be made starting on the signature of the agreement with each client, at the end of each calendar quarter (March 31, June 30, September 30 and December 31) and one hundred percent (100%) of the estimated Performance Fee, if any, shall be payable by the end of the first week (5 business days) of the next quarter.

“Net Capital Appreciation” means the excess, on a US\$-adjusted basis, of (i) the total of all realized and unrealized gains and dividend and interest income, over (ii) the total of all realized and unrealized losses and expenses, all determined on the accrual basis of accounting. “Accumulated Net Capital Depreciation” means the sum of the Net Capital Depreciation (as defined below) for all quarters for which Net Capital Depreciation exists since the last previous date as of which a Performance Fee was payable (i.e., a “loss carry-forward” from prior period(s)/quarter(s)). “Net Capital Depreciation” means the excess of the (i) total of all realized and unrealized losses and expenses, over (ii) the total of all realized and unrealized gains and dividend and interest income. “Expenses” include, without limitation, the Base Fee, dividends paid, any amounts of dividend or interest income withheld as taxes, and interest paid (including interest on capital to fund the Account). Unrealized gains or losses shall be calculated based upon prices at which open positions are valued in the ordinary course at the close of business at the end of the quarter. Realized gains and losses shall be calculated on the actual net purchase or sale prices paid or received.

Legal concepts

If at any time during or following the term of the Investment advisory Agreement, gains or income used to calculate the Performance Fee are subsequently required to be surrendered or otherwise expended as a result of an adjudication or a settlement of allegations to the effect that such gains or income were obtained in violation of applicable law, the Investment Manager shall be liable to return any excess of the Performance Shares previously paid over the amount of Performance Fees which would have been due the Investment Manager in the absence of the activity that gave rise to such surrender.

Item 7 – Types of Clients

CapitalCastle Investment Group Ltda. offers investment advisory services to any individual or entity, and pooled investment vehicles such as any investment company.

In order to be a client of ours generally a person has to accept a fully discretionary account management since it is our most developed service. CapitalCastle manages accounts for Clients that represent they are fully cognizant of the possible high risks associated with investments in assets that may decrease in value.

Item 8 – Methods of Analysis, Investment Strategies and Risk of Loss

General Investment Philosophy

What all of our strategies have in common is that they were created looking to take an opposite approach to what think as the “common wisdom about investing”, since in general terms we increase the portfolios exposure in the markets as the volatility increases. Because of this our clients should expect seeing a more significant part of the account invested when markets get more volatile and seeing their accounts invested in cash and cash equivalent instruments (including money market instruments, such as bankers acceptances, certificates of deposit, commercial paper, short term corporate or government obligations denominated in various currencies) when the volatility in the markets falls.

Portfolio Construction and Risk Management

In order to explain the methods and criteria used to build portfolios for clients, we have performed a *back-testing* simulation of the strategies and published the summary of the results on the Appendix 1 of this document.

Item 9 – Disciplinary Information

Neither CapitalCastle Investment Group nor any of its owners have been involved in any legal or disciplinary events. No disciplinary events have been recorded by any state or the SEC. No prospective Client has threatened CapitalCastle or its owners with disciplinary activities

Item 10 - Other Financial Industry Activities and Affiliations

CapitalCastle Investment Group Ltda. has no other financial industry activities or affiliations at this time.

Item 11 - Code of Ethics, Participation or Interest in Client Transactions and Personal Trading

CapitalCastle has adopted a Code of Ethics (the “Code”) pursuant to Rule 204A-1 of the Investment Advisers Act and Rule 17j-1 of the Investment Company Act. CapitalCastle’s Code sets forth standards of ethical and business conduct expected of access persons and addresses conflicts that may arise from personal trading by CapitalCastle personnel to ensure that CapitalCastle’s fiduciary obligations to its clients are met as well as compliance with federal securities laws. The Code includes a personal trading policy and policies and procedures to detect and prevent insider trading. Additionally, the Code defines material, nonpublic information and the restrictions on trading on any such knowledge. The Code also includes policies and procedures on serving as officers, trustees and/or directors of outside organizations and participating in outside business activities. Additionally, the Code sets forth specific restrictions and limitations as to which employees may make political contributions, as well as preclearance requirements for certain political contributions.

All CapitalCastle personnel must acknowledge understanding and agree to comply with the Code initially upon employment and must certify on an annual basis that they have read and understand the code and have complied with it. Clients or prospective clients may obtain a copy of the Code upon request.

Conflicts of Interest Clients or investors should carefully consider the conflicts of interest described here and in the Agreement, as applicable.

Other Investment Accounts

The Client understands that CapitalCastle or any of its owners may take actions for their own accounts that differ from advice given to or action taken for the Client since the decision to take any position is based on the individual client’s goals and risk tolerance. CapitalCastle is not obligated to buy, sell or recommend for the Client any security or other investment that CapitalCastle or any of its owners may buy, sell or recommend for their own accounts. The Agreement does not limit or restrict in any way CapitalCastle or any of its owners from buying, selling or trading in any securities or other investments for their own accounts.

Conflicts of interest may arise in the allocation of investment opportunities among accounts that CapitalCastle advises. CapitalCastle will seek to allocate investment opportunities believed appropriate for the Client’s account and other accounts advised by CapitalCastle among such accounts equitably and in a manner consistent with the best interests of all accounts involved. But, there can be no assurance that a particular investment opportunity that comes to the attention of CapitalCastle will be allocated in any particular manner.

Additionally, the Code requires access persons to submit transactions reports and initial and annual holding reports showing all transactions in which the person has, or by reason of such transaction acquires, any direct or indirect beneficial ownership in covered securities, with limited exceptions

for securities such as shares of mutual funds. This enables CapitalCastle to determine with reasonable assurance any indications of front-running or other appearance of a conflict of interest.

Item 12 - Brokerage Practices

In determining the brokers and dealers through whom securities transactions for client accounts are to be executed, CapitalCastle seeks to negotiate a combination of the most favorable commission and the best price obtainable on each transaction (generally defined as best execution). Consequently, CapitalCastle selects brokers and dealers primarily on the basis of their execution, trading expertise and service capabilities. There may be occasions when the transaction costs charged by the broker/dealer may be greater than those which another broker/dealer may charge if CapitalCastle determines, in good faith, that the amount of such transaction costs are reasonable in relation to the value of the brokerage and research services provided by the executing broker. The broker/dealer selected by CapitalCastle doesn't make available to the adviser other products or services that benefit CapitalCastle that may not directly benefit its clients' accounts. We do not direct clients to a particular brokerage firm in return for any products, research or other services. CapitalCastle Investment Group does not receive client referrals from any brokerage firm nor do we recommend a particular brokerage firm based on receiving such referrals. In addition we do not permit, recommend, request or require that our clients direct us to a specific brokerage firm to execute transactions.

Item 13 - Review of Accounts

CapitalCastle monitors and reviews all the clients' accounts on a continuous basis using proprietary software and software offered by the broker/dealer to do so. The account review includes monitoring for account restrictions, consistency with investment objectives and strategy descriptions. Adjustments may be triggered by material changes in variables such as the client's individual circumstances, or the market, political or economic environment. Clients receive monthly accounts statements directly from the Custodian. CapitalCastle urges clients to carefully review official custodial records.

Even though CapitalCastle usually informs to its clients about the status of the accounts, market conditions, and other variables that can affect the client's investments in a monthly basis, the adviser must inform about this information at least quarterly, at the same time the statements for the clients' account is sent.

Item 14 – Client Referrals and Other Compensation

CapitaCastle does not receive compensation (sales awards or other prizes) from anyone who is not a client in return for providing investment advice to our clients. In addition, CapitaCastle does not directly or indirectly compensate any person who is not a supervised person for client referrals.

Item 15 – Custody

Custody of the Client's assets will be maintained at the Broker/dealer selected by the client under the recommendation of CapitalCastle. The Client agrees to inform CapitalCastle immediately if it is dissatisfied with CapitalCastle's decisions or actions, or if it is dissatisfied with Broker/dealer's handling of the Investment Account. The Client authorizes CapitalCastle to give the Custodian instructions for the purchase, sale, conversion, redemption, exchange or retention of any security, cash or cash equivalent or other investment for the Client.

CapitalCastle shall at no time have custody or physical control of any of the Investment Account Assets and it is the responsibility of the Client to reach an agreement with the Custodian.

CapitalCastle will not deduct any fee or charge directly from the client's account, but instead will invoice directly to the client. The client will choose among the different payment methods we accept.

Item 16 - Investment Discretion

CapitaCastle receives discretionary authority, in writing, from the client at the outset of an advisory relationship to select the identity and amount of securities to be bought or sold. In all cases, however, such discretion is to be exercised in a manner consistent with the stated investment objectives for the particular client account. When selecting securities and determining amounts, CapitaCastle observes the investment policies, limitations and restrictions specified on the investment plan created for the client.

Item 17 - Voting Client Securities

The Client agrees that CapitalCastle shall not have the authority or the responsibility to vote proxies on the Client's behalf for securities held in the Client's account. CapitalCastle is authorized and directed to instruct the Custodian to forward promptly to the Client copies of all proxies and shareholder communications relating to securities held in the Client's account (other than materials relating to legal proceedings). The Client agrees that CapitalCastle will not be responsible or liable for any proxies where it or the Custodian has not received such proxies or related shareholder communications on a timely basis. CapitalCastle shall not be required to advise the Client or act for the Client in any legal proceedings, including bankruptcies or class actions, involving securities held in the Client's account.

Item 18 - Financial Information

Registered investment advisers are required in this Item to provide you with certain financial information or disclosures about their financial condition if they require prepayment of advisory fees of \$1200 or more per client, six months or more in advance. Since CapitalCastle doesn't require any payment in advance this item is not applicable. CapitalCastle Investment Group Ltda. has no financial commitment that impairs its ability to meet contractual and fiduciary commitments to clients, and has not been the subject of a bankruptcy proceeding.

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**Carlos Quijano 1290 Of. 101
Montevideo, Uruguay
Postal Code: 11.100
<http://capitalcastle.com/>**

ADV Part 2A: Appendix 1.

Process for building an investment portfolio: Fundamental principles and testing.

CapitalCastle's management team explains in detail the process used to build investment portfolios for clients, and we test it by simulating the trades on data from the past 13 years.

Date: May 10, 2015

If you have any questions about the contents of this Brochure, please contact us at info@capitalcastle.com.

The research in this document is for informational and educational purposes; showing step by step of the process used by our team to build investment portfolios for clients. Its objective is to explain the principles in which we base our work and more important, present the results of several tests performed to demonstrate how this principles can generate long term returns to our clients. This document looks to educate our clients about the principles that, according to our beliefs, will help an investor reach financial goals.

