ISCTE Business School
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Validation of Technical analysis – Crack Outright case

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- Spine -

Acknowledgments

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I dedicate this thesis to my sister Joana who was recently and for the first time mother of a beautiful baby.

Abstract

The Technical analysis is a study by nature that generates a lot of disagreement, both academic and amongst the market speculators investors' population. The main objective of this thesis was to clarify the essence and basis of what is a Technical Analysis.

The law of supply and demand rules the price variation of a given financial asset. When demand exceeds supply, the price increases. Applying the rational reverse, the price drops. It was based on this principle that was carried out analysis to identify investment opportunities.

The reading and the graphic interpretation through price analysis were the author's analytical basis. This analysis focuses mostly on identifying price levels characterized by the probability of existence of many buyers or sellers. The use of technical indicators served merely as confirmation and support of price analysis.

The challenge of this thesis was reflected in the practice. The goal was to prove the validity of Technical Analysis based on achieving at least 30 trades. The author reached an annual return of 3,075.92% using a thirty days sample period. This profitability surpassed significantly the 'target' initially set to 242% to complete the Technical Analysis validity. Consequently, this validation technique was proven with the assumptions defined in this study.

The high profitability referred above is justified by the particularities and characteristics of the product in analyze, 'The Crack Outright'.

Keywords: Technical Analyses, Crack Outright, Spread Trading, Commodity Markets

G 11- Investments Decisions

G17 – Financial Forecasting and Simulation

Resumo

A Análise Técnica é um estudo que por natureza gera muita discordância, tanto a nível académico como entre a população de investidores especuladores de mercado. O grande objectivo desta tese foi clarificar a essência e a base do que é a Análise Técnica.

A variação do preço de um dado activo financeiro, rege-se pela lei da procura e da oferta. Quando a procura excede a oferta, o preço aumenta. Aplicando-se o racional inverso, o preço cai. Foi com base neste principio que se realizou a análise à identificação de oportunidades de investimento.

A leitura e interpretação gráfica através da análise de preço, foram a base de análise do autor. Esta análise incidiu maioritariamente, na identificação de níveis de preço caracterizados pela probabilidade de existência de muitos compradores ou vendedores. A utilização de indicadores técnicos servira meramente como confirmação e suporte à análise de preço.

O desafio da realização desta tese foi reflectido na parte prática. O objectivo era provar a validade da Análise Técnica como base na realização de pelo menos 30 trades. O autor atingiu uma rentabilidade anual de 3,075.92% utilizando como período amostral trinta dias. Esta rentabilidade ultrapassou de forma expressiva o 'target' inicialmente definido de 242%, para concluir a validade da Análise Técnica. Consequentemente, a validade da Análise Técnica foi comprovada perante as premissas definidas do presente estudo.

Os elevados níveis de rentabilidade acima referidos, são justificados pela especificidade e características do produto analisado, 'The Crack Outright'.

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Chapter 1: Introduction

1.1. Introduction

Over the time, an old discussion between fundamental and technical analysis have been argued between investors. For many of the investors there is no consensus between these two approaches that differ in the way of researching and forecasting the futures securities price movements on the market.

The aim of this thesis is not to refute any principle of fundamental analysis; the main focus is entirely on testing the validity of technical analysis on the Crack Outright. The main goal is to develop a set of successful trades based on technical analysis, and be able to turn the theoretical background about technical analysis into real profits when applied on the Crack Outright.

Prior to the application on the market, a structured theoretical background on technical analysis will be covered in order to test technical tools. Furthermore, theoretical knowledge about trading spreads will be received from the Trading Lab, an intensive training program provided by the company OSTC (explained in Executive Summary). Once consolidate the theoretical concepts, in both, technical analysis and the trading spreads next step is to develop a set of trades in the Crack Outright. The process ends with the evaluation of trading operations which will measure the success level of my own strategy entirely based on technical analysis.

Thus, to perform the validation of Technical Analysis, a technical strategy will be created and tested on the market. As result of this test there are two hypotheses:

- Hypotheses I: Achieving net profitability (>242%) – The validation of Technical Analysis is proofed;
- Hypotheses II: Not achieving profitability – It is not possible to confirm the validation of Technical Analysis;

Profitability is verified if at the end period of trades, verifies a higher amount than the initial amount in 242% after accounting at least 30 trade operations, considering all transactions costs.

The defined of rate of profitability is explained on the conclusion of the results on chapter 3.5.

So, the thesis will be divided in mainly three parts:

The first part will include the literature review, which will provide an understanding of the traded product, The Crack Outright. It includes a brief description of the Futures Market, characteristics of spread trading and product specifications (Crack Outright). The basis of knowledge provided in this part was mainly acquired during the OSTC's training program.

Also being part of the literature review, the second part contains the main principles and philosophy of Technical Analysis. It works as the basis and guides for the analysis applied during the trading operations.

The last part is composed by the application of the analysis on the market by performing a set of trading operations on the Crack Outright .The evaluation of the trading results will define the level of profitability achieved by a strategy based on technical analysis and the final conclusion (the hypothesis I or II) will be obtained.

Chapter 2: Literature Review

2.1. Financial Markets (Types and Structure of the Markets)

The term 'Stock Exchange' is often used for many different contexts and for many different people. Although the Stock Exchange Market is only a part of the Financial Markets, being one of several different markets. The idea that an investment on Financial Market means the investment in shares of a given company is common in some of the individual investors. This direct association to the Stock Exchange Market may lead to many investors do not have a clear vision, neither an entirely view of what represents the Financial Markets and their possibilities of investments.

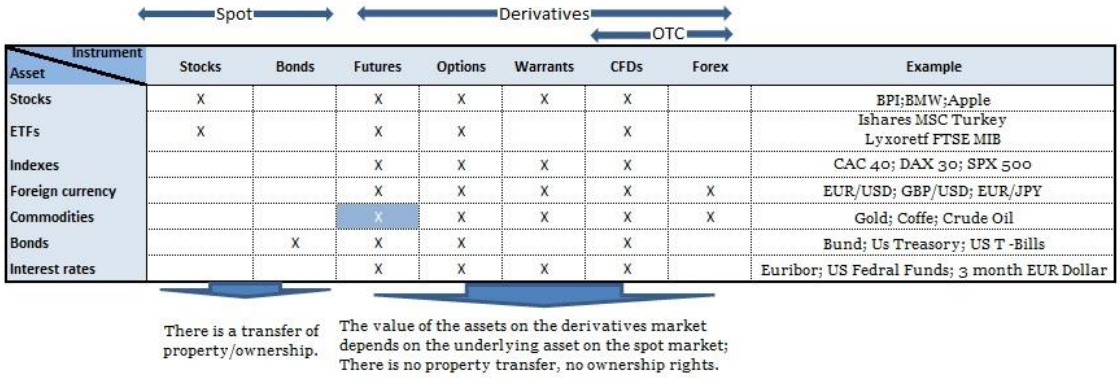
Therefore, the first chapter of Literature Review has the aim to provide an overview of the Financial Markets covering the different assets tradable in the market. Focusing on the financial instrument used to negotiated, Futures contracts, and the market which the traded product belongs, Energy market.