Additional information about CapitalCastle Investment Group Ltda. is also available on the SEC's website at www.adviserinfo.sec.gov. CRD number (#174738).

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References.

The order in which this document is presented, is different from what is normally accustomed. We will start presenting the Reference item which contains explanations about the most important terms used in this document. By doing this we will ensure that the reader will have a deeper understanding of the information presented.

The next 3 items will present the final results and conclusions of the studies. We start presenting this because we believe that it is the most important and valuable information of the document; practical information. Finally, if the reader wants to have a deeper understanding of the premises on which we base these studies, the methods we chose to test them, and other details like the explanation of the principles on which we base the construction of the tested portfolios, the item 5 contains all this information. *Item 5: Clients' portfolios building. Detailed explanation of the study.*

Important terms

SORTINO RATIO: Many of the comparisons we will perform, look to find the relation between risk and reward. We will do it by using the Sortino ratio.

It shows the excess of return produced for each unit of risk (understood as downside volatility, meaning the volatility that produces losses in the portfolio). This ratio will help us to distinguish between returns produced by right investment decisions and returns produced because of an increase in risk; greater risk taking. We use this ratio to compare between several investments and the higher the ratio, the better the investment is in terms of returns/risk relation.

DRAWDOWN¹: We will use this measure as another way to identify risks in each portfolio. It is the maximum loss occurred between a high and a low of the portfolio.

A drawdown is measured from a high reached by the portfolio. It starts at the time a retrenchment begins and ends when a new high is reached. This method is used because a valley can't be measured until a new high occurs. Once the new high is reached, the percentage change from the old high to the smallest trough is recorded.

An example of how this information will be presented is the following:

Drawdown amount	80.26%
Drawdown start period	09/10/2007
Drawdown end period	09/03/2009
Recovery start period	16/08/2012
Drawdown duration (td)	1773

- **Drawdown amount:** It is the loss of the portfolio between a high and a low, before reaching a new high. It is expressed as logarithmic returns.
- **Drawdown start period:** It is the day the drawdown started; meaning the day the value of portfolio fell below the last high.

¹ Definition from <http://www.investopedia.com/>

- **Drawdown end period:** it is the day that the maximum loss was reached in this particular drawdown.
- **Recovery start period:** It is the day the portfolio reached a new high. We consider at this time, that the drawdown finished.
- **Drawdown duration:** It shows the total duration of the drawdown in of calendar days.

CAGR²: The compound annual growth rate is the year-over-year growth rate of an investment over a specified period of time. The number describes the rate at which an investment would have grown if it grew at a steady rate. The easy way to think of it is the average rate of return through the entire period under study if each year's rate of return is applied to the previous year's return.

² Definition from <http://www.investopedia.com/>

Results and conclusions 1. CapitalCastle's low activity portfolio based on Betas: Back testing results.

This item contains the results for the back testing performed on the portfolio used by CapitalCastle's management team as a base, when building an investment plan for a client.

The portfolio we are testing in this item was created with the objective of a medium to long term investment, which means that the investor will commit the capital for several years. We would be able to calculate the expected volatility and adjust it to match the client's risk tolerance. In this case we add a strategy of systematic selling of call options whenever the conditions established by our management team, are met. We also assume a monthly rebalance of the portfolio according to the allocation calculated by our proprietary models. The initial allocation is calculated based on the theoretical volatility and it is the most important variable when we rebalance the portfolio each month, since the allocation may vary from month to month.

We will use 5 different asset classes to test the fundamental concept behind our portfolio theory. They were chosen based on the liquidity of the tradable asset and its option contracts; U.S. stock market (large capitalization), U.S. Treasury debt, precious metals, oil, and natural gas. All the trades were simulated on ETFs (Exchange Traded Funds) that represent each one of these asset classes with an initial portfolio of \$100.000. It is important to understand that this assets are not important by themselves, and the diversification of our portfolio will not be limited to these 5, but we chose them as a first step to demonstrate the concept in which we base our real investment decisions. The study period starts on July 30th, 2002 and ends on February 23th, 2015.

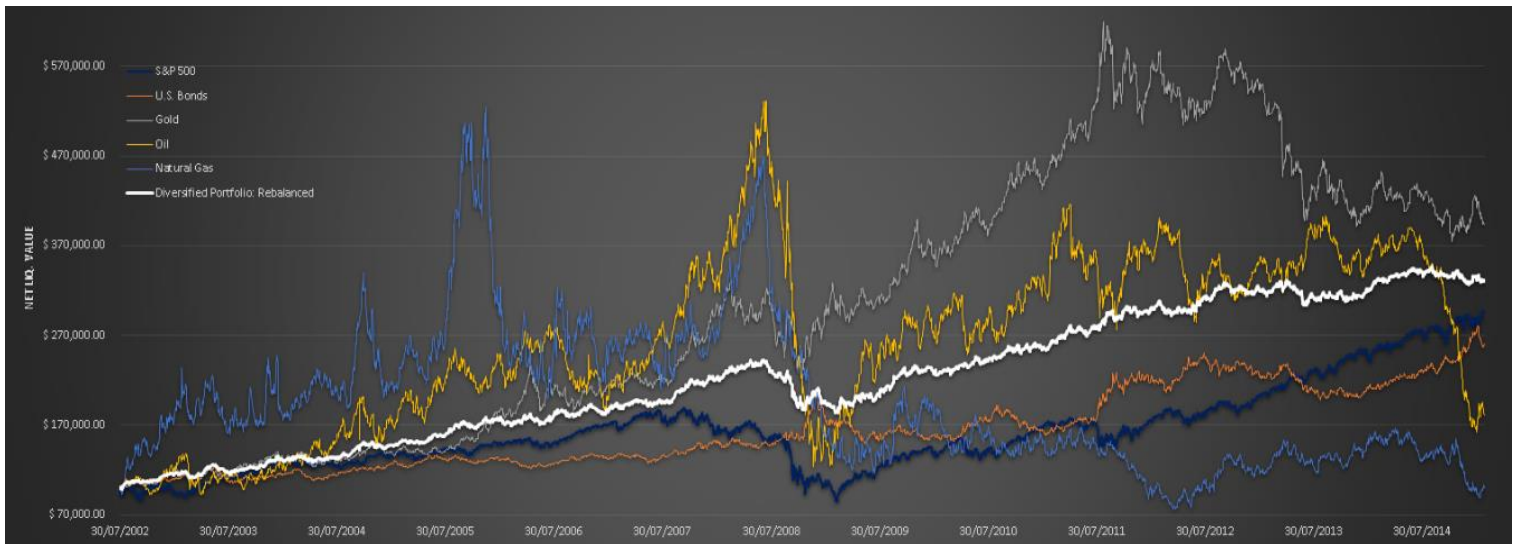
Finally, the following points will describe the steps that our management team took in order to optimize the portfolio:

- Below we can see the results obtained by a portfolio built with the selected ETFs, applying a monthly rebalancing, and we did not use any options selling strategy; just the underlying asset. This portfolio will work as a benchmark and it will be identified with the name *"Benchmark: No leverage-rebalanced"*. Next we compared the results with a position of \$100.000 in the ETF identified with the ticker symbol *SPY*. The *SPY* tracks the performance of the S&P 500 index, common indicator of the performance of the U.S. stock market's return. We selected *SPY* because it performed similar to the diversified portfolio in terms of annual returns.

\$100.000 invested in SPY	
Sortino Ratio	0.039
Abs return	197.27%
CAGR	9.06%
Drawdown amount	80.26%
Drawdown start period	09/10/2007
Drawdown end period	09/03/2009
Recovery start period	16/08/2012
Drawdown duration (td)	1773
Volatilidad	19.79%

Benchmark: No leverage-rebalanced	
Sortino Ratio	0.089
Abs return	230.98%
CAGR	10.00%
Drawdown amount	27.63%
Drawdown start period	01/07/2008
Drawdown end period	03/03/2009
Recovery start period	15/06/2010
Drawdown duration (td)	714
Volatilidad	9.79%

In the following chart we can see the performance of the diversified portfolio (which we will use as a benchmark in the following paragraphs). We also added the individual performance of the 5 assets that are part of the portfolio. The portfolio and the SPY are shown with a thicker line.



1. Based on these results we conclude that the first step we took was the correct. Diversifying the portfolio reduces notably the volatility/risk. This gives us a more sustained, predictable, and controllable growth. We obtained a higher CAGR in comparison to the U.S. stock market ETF, with less than half of the volatility. The greatest drawdown was almost 3 times bigger in the SPY; in 2008.
- Now we will take another step to optimize this portfolio: We want to test the idea that a mechanical call options selling strategy will improve the performance of the portfolio by adding an income.

In this step we built the same portfolio, using the same asset allocation and rebalancing approach but each time that the conditions established by our management team are met in the markets, we sold 1 call option for each 100 stocks in the portfolio. We will identify this portfolio with the name “C.C. portfolio: No leverage-rebalanced”.

Benchmark: No leverage-rebalanced	
Sortino Ratio	0.089
Abs return	230.98%
CAGR	10.00%
Drawdown amount	27.63%
Drawdown start period	01/07/2008
Drawdown end period	03/03/2009
Recovery start period	15/06/2010
Drawdown duration (td)	714
Volatilidad	9.79%

C.C. portfolio: No leverage-rebalanced	
Sortino Ratio	0.142
Abs return	234.89%
CAGR	10.10%
Drawdown amount	11.10%
Drawdown start period	01/07/2008
Drawdown end period	20/11/2008
Recovery start period	11/09/2009
Drawdown duration (td)	437
Volatilidad	6.29%

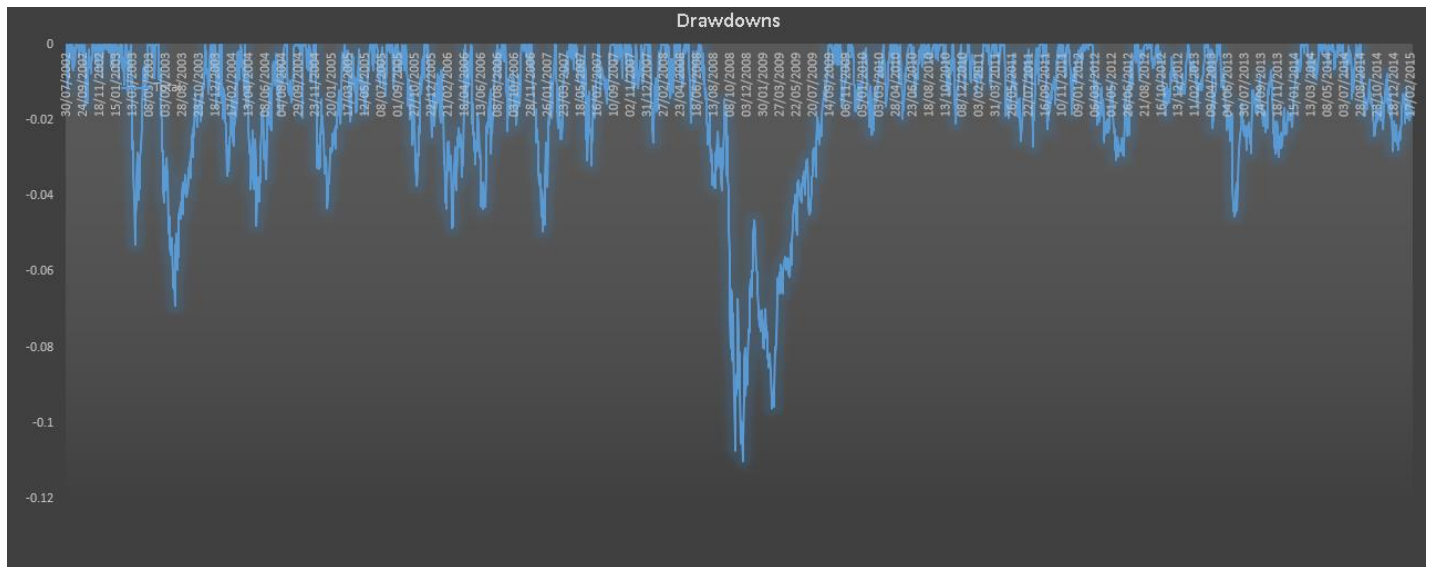
In the next comparison chart we include the SPY as another benchmark. Again, we chose SPY as benchmark because it was the asset that reached a CAGR similar to the 2 portfolios' CAGR.



2. We just proved that the second step taken to optimize the portfolio worked as expected. We get the same compounded annual return with approximately 30% less volatility. We could say that about 30% less risk if we use volatility and Drawdown metrics as a proxy for risk. In 2008 the loss in value was equivalent to the CAGR.

Now, a new question arises: In 2008 the portfolio would have achieved this results, but it was a market crisis; how would it perform on normal conditions? To answer this question we analyze 5 Drawdown occurrences using statistics and a chart.

Drawdown analysis					
Rank	1	2	3	4	5
Drawdown amount	11.01%	6.90%	5.27%	4.92%	4.83%
Drawdown start period	01/07/2008	11/06/2003	07/03/2003	30/11/2006	13/12/2005
Drawdown end period	20/11/2008	05/08/2003	21/03/2003	11/01/2007	08/03/2006
Recovery start period	11/09/2009	13/11/2003	05/05/2003	22/02/2007	21/04/2006
Drawdown duration (cd)	437	155	59	84	129



- In the previous steps we assumed that the portfolio was 100% invested all the time. But, what if we use leverage to increase our exposure to some positions in the portfolio? Or, what if we simply use less capital in other positions? By doing this we could have an exposure of more than 100% of the portfolio (using leverage), we could be invested 100% by using just part of the capital in the account, or we could have an exposure of less than 100%.

We would do it to match the risk/return ratio with the objectives for a particular client and in the following paragraphs we will show the process to do it. We have to understand that a particular client could have as priority either the risk control or the achievement of a return goal. If we increase one the other will also increase and vice-versa. In the following example the clients would have the achievement of a certain return as priority.

There are many variables to take into account when building a portfolio for a client. For example the risk tolerance, time horizon for the investment or the goal return for the initial capital. Let's assume that a client with a high risk tolerance wants to invest part of his capital for the next 7 years, and his priority is to achieve a return of about 15% CAGR.

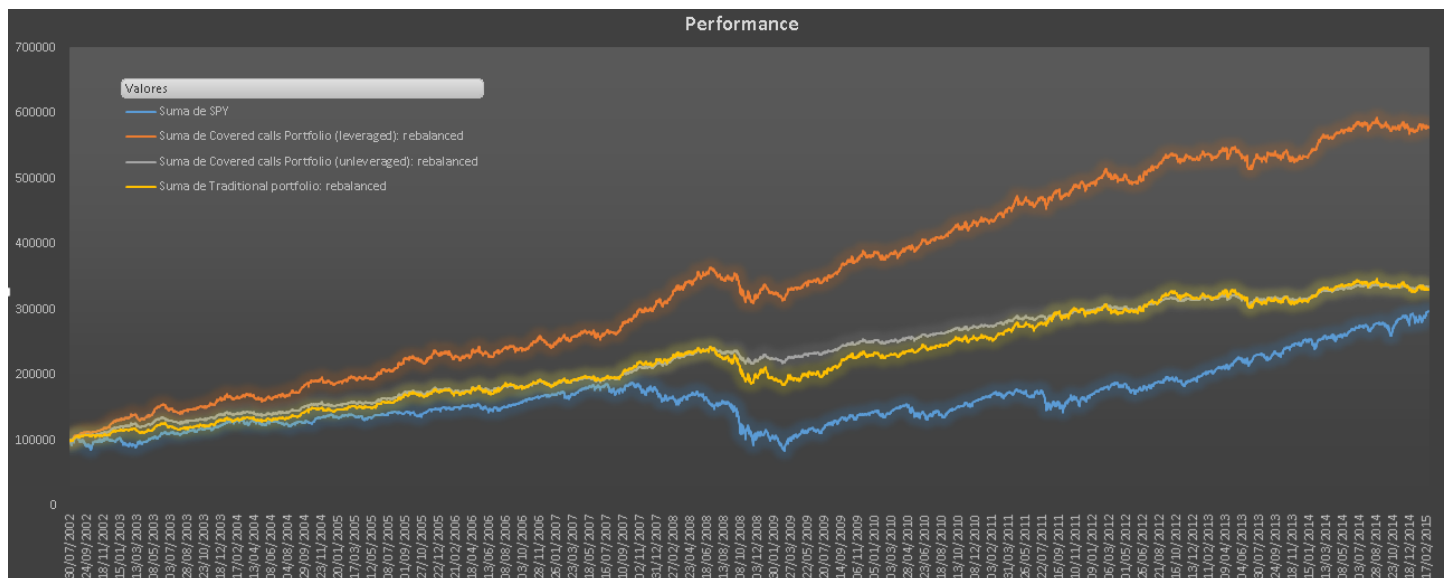
It is rational to expect that during the period he holds the investment, there will be several drawdowns, temporal losses because of the natural volatility of the investment. Maybe we will see a bear market where most of the assets in the portfolio will lose value. We back-tested this portfolio through the 2008 financial crisis because it gives us an approximation of how the investment could perform during other bear market. Now we adjust the parameters of the portfolio based on the client's objectives and back-test it through the same period of 13 years. We will identify this portfolio with the name "*C.C. portfolio: leveraged-rebalanced*".

\$100.000 invested in SPY	
Sortino Ratio	0.039
Abs return	197.27%
CAGR	9.06%
Drawdown amount	80.26%
Drawdown start period	09/10/2007
Drawdown end period	09/03/2009
Recovery start period	16/08/2012
Drawdown duration (td)	1773
Volatilidad	19.79%

C.C. portfolio: No leverage-rebalanced	
Sortino Ratio	0.142
Abs return	234.89%
CAGR	10.10%
Drawdown amount	11.10%
Drawdown start period	01/07/2008
Drawdown end period	20/11/2008
Recovery start period	11/09/2009
Drawdown duration (td)	437
Volatilidad	6.29%

Benchmark: No leverage-rebalanced	
Sortino Ratio	0.089
Abs return	230.98%
CAGR	10.00%
Drawdown amount	27.63%
Drawdown start period	01/07/2008
Drawdown end period	03/03/2009
Recovery start period	15/06/2010
Drawdown duration (td)	714
Volatilidad	9.79%

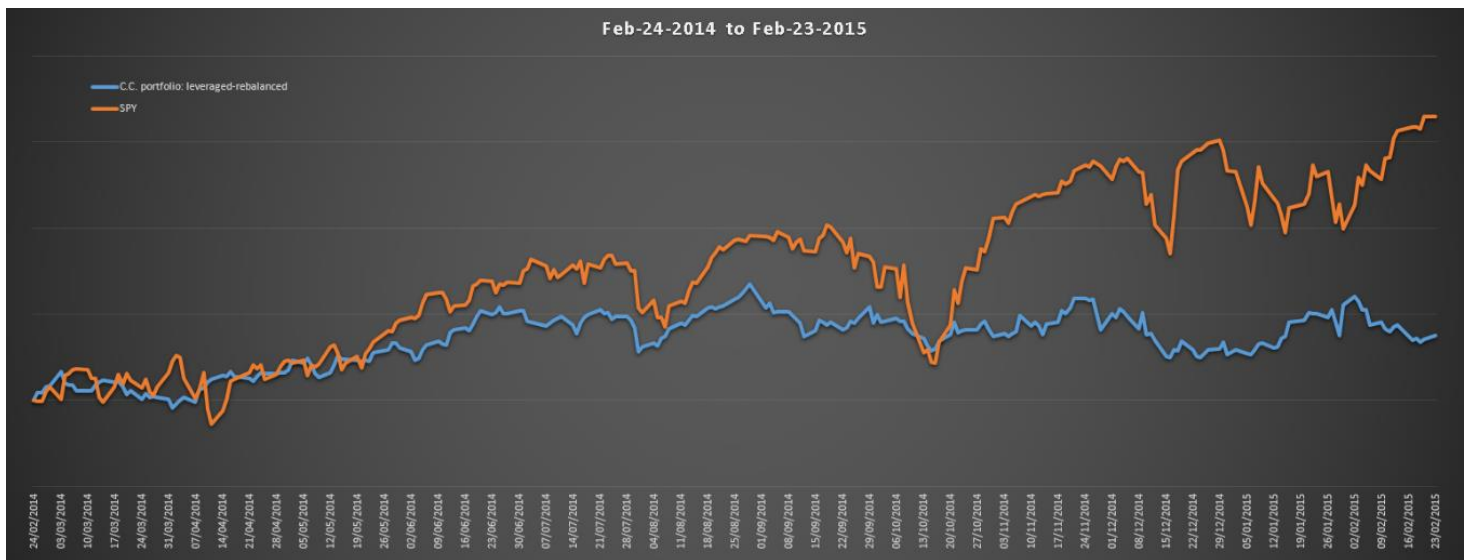
C.C. portfolio: leveraged-rebalanced	
Sortino Ratio	0.141
Abs return	478.84%
CAGR	15.01%
Drawdown amount	16.25%
Drawdown start period	01/07/2008
Drawdown end period	20/11/2008
Recovery start period	16/09/2009
Drawdown duration (td)	442
Volatilidad	9.16%



- Now we have completed the third step taken by our team in order to build a portfolio in which we can base the building of investment plans for clients.
- Finally, we want to test the performance of the portfolio in the future. Well, we know that it is impossible to predict the future but we can use a couple of analysis methods in order to get realistic expectations about the future performance of the portfolio. First of all, we will compare the performance of the portfolio for the first 12 years of this study (until February 2014) with the performance of only the last year (until February 2015). By doing

this we will simulate a scenario where this back-testing was performed last year and from February 2014 we started applying the strategies in a diversified portfolio. What returns would have been obtained?