2.1.1. Financial Securities

Being the aim of this thesis proof the efficiency of technical analysis, it implies the understanding of their basis and principles. The theoretical study of the Technical Analysis is provided forward on literature review on the chapter 2.3. However, the chosen of the assets and markets to operate is directly linked with the way of using technical analysis since there are different specifications when applied the Technical Analysis in different assets. In this way, it is important stablish the criteria to select the financial products to operate on the market before to select them. Next the presentation of the table 1, the mentioned criteria will be presented.

On table 1 is visible the tradable securities divided by type of market: spot and derivatives. The table shows the different ways of investing on financial markets by selecting a given asset to invest and simultaneous an instrument, the way of 'enter' on the market. In other others, it shows the possibilities of investment selecting the asset and their respective market (instrument). Looking to that, through investors perspective it provides an overview about financial markets regarding what invest (asset) and how assets could be invested (instrument).

Table 1: Tradable securities in Exchange Markets



Instrument / Asset	Stocks	Bonds	Futures	Options	Warrants	CFDs	Forex	Example
Stocks	X		X	X	X	X		BPI;BMW;Apple
ETFs	X		X	X		X		Ishares MSC Turkey Lyxoretf FTSE MIB
Indexes			X	X	X	X		CAC 40; DAX 30; SPX 500
Foreign currency			X	X	X	X	X	EUR/USD; GBP/USD; EUR/JPY
Commodities			X	X	X	X	X	Gold; Coffe; Crude Oil
Bonds		X	X	X		X		Bund; Us Treasory; US T -Bills
Interest rates			X	X	X	X		Euribor; US Fedral Funds; 3 month EUR Dollar

2.1.2. Selection of the product

The box filled on blue, on the table above, identify the asset and financial instrument selected to operationalize the trading strategies of TA. The selected product is the Crack Outright. It is a product derivate from two futures commodities contracts, namely Low Sulphur Gasoil and Brent Crude Oil.

The product specifications will be presented on the chapter 2.2. On this part, the key issue is to understand why this product has been chose for testing TA strategies.

The criteria to choose the product were based on the follow aspects:

- Graphical elements
- Volume
- Leverage
- No prior trading experience

Pointing out that, the practical part of this thesis have been made in a professional context, the selected product was made considering some professional aspects. As it was explained on the chapter 3.1, the OSTC internship has the particularity of being a very competitive environment.

The Crack Outright is the difference between two futures contracts with a huge volume, Low Sulphur Gasoil and Brent Crude Oil. Given the importance of volume to TA, it was an important requirement to select the product. In chapter 2.4, it will be further discussed the importance of volume to TA.

Considering all the spreads products that were traded during the internship, the Crack Outright was graphically the most appealing. It because this spread product, trades in a well-defined trends, rather than subsequences ranges as usual in others spread products.

Being the main purpose identifies trading opportunities merely based on graphical analysis, the Crack Outright was the most adequate.

The fact of being a leverage product, it requires a precisely technical analysis, in order to identify points of enter and exit. It also leads the use of a time frame much shorter, which allows the identification of more trading opportunities. Since traders are leverage and small price moves tend to meaning big impact on their overall trading results.

To conclude, being the Crack Outright a completely unknown product for me as a trader, it eliminated any default analysis that could have before starting the practical part of this thesis. In addition, being a spread (difference between two products), proves the multidisciplinary of AT.

2.1.2.1. Futures Market

Futures and forward contracts are a legal agreement between two parties, to buy or sell an asset at a predetermined price at a specified time in the future. This financial instrument allows the investors to negotiate different assets, as it shows on table 1. Futures market allows investors to speculate about the devaluation of a given asset by profiting from that. Contrary, to the spot equity market which investors are not allowed to going short in a position. On spot market, brokers borrow the shares with a limit period until the end of the current trading session.

Backing to the history, the trade of futures began in the mid- 19th century. The establishment of central grain allowed farmers to sell their products either for immediate delivery (spot market), or for forward delivery. This was the beginning of the futures market, a future transaction at a price predetermined today. Nowadays, there are two types of forward commitments, forward contracts and futures contracts. The forward contracts, are OTC (Over the counter), traded derivatives market derivatives with customized terms and features. Futures contract are exchange-traded derivatives with standardized terms.[1]

[1] http://www.cleartrade.com/Commodity-and-Futures-Trading-Options.html

The financial product traded by myself was a future contract, which belongs to the Intercontinental Exchange (ICE), one of the biggest futures exchanges based in Atlanta, US.

The futures contracts have two types of settlement, physical and financial. The physical settlement occurs when the actual underlying asset is delivered in exchange for the agreed-upon price. For trading purpose, the contracts are entered into, for purely financial reasons (i.e. a speculator trader had no interest in taking possession of the underlying asset), the derivative may be cash settled with a single payment equal to the market value of the derivative at its maturity or expiration.[2]

Futures market is also characterized for being a leverage market. Futures are leverage products, since for open a given position the futures exchange will state a minimum amount of money that investors must deposit into their accounts. This initial deposit is called as initial margin. When contract is liquidated, investors will be refunded the initial margin plus or minus any gains or losses that occur from the futures contract position. The gains or losses are calculated multiplying the price change of the underlying asset to the contract size (nominal value), not from the initial margin. The minimum-level margin is determined by the futures exchange and is usually 5% to 10% of the futures contract.[3]

2.1.2.2. Commodities – Energy market

Commodities are a class of asset, available for being traded into derivatives market. As identified on table 1, this class of assets is tradable through futures contracts.

It is an extensive market, divided in sub groups which different types of commodities such as: agricultural, soft commodities, metals, energy. This sub chapter has the aim to provide additional information regarding energy market, before exploring the particular specifications of the product selected, Crack Outright.

Being part of commodities market, the energy products are among the most traded commodities. "*In the case of crude oil, is the largest commodity market in the world, with global demand amounting 80 million barrels daily. Two important benchmarks for*

[2] http://www.investopedia.com/exam-guide/cfa-level-1/derivatives/common-characteristics-futures-forwards.asp
[3] http://www.investopedia.com/university/futures/futures4.asp

pricing are Brent Crude Oil (which is sourced from the North Sea) and West Texas Intermediate (WTI). (Hull, John.1946)" The CME Group and International Exchange (ICE) are the two exchanges that trades a number of futures oil contracts. The next chapter dedicated to product specifications, will explain in detail the characteristics of the crude oil market and its products derivatives.

2.2. Spreads and Synthetic products

In a short way, a spread is defined "*as the sale of one or more futures contracts and the purchase of one or more offsetting futures contract"* (Ross, Joe.2006:15). For purpose of this thesis, operates a spread is a simultaneous purchase and selling of one or more offsetting futures contract, recognized as a spread by the future exchange.

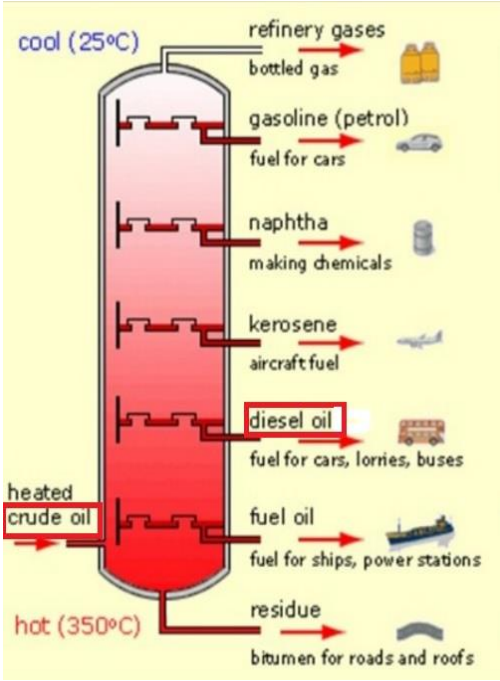
The Crack Outright is a spread recognize by the Intercontinental Exchange (ICE). It is an intermarket spread, since the investors are going long futures in one market and short futures of the same month in another market. It is also a synthetic product. Basically is a strategy that is based by having simultaneous two opposite positions (long and short) in two positive correlated products. They are the crude oil and one of its derivatives, Gasoil (diesel).

2.2.1. Crack Outright

According to the information provided from the exchange ICE (Intercontinental Exchange), "*the ICE Low Sulphur Gasoil/Brent Crack allows investors to trade the spread between ICE Low Sulphur Gasoil Futures and ICE Brent Futures. Trading a position in the crack results in two separate positions in the underlying futures legs; (i.e. a long position in the ICE Low Sulphur Gasoil Futures and a short position in the ICE Brent Futures).*"

Below, on the figure 1, it is visible how the Gasoil (diesel oil) is a derivate from the crude oil. The products of the crack outright are noted with the red rectangle. There is any interest in explain technical issues from the process of refining oil. The only purpose is to proof the positive correlation from the price of these two products.

Figure 1: Refined products, Arun Kumar (Engineering student) – Refining Crude Oil presentation



The strategy of the Crack Outright, is a reflection of refinery business. Since their core business is exactly buy the raw material (crude) and sell the final product Gasoil (Diesel).

2.2.1.1. Product Specifications

Exploring the practical part of trading the strategy Crack Outright, it is important to understand their specifications, in order to be aware of what will be traded in practical part of this thesis.

To start an individual analysis of the market specifications two futures contracts:

Figure 2: ICE Low Sulphur Gasoil Dec 16 –Bloomberg

The Low Sulphur Gasoil Futures contract is traded on the ICE (Intercontinental Exchange) one of the biggest futures exchanges based in Atlanta, US. The underlying physical market for Low Sulphur Gasoil is diesel barges delivered in the ARA (Amsterdam, Rotterdam, Antwerp).

Contract size: 100 metric tones

Maturity: Dec 16 (December 16)

Contract Value: $ 46,525

Currency: US Dollars and cents

Trading Price quotation: Twenty-Five cents ($0.25) per metric tonne

Tick Value: $ 25

Figure 3: Brent Crude Dec 16 – Bloomberg

Similar to the LS Gasoil, the ICE Brent Crude futures contract is traded on the ICE (Intercontinental Exchange).

Contract size: 1.000 barrels

Maturity: Dec 16 (December 16)

Contract Value: $ 51,280

Currency: US Dollars and cents

Trading Price quotation : One cent ($0.01) per barrel

Tick Value: $ 10

The Crack Outright is a strategy based on a spread with a long position in the ICE Low Sulphur Gasoil Futures and a short position in the ICE Brent Futures. Trading the difference implies to match the two different products, in order to invest the same quantity and only trade the difference.

The LS Gasoil (traded in metric tonnes) is converted into a price in barrels using a conversion factor of 7.45. Thus, the minimum crack quantity is 4 lots (made up of 4 LS Gasoil lots & 3 Brent lots). Since:

1 Contract Brent = 1 000 barrels * 3 units = 3 000

1 Contract Gasoil = 100 metric tonnes * 4 units = 400

$\frac{3000}{400}$ = 7,5, the combination that provides the closest value of the conversation factor 7,45.

Price quotation of the Crack Outright:

Tick Value: $ 10[4]

Gasoil: 25USD*4= 100 USD

Brent: 10USD*3 = 30 USD

Calculating the contract value of Crack Outright:

Contract Value Gasoil - $ 46,525

Contract Value Brent- $ 51,280

Contract Value Crack Outright (Exposition[5]): ($ 46,525*4) – ($51,280*3) = $ 32,260

Required Margin[5]: 5%

Thus, is created a product from two different futures contracts. The spread products always have a directional leg. Being a difference, it is important to define which leg gives the direction of the product. For example, a difference between A-B, it is an opposite difference between B-A. In this case the strategy is based on buying LS Gasoil and sells Brent Crude Oil, the LS Gasoil provides the direction.

2.3. Philosophy of Technical Analysis

2.3.1. Rational behind TA

'Technical analysis is the study of market action, primarily through the use of charts, for the purpose of forecasting future price trends.' – by John Murphy

The study of technical analysis has been extensively studied over the years, John Murphy considered by many the father of Technical Analysis. He was the great pioneer of the study of this area.

[4] The tick value is given by the minus of the variation of the price at a given product. It means that the tick value of the Crack Outright is 30 USD, the minus amount between 30, 100 and 70 USD.
[5] A percentage of the contract size amount, which represents the required amount to open a position.

The price changes are reflected by the law of supply and demand. If demand is greater than supply the price goes up, conversely, the price drops. Technical analysis, focuses into understands the human behavior and identifies levels characterized by the high probability of having many buyers (buy zone) or many sellers (sell zone).

According to John Murphy, there are three premises on which the technical analysis is based:

1. Market action discounts everything.

The first premise of technical analysis is based on that anything that can affect the price is reflected on the price. The technician believes that any fact fundamentally, politically, psychological of a given asset is already discounted on the price in the market. Assuming this premise as true, a precise price analysis is all that is necessary. In fact, looking to the price charts and studying price action with a support of technical indicators, technicians lets the market which way it is most probably the price goes.

2. Price move in trends.

'The trend is your friend'

The premise is based that price moves in a trend and the trends tend to persist. The meaning of trend will be further discussed on next chapter, since it is one of the basic concepts of technical analysis. *'The trend in motion is more likely to continue than to reverse* (Murphy, John J..1999)', this premise is an adaptation of Newton's first law of motion. In other words, the pace of demand and supply creates a price trend. The purpose of a technical trader is to identify trends in an early stage in order to predict futures price movements.

3. History repeats itself.

The last principle of Technical Analysis assumes that past price movements are able to be identified as patterns and categorized in order to be predicted in the future. The identification of a price patterns is a 'picture' that appears on price charts. Since these pictures had the common meaning in the past, technicians assumes that will be the same meaning in the future. The interpretation of this price patterns is based on human psychology and it is assumed that the way of human thinking tends to not change. Thus, technical analysis is based on the study on the past in order to predict the future.

2.3.2. Technical versus Fundamental

This thesis has the particularity of focusing exclusively in the proof of the validity of TA. For this reason, only a brief comparison between technicians and fundamentalists will be provided.