C.C. portfolio: leveraged-rebalanced; 07-30-2002 to 02-21-2014		C.C. portfolio: leveraged-rebalanced; 07-30-2002 to 02-21-2014	
Sortino Ratio	0.126	Sortino Ratio	0.053
Abs return	456.24%	Abs return	3.76%
CAGR	16.01%	CAGR	3.76%
Drawdown amount	20.75%	Drawdown amount	4.06%
Drawdown start period	01/07/2008	Drawdown start period	29/08/2014
Drawdown end period	20/11/2008	Drawdown end period	24/12/2014
Recovery start period	07/10/2009	Recovery start period	0
Drawdown duration (td)	320	Drawdown duration (td)	N/A
Volatilidad	0.107941087	Volatilidad	0.063488462

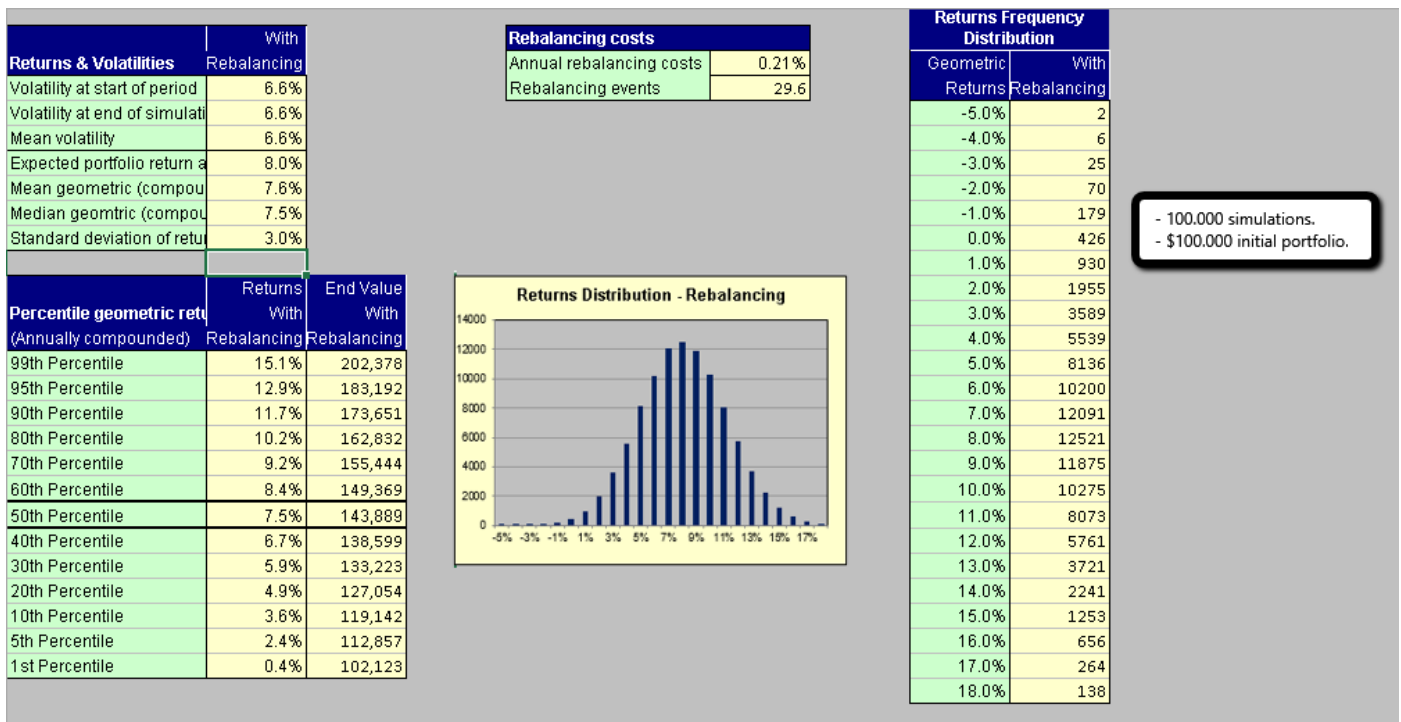


4.1 The results of this test remind us a very important concept about the investment plan we may execute. The expectations and goals we established for the plan are achievable, but we have to keep our focus on the same time horizon we had when we built the investment plan or portfolio. The portfolio we simulated above was created with a 15% CAGR goal, but in the first year we would have achieved only about 3%. Does that mean that we are making mistakes? No, it is simply one of the many random occurrences that are part of the total return of the investment when it gets to an end. It is an important idea to keep in mind.

- Now, we will try another test to create realistic expectations about the investment plan. We can use certain variables computed from the back-testing of the portfolio, and the past behavior of its components as an input of a simulation where we generate several potential

scenarios for the next 5 years. We will simulate thousands of time potential 5-year-periods and measure the portfolio in each one of these. By doing this we will be able to compute the probability of the portfolio performing in a certain way.

We tested the base portfolio which returned a 10% CAGR in the back-testing through 100.000 random generated 5-year-escenarios. This simulation allows us to have an approximation of the probable returns at the end of a 5 years investment period. Here are the results:



4.2 There are implicit assumptions in the simulation method we used above that may cause the simulation to be deviated from reality, but in general it gives us a good approximation and a range for us to have realistic expectations about our investment. This simulation gave us again confirmation about the potential of the portfolio. Now, we have to ask, is this the end of the story? We just have to build a portfolio with these characteristics and forget about it for the next 10 years?

Obviously the answer is no. This study is not the end of the story, but just the beginning. We have tested the premises of our portfolio hypothesis in this study, but we only used 5 assets. The portfolio will be optimized as we increase the number of asset classes in the portfolio because the diversification will be higher, the risk reduced and we will have more options to use leverage in certain assets. As soon as new studies are performed by our team to prove the previous statement, they will be included in this document as an update.

Also, this is not a passive investment, but a portfolio where adjustments must be done in order to achieve the projected results. Adjustments include the monthly rebalance, the options selling each

time certain conditions are met, and finally the changes in asset allocation triggered by changes in projections of volatility in each position.

Now, and as an introduction to the next item of the document we ask the following. All the adjustments triggered by current and projected market conditions, could they change the returns and volatilities projected based on the back-testing?

They could if the adjustments would be executed in the same portfolio (or portion of the portfolio) that is supposed to be held in the long term. But the use of leverage will actually give us some extra capital we can use to take opportunities created by market conditions. Just to put some context about how much extra capital we can have to re-allocate capital into market opportunities. In order to build the portfolio targeted on 10% CARG (previously analyzed) we only need about 50% of the cash held into a regular margin account. For some types of account we would only need about 20% to 30% of the cash of the account.

We would use the rest of the capital to increase the diversification of the portfolio. This time we will analyze another type of diversification, a different *asset class* could be said. This asset class based on alphas, on the active participation of our management team in the markets, increasing the exposure of some sectors when opportunities are presented. We will analyze this as a different portfolio and after that, the combination of both portfolios.

A couple of notes about the back- testing exposed in this item. The reader may have noticed that all the hypothesis and assumptions described in detail in item 4, in which we based the study were confirmed. This is because previous to propose the assumptions and hypothesis tested in this document, we have already tested hundreds of other combinations, most of them were proved wrong during several studies. The combination we used in here was not the first proposal of our team, but one of the last. All of them were based on the learning that intensive research gave us. Research on how financial assets behave and how we can optimize the portfolios.

Results and conclusions 2. CapitalCastle's high activity portfolio based on alpha: Back-Testing results.

The reader can find a detailed explanation about the premises and guides we use to create the alpha based portfolio at page 26, but we need a brief summary before showing the results of the study. The portfolio seeks market neutrality, which means that the movement of prices of assets in the market should not affect in a positive or negative way the profits or losses in the account. In this case we are talking of neutrality against all the markets traded (US stocks, US bonds, Oil, Natural Gas and precious metals). We use mathematical models to compute theoretical hedges to all of our positions which would eliminate the risk related with the change of prices in the underlying asset, if implemented correctly. *For example if we execute a trade with assets that belong or correlate to the oil industry, the profits and losses of that trade would not be affected by the oil going up or down.*

To accomplish this we build trades with several assets at the same time. In the example of the oil market trade, we would use about 7 or 8 different underlying assets to diversify some risks and make the hedge as perfect as possible.

In order to develop this item as systematically as possible our team listed the basic parameters that have to be met for our team to consider opening a trade, because there could be a statistical arbitrage opportunity. Then we put together historical data for the underlying assets used in the study, and their options since 2002 to 2015 to simulate trades on this data when the parameters are met.