Both approaches, TA and Fundamental analysis, have the same goal, determine the direction prices are likely to move. According to John Murphy, the fundamentalist studies the cause of market movement, while technician studies the effect. "*Most traders classify themselves as either technicians or fundamentalist. In reality, there is a lot overlap. Many fundamentalists have working knowledge of the basic tenets of chart analysis. At the same time, many technicians have at least a passing awareness of the fundamentals*. (Murphy, John J. 1999: 7)"

2.3.3. Applicability and adaptability of TA

One of the characteristics of TA is their adaptability of any financial asset at any market. In this thesis, this characteristic is well portrayed. The Crack Outright, the traded product for the practical part of the thesis is an unknown product for the mainly professionals on that industry. Besides that, is a spread product, in other words, is a trade of a difference of two products. The main goal in the perspective of this thesis was to validate TA without any fundamental excuse.

Assumed the first premise of TA by John Murphy (Market action discounts everything), it make sense use the graphical analysis as the main source of analysis a given asset.

2.3.4. Random Walk Theory and the Efficient Market Hypothesis (EMH)

The main purpose of discuss these theories from the perspective of this thesis is merely discuss some academic ideas regarding the price movements in the markets. Random Walk theory and the EMH are two theories both defend the impossibility of forecasting futures price movements.

The Random Walk theory, created by Maurice Kendall, he affirms that the market works in an irrational way, being the price movements unpredictable, following a 'random walk'. The EMH was developed by Professor Eugene Fama. This theory is based on the idea that asset prices fully reflect all relevant information for futures events. It mean, that the financial asset will be always traded to the true value, which

leads to the impossibility of the investors buying undervalued stocks or sell stocks for inflated prices.

There are three variants of the Efficiency Market Hypothesis:

Weak form - This variant accepts that prices on traded assets already reflect al past publicity available information.

Semi-strong form – The second variant is based that prices reflect all publicity available information and that prices change to reflect new information, instantly.

Strong form – The last type of variant defends that price instantly reflects all information, even from futures events.

It is not the intention of this thesis prove or disapprove these two theories. However, it is clear that TA does not approve these theories. Once again, the validity of TA would be only achieved by proofing profitability in practical part of this thesis.

2.3.5. Down Theory (Theory itself and their criticism)

Technical analysis was born in the late nineteenth century. In July 1884, Charles Dow published an important article, which introduced the first index on stocks as a tool to determine the overall market trend. During the development of his theories, Dow was more interested to explain the finding of the direction and the market situation, rather than find a method of forecasting for their future behavior.

The Dow Theory is based in six principles:

1. The averages discount everything

   According to William Peter Hamilton: *'The sum and tendency of the transactions of the Stock Exchange represents the sum of all Wall Street's knowledge of the past, immediate and remote, applied to the discounting of the future. There is no need to add to the averages, as some statisticians do, elaborate compilations of commodity price index numbers, bank clearings, fluctuations in exchange, volume of domestic and foreign trades or anything else. Wall Street considers all these things.'*

   This first principle is similar to the first premise of TA according to John Murphy. The main difference is the fact of the theory applies to the market averages.

Additional, it also refers that markets discount instantaneously in the price through the changes on overall supply and demand, even events that market cannot anticipate such as earthquakes.

2. The market has three trends

Before analyzing how Dow defines the trends behaves, it would be interesting defining a trend. According to Dow, an uptrend is an increasing succession of highs and lows over the time. Contrary, a downtrend is a decreasing succession of highs and lows.

Dow defends that trends have three parts: primary, secondary and minor. He used an analogy between the market trends and the waves of the sea to describe what represent the three distinct parts of a trend. According to Charles Dow, the primary trend represents the tide, the secondary represents the waves and the minor is compared with ripples on the waves.

Is not possible to identify a different tide on the short time, similar in the market a primary trend is only visible in long-term. According Dow, a primary trend should last at least 18 months. The secondary trend is compared to the waves and is seeing as the important correlative movements of the primary trend. The usual time o duration of a secondary trend varies between three weeks to three month. The minor represents the small movements occurred during the secondary trend. Their duration can take between some hours to three weeks. Nowadays, this trend takes too much importance in order to identify the enter signals and to operate with leverage products.

3. Major trends has three phases

According to Dow, all the primary trends have common characteristics, being possible identify typical phases on the upward and downward movements of the price. At the upward movements, there are three phases:

- Accumulation: The initial phase is characterized by the existence of few buyers that are investing based in information not yet discounted on the market. In this phase the price increase slowly, the sentiment is not positive yet.

- Public participation: At this phase, the analyst start to understand what is happening on the market and the investor starts buying. There is an increase of volume, at this phase most of the professional investors already took their positions
- Euphoria: At this phase, the information is completely spread between the market which leads to an increase of the price market. At the end of this phase, the investors who bought at the beginning are already closing their positions, in order to taking their profits.

Regarding the downward movements, there are another three phases:

- Distribution: This phase, initiates after the end of euphoria phase of an upward movement. At this phase most of the buyers are small investors. Normally professional's investors start to anticipate the end of the upward trend during this phase.
- Panic: This phase is characterized by the significantly decreasing of the buyers in the market and by the high volume leading the price fall.
- Selling off: During this phase, everybody wants to 'get out' of the market. The price will fall until the 'bad news' being completed discounted on the market. Then an accumulation phase from the uptrend could begin.

4. The Averages must confirm each other

This principle of Dow, is referent to the Industrial Average and Railroad Average, the two index introduced from himself. According to Dow, an upward movement in Industrial Average is only valid if there is also a signal of upward trend on the Rail Average. If there is a divergence between the movements of the indexes, Dow does not accept a given movement as a signal of buy or sell.

5. Volume must confirm the trend

The volume is considered an instrument which allows supporting the confirmation of a given trend. There is rule that is based that the volume should follow current trend. However, the volume should not be used as the principal tool of identifying a formation or a reversing of a trend.

6. A trend is assumed to be in effect until it gives definitive signals that it has reversed

This principal of Dow's theory reflects the main Dow's idea that is not so interesting of perceive reversing trends. Rather than, he gave priority to realize the current trend of the market. '*It relates a physical law to market movement, which states that an object in motion (in this case trend) tends to continue in motion until some external force causes it to change direction*.' (Murphy, John J.. 1999:28) Nowadays, identifying signals of reversing could be supported by the study of support and resistance levels, price patterns, etc. It will be further discussed on the next chapters.

2.3.6. Types of TA: Statistical technicians and Chartist (art charting)

By the increasingly specialization on study of TA over the years, it is possible to distinguish two types of technicians: the Statistical technicians and Chartist. From the perspective of this thesis, it is important to discuss these two different types of analysis, in order to understand structure of this work.

The chartist, *'(…) uses quantitative work to supplement his or her analysis, charts remain the primary working tool. Everything else is secondary. Charting, of necessity, remains somewhat subjective. The success of the approach depends, for the most part, on the skill of the individual chartist. The term 'art charting' has been applied to this approach because chart reading is largely an art.*

By contrast, the statistical, or quantitative, analyst takes these subjective principles, quantifies, tests, and optimizes them for the purpose of developing mechanical trading systems. These systems, or trading models, are then programmed into a computer that generates mechanical 'buy' and 'sell' signals'. (Murphy, John J..1999:11).

As referred above, this distinction from John Murphy, justifies the approach used in order to operate the thirty trades in the practical part of the thesis. The chartist is the type of analyst which matches with the trader profile of this thesis.

2.4. Technical Analysis Pillars (Art Charting)

2.4.1. Chart construction

The graph is the most important tool for a technical analyst. Being an art chartist analyst, as discussed on the previous chapter, the graph it is something very important which chart construction should be thinking in detail.

In this chapter, it will be discussed with the most detail the type of graph used for the analysis in the practical part, the candlestick chart. Also, a reference of the two type of price scale: arithmetic and logarithmic. Lastly, the importance of volume on the charts analysis will also be covered on this chapter.

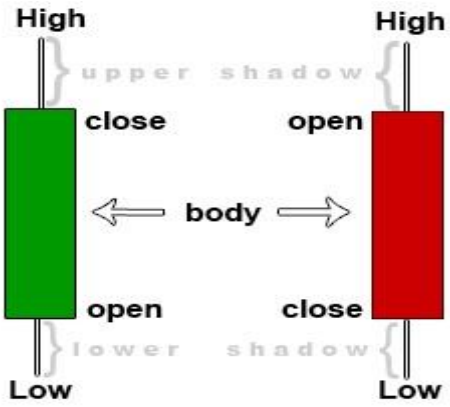
2.4.1.1. Candlestick Chart

'According to Steve Nison, candlestick charting first appeared sometime after 1850. Much of the credit for candlestick development and charting goes to a legendary rice trader named Homma from the town of Sakata. It is likely that his original ideas were modified and refined over many years of trading eventually resulting in the system of candlestick charting that we use today.'[6]

'Candlestick charts are the Japanese version of bar charting[7] and have become very popular in recent years among western chartist. The Japanese candlestick records the same four prices as the traditional bar chart – the open, the close, the high, and the low. The visual presentation differs however. On the candlestick chart, a thin line (called the shadow) shows the day's price range from the high to the low. A wider portion of the bar (called the real body) measures the distance between the open and the close. If the close is higher than the open, the real body is green. (see figure 4)

[6] http://stockcharts.com/school/doku.php?id=chart_school:chart_analysis:introduction_to_candlesticks
[7] During many years the most widely used type of chart in technical analyses

Figure 4: Japanese Candlesticks



The key to candlestick charts is the relationship between the open and the close. Possibly because of the growing popularity of candlesticks, westerns chartist now pay a lot more attention to the opening tic on their bar charts. You can do everything we the candlestick chart that you can do with the bar chart. In other words, all the technical tools and indicators will be showing you for the bar chart can also be used on the candle sticks.'(Murphy, John J. 1999:38)

2.4.1.2. Arithmetic vs. Logarithmic

The charts could be constructed by two types of price scales: arithmetic and logarithmic. The arithmetic creates the charts based on an equidistant price distant. It shows the vertical price with an equal distant for each price unit of change. On the logarithmic scales, it shows an equal distant for similar percentage moves. E.g. 'the distant from 1 to 2 is the same to the 5 to 10. Since both situations represent an increase of 100%.' (Murphy, 1999)

The chart price scale used for this thesis was the arithmetic. According to John Murphy, many stock market chart services use log charts, whereas futures chart services use arithmetic. The stellar trading platform, the OSTC's platform this function was pre-defined to the arithmetic scale. However according to the types of analysis and traded products (only futures contracts), this price scale seems to be the best option.

2.4.1.3. Volume and its importance

According to John Murphy, volume is an important chart information, that should be included on the chart. The volume shows the importance of a given price movement. A higher volume bar in an upward price movement means the existence of many buyers in

the market. Therefore, it provides the important of the price movements. For example, an upward price movement accompanied by a high volume indicates there are more buyers than sellers by a high number of buyers. Contrary, if in an upward movement the volume is low, it indicates there are more buyers than sellers by the low number of sellers in the market.

Despite of volume being one of the most important tools by the TA, the practical analyses did not contain volume analyses. This fact is justified by the product specifications, particularly the fact of being a spread product. However, the fact of have had full access to depth market, provides similar information, equally valuable.

2.4.2. Basics concepts of Trend

For purpose of this thesis, it is probably the most important chapter since it describe the mainly theory applied on the practical analysis of each operation. Important concepts of trend were already covered in the Down Theory chapter. However, this chapter has the goal to provide more precise and practical inputs to work as a support for the trade analysis.

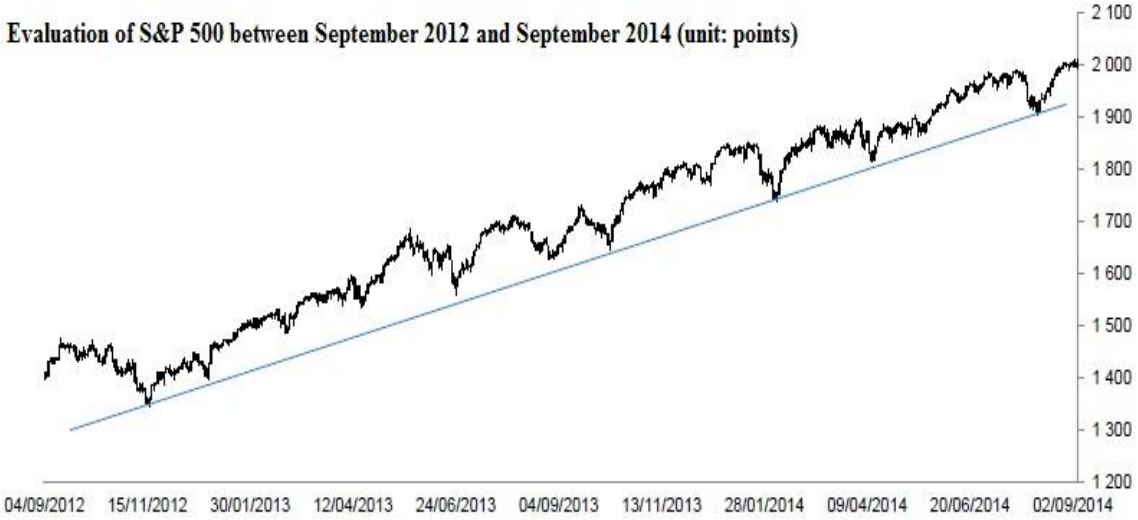
The main analysis provided on the practical part was based in the basis of price action analysis. It means identifications of important supports and resistances levels, moving averages, trend lines. According to John Murphy (1999) and Grimes Adam (1975), the tools mentioned are the basis of a chartist analyst (see chapter 2.3.6).