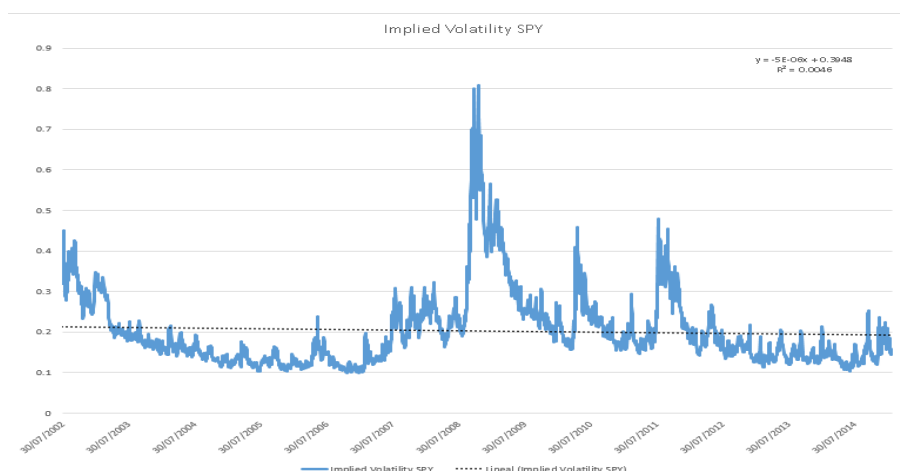
As a first step we split the assets under study into 5 “legs” of the portfolio (5 different sectors). Then we chose a **base asset** to open every trade, where it was used as a comparison point to make all the relative measures (correlation, position sizing, etc.), then we used 6 other assets that in addition to the base asset would be the position of the portfolio in a particular market each time an opportunity is found. The 5 legs in the portfolio were:

- a. US Stock market: in this case we executed the trades using the ETF SPY as the *base asset*. Then we used 6 other related assets to build the entire position. Those 6 assets changed dynamically through all the study period, that is why we don't believe listing them is relevant for the reader.
- b. Precious metals market: In this case we used the ETF GLD as the *base asset*. Then we also used 6 different assets to build the position. Among these assets we included the ETF SLV that tracks the price of silver.
- c. Oil market: similarly we chose the ETF USO as the *base asset* and complemented moments in the study where data was missing with the data of natural gas futures.
- d. Natural Gas market: We used the ETF UNG as *base asset*, and complemented moments in the study where data was missing with the data of natural gas futures.
- e. US bond market: Finally, we chose the ETF TLT as *base asset* to simulate all the related trades.

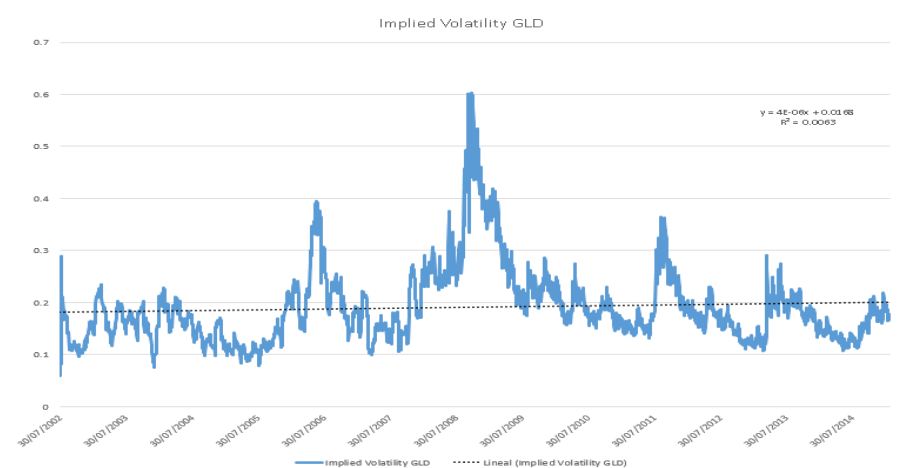
Once we have the results of each leg, we will allocate capital of a simulated portfolio to each one based on the volatility that each underlying market have in average. Then we will measure the performance of the total portfolio.

- To show in a visual way the most fundamental and basic idea used when we built this strategy, we will show in a chart the historical value for the Implied volatility index of each *base asset* used in the study. The implied volatility is a relative measure of the options prices, since we don't see the absolute price of the contracts but the prices taking away other variables (like the price of the underlying, which influence we try to eliminate through the hedges). We added a trend line calculated with the linear regression method that gives us a visual guide of how the implied volatility tends to move around a historical value. We use this property of the implied volatility to find moments in which it may be out of line with a theoretical fair value.

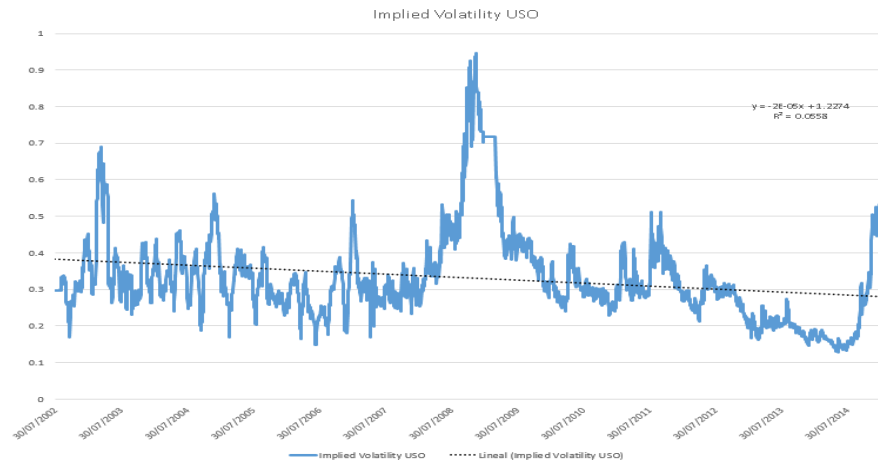
SPY



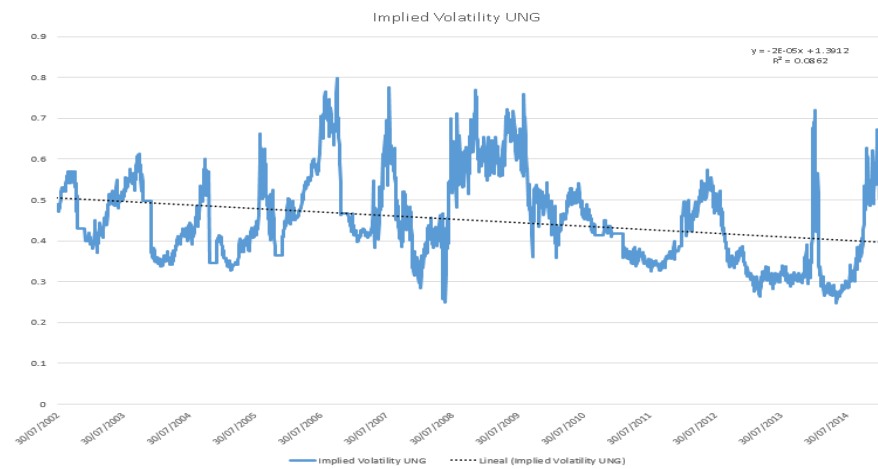
GLD



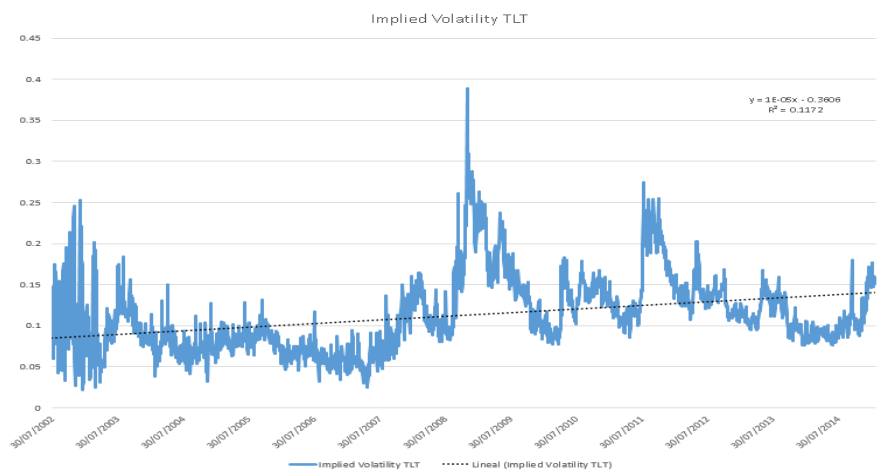
USO



UNG



TLT



1. The simple conclusion is that the relative price of options tend to move around a historical mean. Now, in order to take advantage of this behavior an investor have to take into account a big number of variables. For example just selling options when the implied volatility is *high* relative to its mean will not necessarily profit if the implied volatility falls in value. The investor or trader, have to eliminate the other variables that give price to options; unfortunately this methods are out of the reach of this document.
- Now we will test the conditions we use to find and take advantage of opportunities. As explained we will look to eliminate the influence of the price movement in the underlying assets trying to expose our portfolio to the implied volatility risk only (or at least as purely as possible). We will measure the results for each leg in 2 periods: From July 30th 2002, to January 21st 2014 and from January 21st 2014 to February 21st 2015.

SPY

Volatility arbitrage SPY: 07-30-2002 to 01-21-2014		Volatility arbitrage SPY: 07-30-2002 to 02-21-2014	
Sortino Ratio	0.418	Sortino Ratio	0.604
Abs return	392.97%	Abs return	17.08%
CAGR	14.92%	CAGR	15.67%
Drawdown amount	-3.15%	Drawdown amount	-1.11%
Drawdown start period	01/08/2011	Drawdown start period	15/01/2015
Drawdown end period	08/08/2011	Drawdown end period	22/01/2015
Recovery start period	06/09/2011	Recovery start period	26/01/2015
Drawdown duration (td)	36	Drawdown duration (td)	11
Volatilidad	0.04750059	Volatilidad	0.03185054

GLD

Volatility arbitrage GLD: 07-30-2002 to 01-21-2014		Volatility arbitrage GLD: 07-30-2002 to 02-21-2014	
Sortino Ratio	0.271	Sortino Ratio	0.791
Abs return	298.93%	Abs return	4.14%
CAGR	12.82%	CAGR	3.82%
Drawdown amount	-4.76%	Drawdown amount	-0.20%
Drawdown start period	30/05/2006	Drawdown start period	27/01/2015
Drawdown end period	12/07/2006	Drawdown end period	06/02/2015
Recovery start period	03/08/2006	Recovery start period	13/02/2015
Drawdown duration (td)	65	Drawdown duration (td)	17
Volatilidad	0.06699927	Volatilidad	0.00965508

USO

Volatility arbitrage USO: 07-30-2002 to 01-21-2014		Volatility arbitrage USO: 07-30-2002 to 02-21-2014	
Sortino Ratio	0.138	Sortino Ratio	0.080
Abs return	157.88%	Abs return	2.36%
CAGR	8.61%	CAGR	2.18%
Drawdown amount	-7.10%	Drawdown amount	-3.15%
Drawdown start period	07/07/2008	Drawdown start period	01/12/2014
Drawdown end period	11/07/2008	Drawdown end period	29/01/2015
Recovery start period	29/07/2008	Recovery start period	21/02/2015
Drawdown duration (td)	22	Drawdown duration (td)	82
Volatilidad	0.05848879	Volatilidad	0.02527977