'*All of the tools by the chartist (...) have the sole purpose of participating of helping to measure the trend of the market for the purpose of participating in that trend. (...). In general sense, the trend is simply the direction of the market, which way it's moving. But we need a more precise definition with which to work. First of all, markets do not generally move in as straight line in any direction. Markets moves are characterized by a series of zigzags. These zigzags resemble a series of successive waves with fairly obvious peaks and troughs. Whether those peaks and troughs are moving up, down, or side-ways tell us the trend of market.*' (Murphy, John J.. 1999:50)

Being the main objective, identify a market, it is important to understand their definition. *'An uptrend is a series of successively highs peaks and troughs. A downtrend is a series of successively lows peaks and troughs.'* (Murphy, John J.. 1999:49).

An analysis of a trend is based on a tool, called trend line, indispensable for the study of trends. Once a trend line affects the price movement, it should be precisely evaluate the reliability of the line. For these reasons, it is important to be aware of the criteria for a drawing trend line. The construction of a trend line is based on a line which link at two points. In the case of being an uptrend line, it is a line which links at least two minimums or closed prices. For having a confirmation of the trend line, after drawing a line from the points, a third point respecting the line should exist (see figure 5).

Figure 5: Uptrend line of S&P 500 between September 2012 and September 2014



Regarding the downtrend line the rationale is to link closed prices or maximus, as it is demonstrated on figure 6.

Figure 6: Downtrend line of BCP (Banco Comercial Português) between July 2008 and November 2008

Regarding the creation of a trend line, there are no specific rules to consider close prices or maximus and minimums. In fact, the close price has a higher significance than

maximus or minimums, since it represent the price that investors are willing to take to the next day (in case of daily time frame). However, there are a set of criteria which define the importance of a trend line. They are:

- The number of touched points over the line
- The size of the line (duration)
- The slope of the trend line

Every time, the price touched or gets closed to a trend line and respects the line, the investor's confident increase on that line. Also, another indication is the fact of being the line more times touched, greater the number of investors who are trading this line. The second criteria define that the greater the length (duration of the trend), the greater the confidant on that line. The last criterion is related with line's slope. The smaller the slope of a line, the greater the signification on that line. Since lines with a big slope are easily penetrated by sideways movements (Peixoto, João Paulo.2004:33).

The trend lines, allow to precisely defining the direction and quality of a given trend. Therefore, they are very important for the study of chartist analysis. In the next chapter it will be studied in more detail the identification of support and resistance levels.

2.4.2.1. Resistances and Supports

The levels of resistances and supports are closely related with trend lines. The support, true to its name, that support is a level or area on the chart under the market where the level of demand (buying interest) is sufficiently high to overcome the level of supply. Usually a support is identified by previous troughs.

Contrary, the resistance is a level or area on the chart over the market where the level of supply (selling interest) is sufficiently low to overcome the level of supply. Usually a resistance is identified as a previous peak.

Supports and resistances, generally indicates potential softening points or inversion points of the trend. The identification of supports and resistance is basically the identification of areas which there is a higher probability of existing buyers (sellers) than sellers (buyers) and consequently be a buy zone (sell zone). It an identification of zone characterized by the existent of buyers or sellers. (see figure 7). Thus, they are physiological levels based on the human behavior.

Figure 7: Resistance and support levels – Evaluation US Dollar Index between April 2012 and August 2014

2.4.2.1.1. Physiologic of support and resistances

Following the previous idea of having physiologic fundamentals behind the conception of supports and resistances, this chapter is to provide further details regarding the market psychologic. To better illustrate this, it will be presented an example provided by John Murphy.

'*(…) let's divide the market participants into three categories – the longs, the shorts, and the uncommitted. The longs are those who have already purchased contracts; the shorts are those who have already committed themselves to the sell side; the uncommitted are those who have either gotten out of the market or remain undecided as to which side to enter. Let's assume that market starts to move higher from a supports are where prices have been fluctuating for some time. The longs (..) are delight, but regret not having bought more. If the market would dip back near that support area again, they could add to their long positions. The shorts now realize (…) that they are on the wrong side of the market. (…) The shots are hoping (and praying) for dip back to that area where they went short so they can get out of the market where thy got in (their break even point). Those sitting on the sidelines can be divided into two groups – those who never had a position and those who, for one reason or another, liquidate previously held long position in the support area. The latter group are, of course, mad at themselves for liquidating their longs prematurely and are hoping for another chance to reinstate those longs near where they sold them.*

The final group, the undecided, now realize that prices are going higher and resolve to enter the market on the long side on the next good buying opportunity. All four groups are resolved to "buy the next dip". They all have a "vested interest" in that support area under the market.' (Murphy, John J.. 1999: 59)

This example, provided by John Murphy, is the perfect demonstration how the psychological factor explains the price action analysis. For the same reason mentioned on the example of John Murphy, it is usual the support become resistance and vice versa. The next image, which shows the evaluation of the Ibex 35[8], reflects graphically how a support has become into a resistance.

Figure 8: Saxo Bank Platform – Evaluation of IBEX 35 between September 2013 and October 2015

The previous image was created by the author. The level of 9,250 points (the dark horizontal line) is the support zone which has become into a support. This fact is entirely based on the physiologic market and consists of the one of the most fundamentals of chart analysis. Therefore it is usually verified. In the practical part of this thesis, it was often described by the author.

2.4.3. Price Patterns

Being the principle of TA, study the graphs from past movements in order to predict the futures ones. There are certain patterns which commons characteristics that present a

[8] Spanish Index

high possibility to behave the same way on the future. The price patterns are divided into two categories: reversal and continuation.

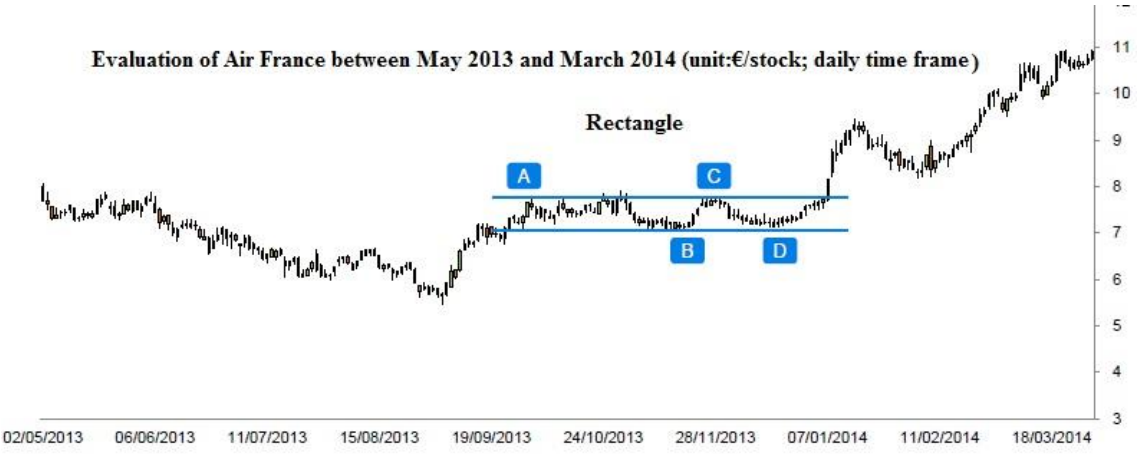
On this chapter, it will be presented only the price patterns identified on the trading analysis. They are:

- Rectangle
- Flag

Both of them are continuation patterns and were identified on the trading analysis.

The rectangle is often observable price pattern on the chart analysis. "It represents a pause in the trend during which prices moves sideways between two parallel horizontal lines. (John Murphy, 1999:147)." These parallel lines are visible on figure 9.

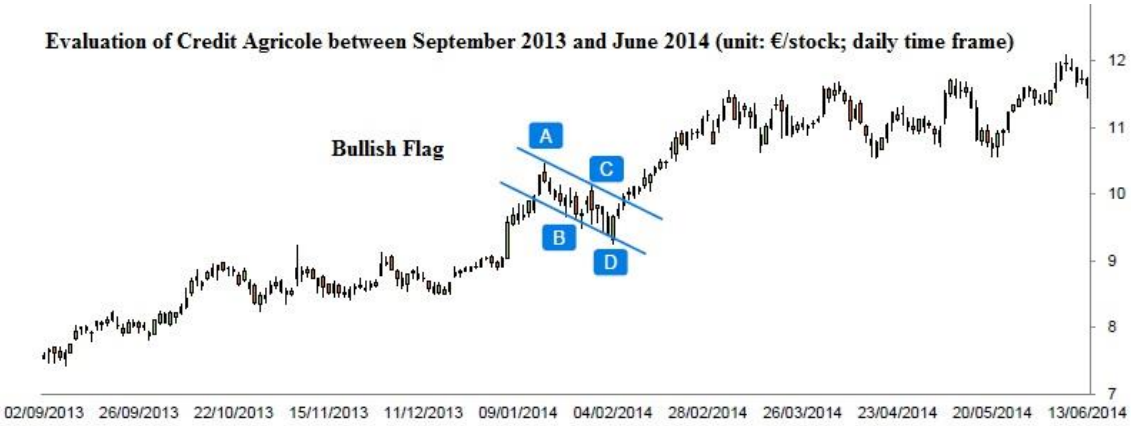
Figure 9: Rectangle Price pattern – Evaluation of Air France between May 2013 and March 2014 (Activotrade e-book)



On this example there is a continuation of the trend after a breakout of the resistance. They are seeing as consolidation of price. It happens when the level of demand and the level of supply are equalized. The breakout of the resistance indicates that, the buyers won 'the battle'.

The other price pattern identified on the trading analysis was the flag, more specifically a bullish flag.

Figure 10: Bullish Flag Price pattern – Evaluation of Credit Agricole between September 2013 and June 2014 (Activotrade e-book)



This price pattern is characterized by a pause of their main trend (uptrend), designed a two parallel lines with downward slope. The confirmation of this price patterns is given by the moment of breakout of the line (A-C), in the case of the image above. It can be interpreted by a moment when investors are taking profits from their long positions. Since the main trend is upward.

There is also, a bearish flag. The rationale behind is exactly the opposite.

2.5.Technical Analysis Oscillators

There are a lot of technical indicators. Since the author this thesis assumes a trader profile of chartist, according to (John Murphy, 1999), as it is referred on the chapter 2.3.6, the basis of the whole analysis was by reading the chart, studying essential price action. The technical oscillators were used, essentially to confirm the analysis of price action.

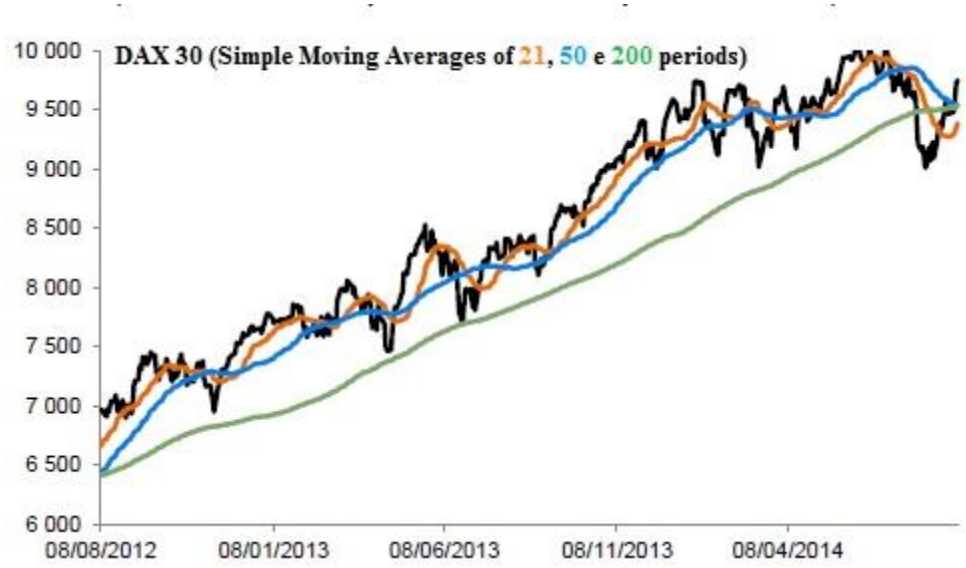
In this chapter it will be provided a briefly description of three oscillators which were used during the trading period. They are:

- SMA (Simple Moving Average)
- MACD (Moving Average Convergence Divergence)
- Fibonacci

2.5.1. Moving Averages

On the figure 11 it is visible the Simple Moving Average (SMA) of 21, 50 and 200 periods applied on the daily graph of DAX 30.

Figure 11: Simple Moving Averages of (21, 50 and 200 periods) in DAX 30. – (Activotrade e-book)

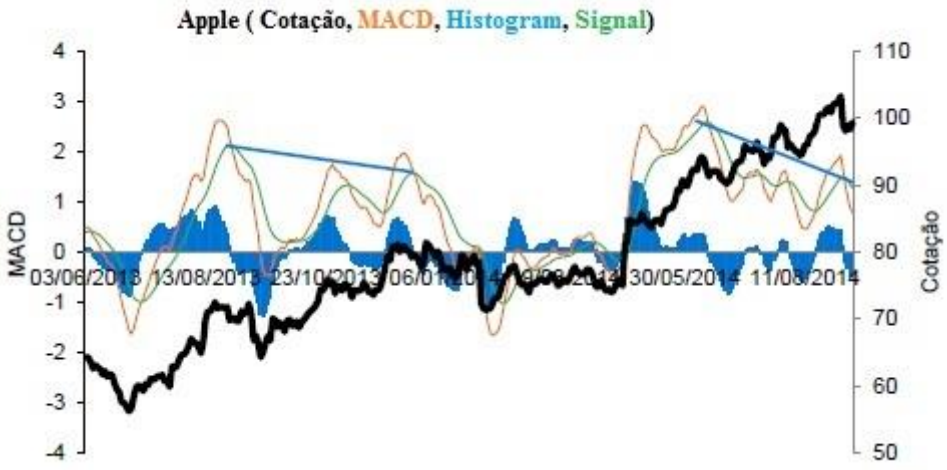


This oscillator is manly characterized by smooth the movements of the price by removing the stronger oscillations. It also allows understanding the main trend through its slope. Besides that, the SMA could perfectly work as level of support or resistance.