UNG

Volatility arbitrage UNG: 07-30-2002 to 01-21-2014		Volatility arbitrage UNG: 07-30-2002 to 02-21-2014	
Sortino Ratio	0.100	Sortino Ratio	0.348
Abs return	385.70%	Abs return	18.95%
CAGR	14.78%	CAGR	17.37%
Drawdown amount	-23.80%	Drawdown amount	-2.31%
Drawdown start period	13/09/2004	Drawdown start period	23/01/2014
Drawdown end period	15/11/2004	Drawdown end period	04/02/2014
Recovery start period	24/07/2006	Recovery start period	21/02/2015
Drawdown duration (td)	679	Drawdown duration (td)	394
Volatilidad	0.12678252	Volatilidad	0.0559014

TLT

Volatility arbitrage TLT: 07-30-2002 to 01-21-2014		Volatility arbitrage TLT: 07-30-2002 to 02-21-2014	
Sortino Ratio	0.217	Sortino Ratio	0.206
Abs return	151.03%	Abs return	5.25%
CAGR	8.36%	CAGR	4.84%
Drawdown amount	-6.85%	Drawdown amount	-1.32%
Drawdown start period	05/06/2003	Drawdown start period	26/01/2015
Drawdown end period	12/08/2003	Drawdown end period	10/02/2015
Recovery start period	03/10/2003	Recovery start period	21/02/2015
Drawdown duration (td)	120	Drawdown duration (td)	26
Volatilidad	0.05505178	Volatilidad	0.02294552

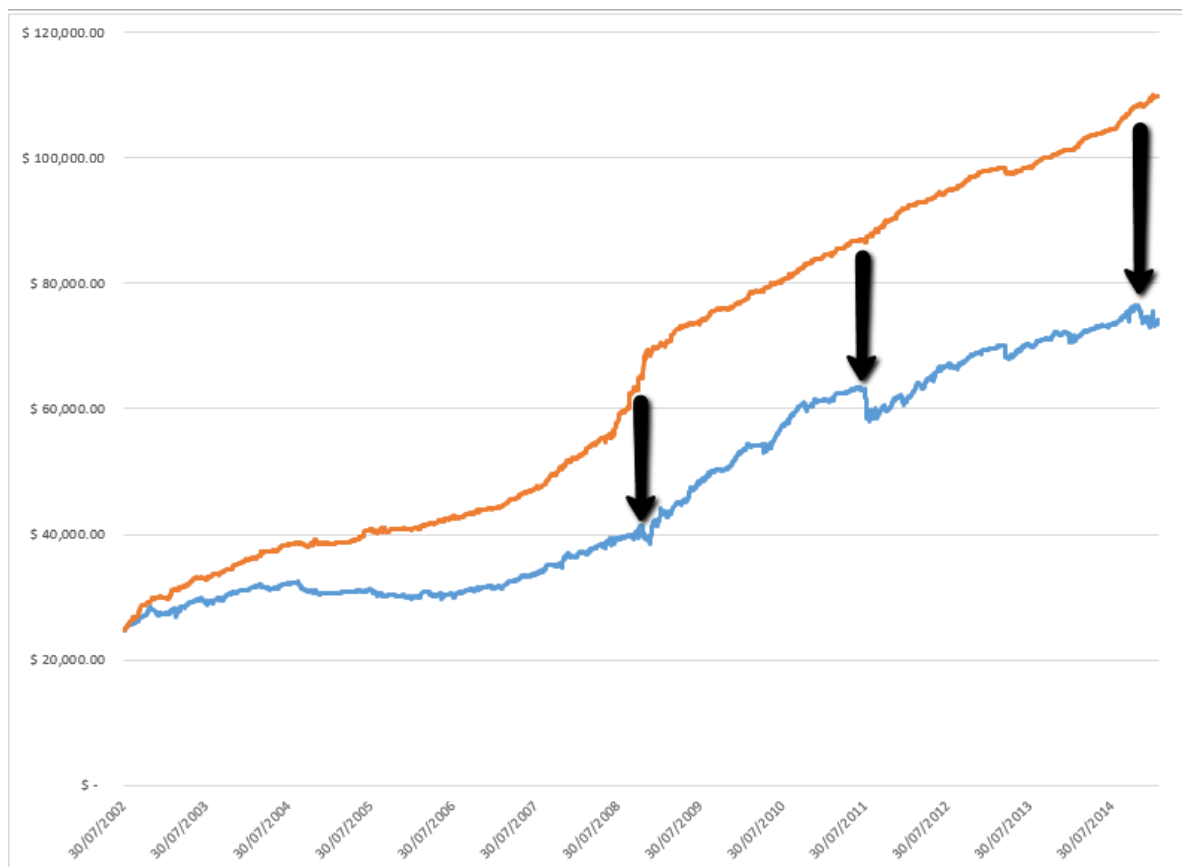
- We will compare the approach of expressing our trades as a spread between several assets with the approach of expressing our trades just in the *base asset*. We simulated a portfolio that only opens trades on the *base assets* listed above, and after measuring its performance, we will add the diversification among multiple assets for each trade and measure its results.

Results of the single-asset-per-trade portfolio

Vol. Arbitrage - 1 position/trade: 07-30-2002 to 02-23-2015	
Sortino Ratio	0.128
Abs return	153.75%
CAGR	7.70%
Drawdown amount	-8.15%
Drawdown start period	27/06/2011
Drawdown end period	22/08/2011
Recovery start period	20/03/2012
Drawdown duration (td)	267
Volatilidad	0.051054844

Results of the multiple-assets-per-trade portfolio

Hedged portfolio - Vol. Arbitrage: 07-30-2002 to 02-23-2015	
Sortino Ratio	0.491
Abs return	3021.33%
CAGR	31.53%
Drawdown amount	-3.56%
Drawdown start period	09/02/2009
Drawdown end period	26/02/2009
Recovery start period	12/03/2009
Drawdown duration (td)	31
Volatilidad	0.070286774



2. This chart shows in a visual way the big difference that the statistics found. Diversification of risks certainly reduces the risk of abnormal movements in the market.

- Finally, we want to find a place in a client's portfolio for this approach. The first step and requirement is to make sure that the approach have a low correlation with the beta based portfolio.

We are going to compute the correlation coefficient for each individual *leg* that are part of the alpha portfolio with the sum of them, also we will add the portfolio based on betas and the SPY as a general benchmark.

	Betas Portfolio	Alpha Portfolio	SPY	SPY leg	GLD leg	USO leg	UNG leg	TLT leg
Betas Portfolio	1	0.140066292	0.35816147	0.12042876	0.03294548	0.02233073	-0.00905874	0.05594564
Alpha Portfolio	0.140066292	1	0.22573512	0.44376714	0.33153661	0.31604841	0.33927372	0.2403081
SPY	0.358161468	0.225735124	1	0.21719893	0.03585942	0.00396359	0.03030112	0.05630236
SPY leg	0.120428765	0.443767139	0.21719893	1	-0.01547956	-0.1830393	-0.11614785	-0.18502102
GLD leg	0.032945478	0.33153661	0.03585942	-0.01547956	1	-0.06934385	-0.16038402	-0.0613801
USO leg	0.022330729	0.31604841	0.00396359	-0.1830393	-0.06934385	1	-0.02839212	0.00702918
UNG leg	-0.009058737	0.339273717	0.03030112	-0.11614785	-0.16038402	-0.02839212	1	-0.22784944
TLT leg	0.055945643	0.2403081	0.05630236	-0.18502102	-0.0613801	0.00702918	-0.22784944	1

- The conclusion is also simple. The correlation between the beta base, and alpha based portfolio is practically nonexistent. If used together the volatility of the portfolio should go down and the returns improved. We will test this idea in the next item.

A couple of notes about the back- testing exposed in this item. The reader may have noticed that all the hypothesis and assumptions described in detail in item 4, in which we based the study were confirmed. This is because previous to propose the assumptions and hypothesis tested in this document, we have already tested hundreds of other combinations, most of them were proved wrong during several studies. The combination we used in here was not the first proposal of our team, but one of the last. All of them were based on the learning that intensive research gave us. Research on how financial assets behave and how we can optimize the portfolios.

Results and conclusions 3. Combination of portfolios based on Betas and Alpha.

We analyzed the betas based, and alpha based portfolio separately because we wanted show to the reader that they deliver different types of returns, they are different types of portfolio. However they can (or must) be used in conjunction in order to get returns that are not strongly correlated with the price movement in any particular market. Also we can reduce the volatility of a portfolio by diversifying risks, and achieving a target return.

In this item we will use an example, similar to the one used when we explained how leverage can help an investor achieve a target return, in the first item of the document.

We will build a portfolio for a client that wants to achieve a CAGR of 15%; this is a client with high tolerance to risk. We will start with a portfolio based on betas that is targeted at 15% CAGR (at least historically). Then we will change the number of contracts used in each trade in the alpha based portfolio in order to achieve a 15% CAGR during the study period. Bellow we see the performance statistics for each portfolio, and a comparison chart.

C.C. portfolio: leveraged-rebalanced	
Sortino Ratio	0.122
Abs return	478.23%
CAGR	15.00%
Drawdown amount	20.75%
Drawdown start period	01/07/2008
Drawdown end period	20/11/2008
Recovery start period	07/10/2009
Drawdown duration (td)	463
Volatilidad	0.105095868

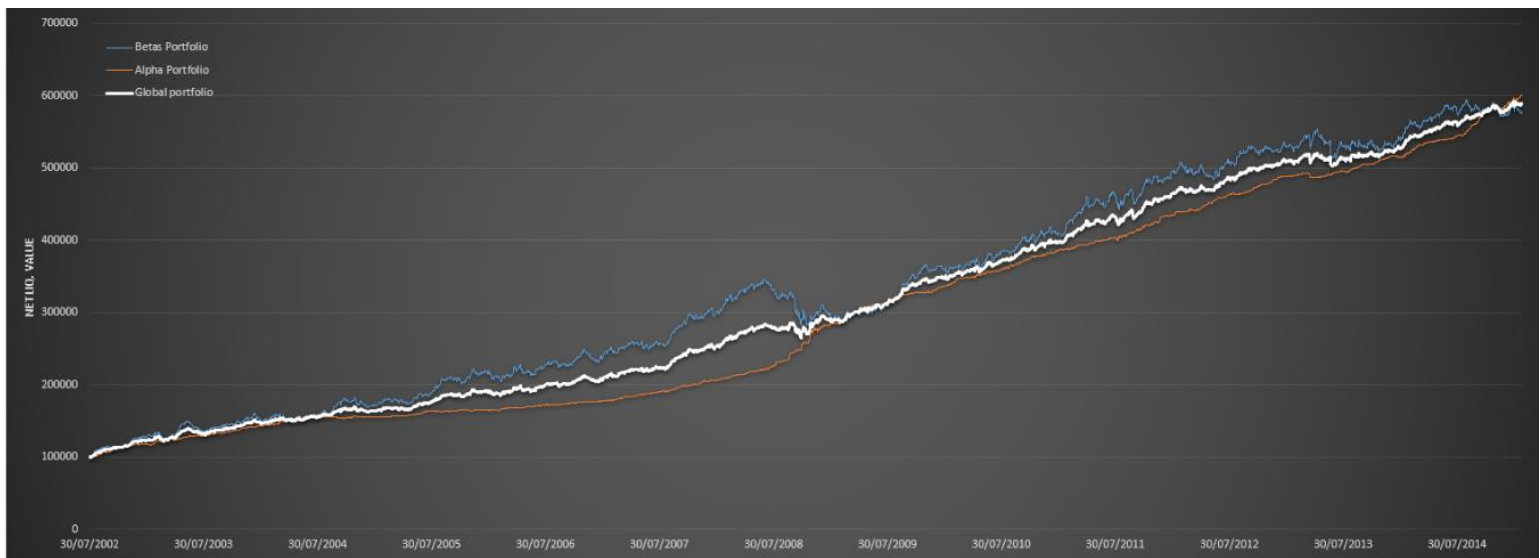
Hedged portfolio - Vol. Arbitrage: 07-30-2002 to 02-23-2015	
Sortino Ratio	0.505
Abs return	500.42%
CAGR	15.35%
Drawdown amount	-1.76%
Drawdown start period	08/12/2008
Drawdown end period	19/12/2008
Recovery start period	29/12/2008
Drawdown duration (td)	21
Volatilidad	0.036150887



- Now we will build a portfolio of USD100.000 initial value but allocated among both the beta based, and alpha based approaches, where we assigned 50% to each. At this point we believe important to make a couple of explanations:
 - We notice that the Alpha based portfolio shows a much higher *Sortino ratio* than the beta based one. It had it much smaller volatility to achieve the same level of return. Why don't we pair their volatilities to a desired risk level, and assign a bigger allocation to the alpha based portfolio? One reason is that the Beta based portfolio is much more predictable as its returns and volatility come from the historical nature of the assets. On the other hand the alpha based approach gets its returns and risks from the market conditions which change constantly. Also from the condition that the strategy continues to work in the long term. This condition may be false in the future since as the markets become more efficient some opportunities may be taken faster, and their risks increase. It is impossible to know when it is going to happen and as a risk management decision, we assign more weight to the more predictable outcome.
 - Other question may be, why do we assign the 50% of the portfolio to strategies that have the risk of being more volatile or less profitable in the future? Actually we don't. Asset allocation starts with the construction of the base portfolio, the beta based approach. As we saw in the first item of this document the capital required to build a portfolio with a targeted return of 15% CAGR may use about 50% of the cash deposited in a standard margin account. If the account is a portfolio margin account, we can build the same portfolio using about 25% of the account's cash. The allocation to the alpha approach is really measured in number of contracts traded on each position in a way that changes in the market conditions that may increase the volatility of the alpha side of the portfolio would be less than the long term expected return of the beta based approach. Implementing this 15% CAGR targeted return with the alpha approach would use about 20% or 25% of the cash in a standard margin account.

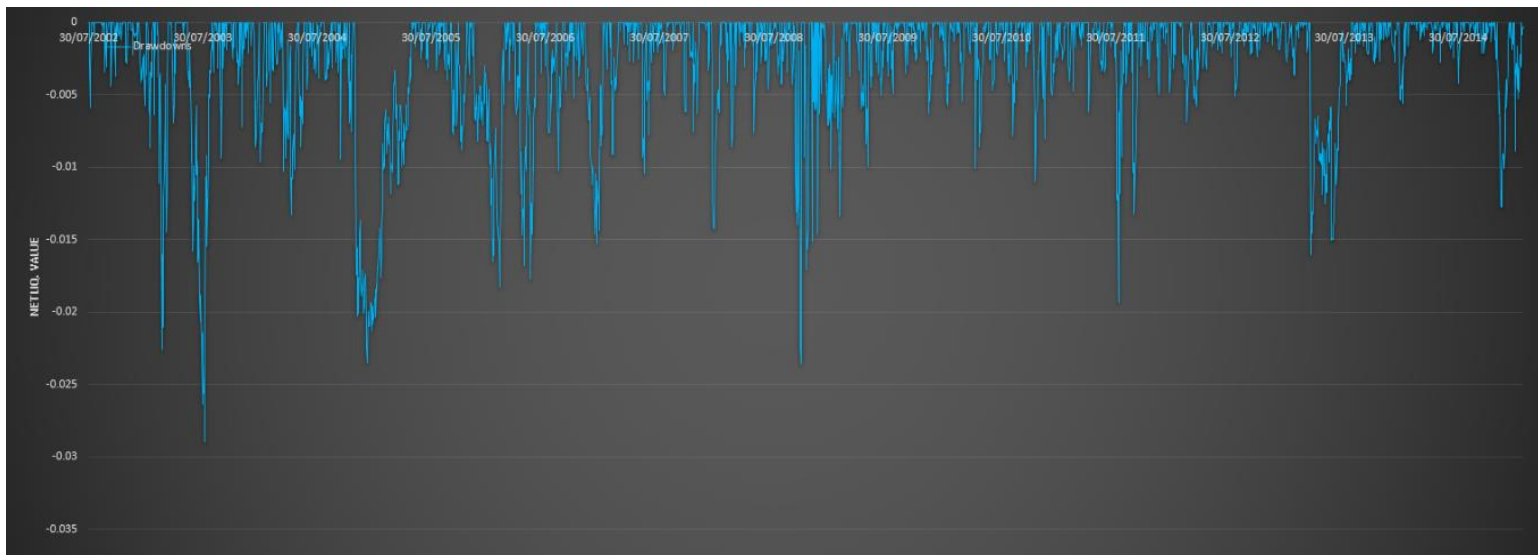
Resultados portafolio global (Betas y Alpha)

Global Portfolio - Vol. Arbitrage & Betas based: 07-30-2002 to 02-23-2015	
Sortino Ratio	0.403
Abs return	495.98%
CAGR	15.28%
Drawdown amount	-2.90%
Drawdown start period	11/06/2003
Drawdown end period	05/08/2003
Recovery start period	28/08/2003
Drawdown duration (cd)	78
Volatilidad	3.92%
Rsquared (SPX)	0.142676072



- Below we analyze other measures of risk, the drawdowns.

Drawdown analysis					
	1	2	3	4	5
Drawdown amount	2.90%	2.36%	2.35%	2.26%	1.93%
Drawdown start period	11/06/2003	13/10/2008	26/11/2004	07/03/2003	22/07/2011
Drawdown end period	05/08/2003	27/10/2008	06/01/2005	21/03/2003	08/08/2011
Recovery start period	28/08/2003	28/10/2008	31/05/2005	11/04/2003	26/08/2011
Drawdown duration (cd)	78	15	186	35	35



Clients' portfolios building. Detailed explanation of the study.

Introduction:

This document has the objective to present the performance of the portfolios used as base in CapitalCastle Investment Group to create investment plans and accounts for clients. We will use statistical tools to measure its performance through different market conditions, and more important, to test the premises in which we base the investment criteria. If the premises are proven right then we can change different variables in the portfolio always knowing that the fundamentals will most likely give the clients positive results.

What we do is to build a simulated portfolio and measure its performance on past data from the last 13 years. The study period will allow us to test the portfolio and its premises through one of the worst financial crisis of the last 2 or 3 decades in order to give us an approximation of the performance the portfolio may have future bearish markets. Then we test the portfolio using random simulations in order to get an idea of how the portfolio may perform on the future. We used 100.000 randomly simulated scenarios.

The results of this process were published in the first 3 items of this document and will allow current and potential clients of CapitalCastle to understand the expected risks and returns for their accounts, so when a client enters into an advisory contract with us the expectations are realistic and grounded on exhaustive research about the portfolios.

Principles in which we base our portfolios construction:

The long term vision of CapitalCastle Investment Group is to establish the advisor as the last place a client has to go in order to find all the knowledge and tools needed to create and execute a financial plan to achieve any kind of financial goals. All the safety, diversification and advisory services that a client may look for will be found in CapitalCastle Investment Group. The client will not need to diversify the investments out of our company.

In order to achieve this vision we will start investing in several investment vehicles which have no correlation between them in order to reduce the volatility in the portfolio. Then we have to choose the optimal method to allocate the client's capital between those assets. In this document we will analyze the principal methods used by our management team to allocate capital:

1. Low activity portfolio based on Beta.
2. High activity portfolio based on alpha.

Before we describe the premises behind each type of portfolio, it is important to remember the fundamental principles in which each person involved with CapitalCastle Investment Group base their decisions and the daily work. The corporate culture that guides our path. We believe that the vast majority of the crowd, of investors, will reach the end of their investment career with mediocre (if not negative) results, and the reason is that they will invest at the same time the rest of the investors. It is a natural behavior but paradoxically eliminates the potential an investment may have

by increasing its price; they will also sell their holdings at the same time all other investors do and again, paradoxically the natural behavior will force prices to fall below fair value.

As our goals were set well above the average of the market, we had to find a way to take the opposite side of what the general public does, or at least be sure to make investments that the masses are less likely to make. We work every day to find better ways to express this principle and we are constantly improving (a characteristic masses usually don't have). Now, let's go into the premises to build investment portfolios:

1. **Low activity portfolio based on betas.** Basically what we look to do is to create a portfolio with non-correlated assets, with really high liquidity and with proofs that they will deliver positive returns over the risk free rate (actually we could say that any investment have expectations of making positive real returns, otherwise nobody would buy them. The financial assets we will use have also a long history of outperforming at least risk free rates). We say that the portfolio is based on Betas because beta is the return we get from risk taking. The returns that exceed that risk free rate and increase as we increase risk, are known as the risk-premium. The compensation we get for taking risks. If we choose investments with higher risks the compensation will increase in the long term, and there will be always a direct relation between risk and returns.

The objective of the portfolio is to give the client a big part (or all of it) of the diversification that could be needed in order to get desired returns at the same time the risk is reduced to the minimum possible level.

We will allocate capital based on the volatility that each asset has shown in the past. We add a mechanical call options selling strategy so the portfolio is going to be paid to hold those assets, we will create an income this way. The income will increase returns most of the time, and reduce the effect of losses when assets value decrease.

The portfolio has been built with a medium to long term horizon as it looks to take advantage of the natural growth of assets, letting the volatility run its natural course. We will not be looking to predict any future movement in assets.

An extra element that looks to improve performance at the same time we apply our corporate culture of going against the crowd is the aggressive rebalance of the portfolio, by selling part of the positions that made money and buying the ones that are making new lows. The final objective is that every position contributes the same amount of risk to the portfolio. If cannot predict the future movement of the assets, the best we can do is to make sure that each one represents the same risk to our capital.

Now, the above is the theory and what we are trying to do in this document is to test the underlying assumptions that are necessary for the theory to be correct, and real. Following are those assumptions listed; the ones we are going to test in past data and simulations:

- i. If we combine long positions on a group of assets with mechanical call options selling, we obtain profits in the long term.
- ii. The selected assets have an almost absolute un-correlation between them, and this results in a notorious reduction in risk in bear markets; or a notorious increment in returns compared to holding each one of the assets alone.
- iii. The fact of using a mechanical call options selling results in a notorious increment in return/risk relation.
- iv. The active rebalance of the portfolio results in better performance than letting the original allocation evolve freely.
- v. The portfolio will perform in the future as expected, based on past returns or at least in a similar way.

If we prove this assumptions correct, we could use them as a base to build investment portfolios using objective research as a pillar. After explaining the premises behind the high activity portfolio, we will explain the methods used to test the assumptions.

2. [High activity portfolio based on alpha](#). The portfolio we described above allows us to plan a medium to long term investment with a rational level of confidence about returns and volatility we will get in the future. The adjustments in the portfolio look to buy assets when they decrease in value, and sell them when they increase to reinvest the profits. In order for the portfolio to work we have to take advantage of the natural movement of assets through time, wait patiently and not try to predict the future movement of prices. Now, we can add another kind of portfolio management that have no correlation with the previously described portfolio. We can build a portfolio that gets its returns from alpha instead of betas.

Alpha is the value added to a portfolio because of good decisions made by a manager. We say that this portfolio is based on alpha because its allocation is based on opportunities that appear in the market, and last for a relative short period of time.

This second portfolio looks to take advantage of temporary opportunities that appear in the financial options markets; we base our decisions in the behavior of the volatility in these markets. This is the same approach we have been using since the foundation of CapitalCastle (*obviously with major improvements*) and it has worked to all the persons involved with the company as a vehicle to get returns with no correlation to the rest of our investments. It is because of this *no-correlation* nature that it is a perfect complement to the betas portfolios.

The difference between both portfolios (and the reason for the lack of correlation) is that we wait patiently for an arbitrage opportunity to be identified in the market to put capital into a position. The rest of the time we maintain more cash in the account.

It is harder to predict or project into the future the results of this portfolio because the opportunities are not cyclical, and they are not found with the same frequency as in the past. However this is why this approach is a good complement to the previous one; one portfolio is always positioned in the market, the other one only has positions when the options prices move away from an equilibrium. We define *equilibrium* as a fair relation between the prices of options of different assets that show a high level of correlation between them. This also allow us to always have hedges that cover us from any unusual movement (*the tail risk that threatens the consistency of most of the short premium strategies*).

In addition we have seen that the periods where we find most of the opportunities are those in which the asset prices are falling, and most investors make irrational decisions (*or simply their goals are not to make profits anymore, but to protect themselves from big losses by buying options*). We would be positioning our portfolio in the markets as most of the people are looking to get out by selling their assets. This is why we generate most of the profits of the alpha portion of the portfolio when the Beta portion is decreasing in value. The result is a portfolio based on Betas that make money as the asset prices raise, and a portfolio based on alphas that create profits as the asset prices fall; a perfect balance that improves the long term performance significantly.

The previous is the theory, and since we are trying to test and prove the premises in which we base our investment decisions, first we have to identify and list the testable assumptions. Here they are:

- i. The mechanical selling of options that meet the parameter established by our management team results in net profits in the long term (in contrast with a zero sum game, where a few big losses take away the profits of many profitable trades).
- ii. The fact that we express our expectations about the price of options as a spread between many assets and markets, looking for a regression to a mean, works as a hedge against unusual movements, and it results in a net profit in the long term (in contrast of the tail risk taking away the profits obtained most of the time).
- iii. The Price of the options we try to sell or buy tend to revert to a historical mean.
- iv. The fact of positioning the portfolio in the market as the vast majority is trying to get out, actually results in better returns than following the trend of the markets.
- v. This approach works as a diversification of the portfolio based on Betas because it has had an almost inexistent correlation with it and improves the long term performance of the overall account.

If we confirm this assumptions performing an extensive research, we can use them as proven premises to make investment decisions.

Methods used to test the assumptions used to build portfolio.

Portfolio based on Betas: test methods.

Once we have the assumptions listed, we determine the methods we will use to test them. The results will be shown as a “step by step” showing the process followed by our team to optimize the portfolio. Through the process we will try to prove the following points:

- We will use for all the tests 5 types of assets that show a lack of correlation between them. US stocks, US Treasury bonds, precious metals, oil and natural gas.
 - We chose these assets because they can be tested using highly liquid instruments, besides the fact that they have also a highly liquid options market.
- We chose 5 Exchange Traded Funds (ETFs) that represent each one of the markets described above.
 - SPY, TLT, GLD, USO, UNG.
 - Some of these ETFs do not have historical data that goes until the initial period of the study. We used the price of futures contracts that represent the same market to simulate the prices of the ETFs in those periods where data was not available.
- To test if the mechanical selling of call options gives us consistent profits in the long run, at the same time we improve a traditional allocation that uses no derivatives strategies we will
 - Measure the performance of a portfolio built with our 5 ETFs from July 2002 to February 2015. We will allocate assets so the risk that each position contribute to the portfolio is the same. This is known as risk parity.
 - Then we will measure the performance of a portfolio built with the exact same allocation but we add the selling of call options against the positions, each time the conditions established by our management team are met.
 - We will compare the performance looking at returns and risks.
- Does the lack of correlation result in a reduction of risk when markets are in corrective phases, compared to holding each one of the assets individually?
 - To eliminate other factors besides the diversification, we will compare a diversified portfolio against individual assets and with no options selling strategy embedded.
- Does the lack of correlation result in an improvement of the returns achieved through the entire period of the study?
 - To eliminate other factors besides the diversification, we will compare a diversified portfolio against individual assets and with no options selling strategy embedded.
- Does the fact of selling call options improve the return at the same time that reduces the risk of the investment through the entire period of the study?
 - We will compare the return, volatility/risk, and their relation for a portfolio composed only with the 5 chosen ETFs with the same measures of an identical allocated portfolio that includes a systematical options selling strategy.
- Will the portfolio have the same performance it showed in the back-testing, in the future?
 - Another way of asking the same question is, if the same portfolio would have been held through a completely different scenario than the one used as study parameter (2002 to 2015), what would be its performance?

- We will simulate 100.000 random generated scenarios and measured the performance of the portfolio in those. It is not exactly testing the portfolio into the future, but it will be a rational approximation of what we can expect in the future.

Portfolio based on Alpha: test methods.

Just as in the previous point we list the methods that will be used to test the suppositions in which we base the building of the portfolio:

- We will use the same 5 types of asset used in the previous study, for the same reasons. The same ETFs will be used to trade those markets.
 - Some of these ETFs do not have historical data that goes until the initial period of the study. We used the price of futures contracts that represent the same market to simulate the prices of the ETFs in those periods where data was not available.
- The price of the options we want to sell tends to move around an historical mean. If the prices are high relative to an historical mean, we can expect a mean regression. We will use the Implied Volatility as base of the study, as it is a relative measure of the options prices.
 - This part of the study will have the purpose of illustrating the general and basic idea of the strategy; not the mechanics of how we take advantage of it. We will try to prove a mean regression behavior of the options prices.
- Does the mechanical selling of options, every time the parameters set by our team, result in long term profits?
 - We will execute an options trade (*selling of options hedged with a simultaneous buying of options in other asset*) each time the prices of options move away from their mean.
- When we express our expectations about the options prices using spreads (combination of trades) between several assets and markets; do we reduce the risk of abnormal movements in the prices? Do we get a better risk/return relation in the long term? Do we get an uncorrelated portfolio with the other strategies used in our clients' accounts?
 - We will try to answer those 3 questions at the same time using as a comparison base the portfolio created only with short/sold options.
 - We will add the simultaneous buying of hedging positions for each short option. We will buy the hedging options in 2 different assets. The assets used as hedges will change through the life of the investment and are chosen based on several variables like correlation and gap between mean prices of options between the spreads.
 - We will measure the performance of the only short options portfolio, just as the correlation with the other strategies used by our team. Then we will add the hedges and make the same measurements in order to compare both results.
- The alpha high activity portfolio works as a diversification of the portfolio based on Betas, as it shows a correlation coefficient close to zero; and when we combine both portfolio the performance of the totality notoriously improves.

- Once we have analyzed the results of the final alpha portfolio, we will simulate a portfolio that diversifies its capital between our Beta and Alpha portfolios, and test it on the same 13 years historical data.

Disclosures

Disclosure 1: We have used a single number to represent costs for each transaction in the simulations, but there is no guarantee that the transaction costs will remain the same when applying the strategies in live trading. Fees charged by the management team are not taken into account in the simulations.

Disclosure 2: Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading or the costs of managing the portfolio. Also, since the trades have not actually been executed, the results may have under or overcompensated for the impact, if any, of certain market factors, such as lack of liquidity.

In CapitalCastle Investment Group we try to mitigate part of these limitations by making sure that the historical costs of live trading do not affect the performance in a significant way. They were not included as a variable because we constantly try to reduce costs; from the negotiation of the fees and commissions paid to the broker, to the reduction of activity to optimize results.

Disclosure 3: Simulated 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 will or is likely to achieve profits or losses similar to those shown.

The investor must understand that any investment decision is made based on suppositions about the future which normally are based on past behavior of assets. In this document we have tested our investment methods on past data and we believe that there is high probability that the performance will be similar, although there is no guarantee about results.

Disclosure 4: The price and value of the investments referred to in this research and the income therefrom may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Disclosure 5: The research in this document is, and must be understood as illustrative and educational information about the methods used in CapitalCastle Investment Group when an investment plan is created for a client. It does not constitute a personal recommendation or advice about the convenience of using any method or strategy in an investment portfolio. The decisions that the reader may make must be based on an analysis and evaluation of the individual necessities, expectations and limitations. An investor must take into account the opinion of other professionals in topics referring local laws and taxes.