To study buy and sell signals, it is necessary observe the cross of different moving averages periods. For example, when the shorter moving average period crosses above the longer moving average period, there is a buy signal. When the reverse happens, there is a sell signal.

2.5.2. MACD (Moving Average Convergence and Divergence)

Figure 12: MACD – Apple Evaluation. – (Activotrade e-book)



Moving average convergence divergence (MACD) is a trend-following momentum indicator that shows the relationship between two moving averages of prices. The MACD is calculated by subtracting the 26-day exponential moving average (EMA) from the 12-day EMA.[9]

A nine-day EMA of the MACD, called the signal line (green line on the figure 12) is then plotted on top of the MACD, functioning as a trigger for buy and sell signals.[10] When the line of MACD crosses above the signal line there is a buy signal. This technical oscillator, similar to the SMA was used always as a confirmation of the chart analysis, in other words, price action analysis.

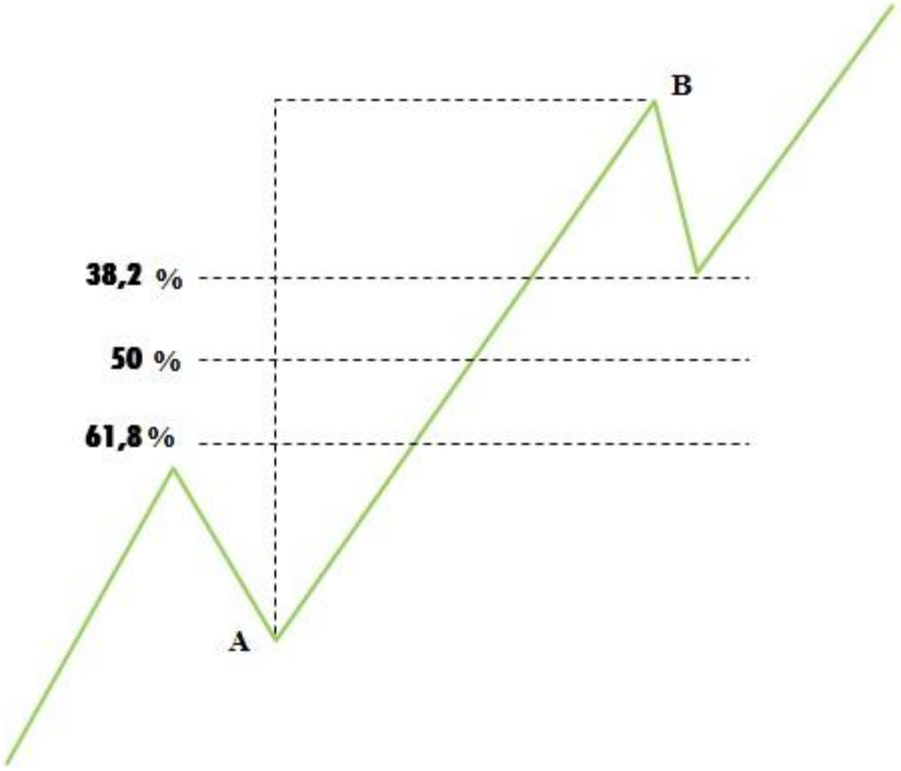
2.5.3. Fibonacci

This technical indicator has a lot empirical knowledge behind it. For the purpose of this thesis, it will be briefly analyzed their applicability. On figure 13, it reflects the three Fibonacci retracements levels: 38,2%, 50%, 61,8%. Considering a swing from point A (minimum) to B (maximum), the Fibonacci provides the most probable correction levels of the price. Looking to the figure 13, the 38,2% of the Fibonacci drawn from the minimum (B) to the maximum worked as support level.

[9] An exponential moving average (EMA) is a type of moving average that is similar to a simple moving average, except that more weight is given to the latest data
[10] http://www.investopedia.com/terms/m/macd.asp

For a stronger analysis, these levels should coincide with the price action analysis. For example, in this case the 38,2% level gains more importance if there is an old resistance or support.

Figure 13: Fibonacci – Activotrade e-book



This technical oscillator, similar to the previous ones was used always as a confirmation of the chart analysis, in other words, price action analysis.

Chapter 3: Application of Technical Analysis – Trades

3.1. Initial context of the product and the period of trading

The chapters covered previously support and work as a preparation of the following practical part of this thesis – the trade execution. This chapter is specifically dedicated to the analysis technique applicability, by developing a set of 30 trades.

Before starting with the results and analyses presentation, will be addressed the trades context and involvement, as well as the reasons that led to operate the Crack Outright, as chosen product to prove and validate the Technical Analysis.

All trades were developed in a professional context; from February to May of 2016 I joined the OSTC training program. The purpose of this training program was to train and evaluate a group of nine people, and from those nine people, only three would have the possibility of enrolling on a job opportunity as a Junior Trader OSTC. In this regard, the trade environment was professional and a real scenario. Despite the training period being done in a demo account with play money, there was a lot of pressure and competition amongst the nine that were racing to get the investment fund trader position. The stress and emotional pressure that is involved when operating with real money, in part was reflected within the emotions of wanting to be part of the top 3. Nevertheless, the key criteria to select candidates were based in account performance.

The product chosen to validate the technical analysis applicability was based considering the range of products available to operate. The reason why Crack Outright was chosen is due of being the product technically most appealing. I came to this conclusion together with my OSTC trainers, during the theoretical training period given in February.

In the following chapter will be presented the different types of orders used during trade operations.

3.1.1. The Company – OSTC

This chapter has the aim to provide a brief presentation regarding OSTC. Since, the whole practical part of this thesis was development as part of the author's job.

OSTC is a prop-trading company, which their trades, operates with the company's capital in order to create profit by market speculation.

To a better understanding of the company, it is provided below the vision and values of the company.

Vision

OSTC will be the global leader within its chosen markets by maximizing the potential of every trader and every trading opportunity.

Our ambition is simple, though quite a challenge.

To be recognized as the global leader in what we do – and to bring out the best in everyone who works for us and in every trading opportunity. The two are, of course, inextricably linked.

By doing everything that we are capable of, both individually and as a company, we will naturally assume and maintain a leadership position, both in the market and in terms of our reputation.[11]

Values

High Performing

We want our people always to be able to perform to their maximum and fulfil their potential.

Dynamic

We want to be agile – able to see opportunities and to take advantage of them in a way that benefits us all.

Committed

We expect a lot of ourselves and we expect the same commitment from all of the people at OSTC.

[11] http://www.ostc.com/about-us/vision

Disciplined

We value strict discipline. It enables all of us to operate within clear boundaries and minimizes our risk.

Respectful

We respect the views and opinions of all our people. We listen.

Passionate

We care about every detail that affects our business and we are driven to be the best at everything we do.

On the next chapter it will be explained the all order execution used on the practical part of this thesis.

3.2. Trading orders

This chapter has the aim to provide an idea regarding the orders execution. The image below shows the depth market of the Crack Outright Dec 16, and how the orders are placed on the market by the platform which was used to operates the thirty trades.

Figure 14: Market depth of Crack Outright provided by Stellar platform

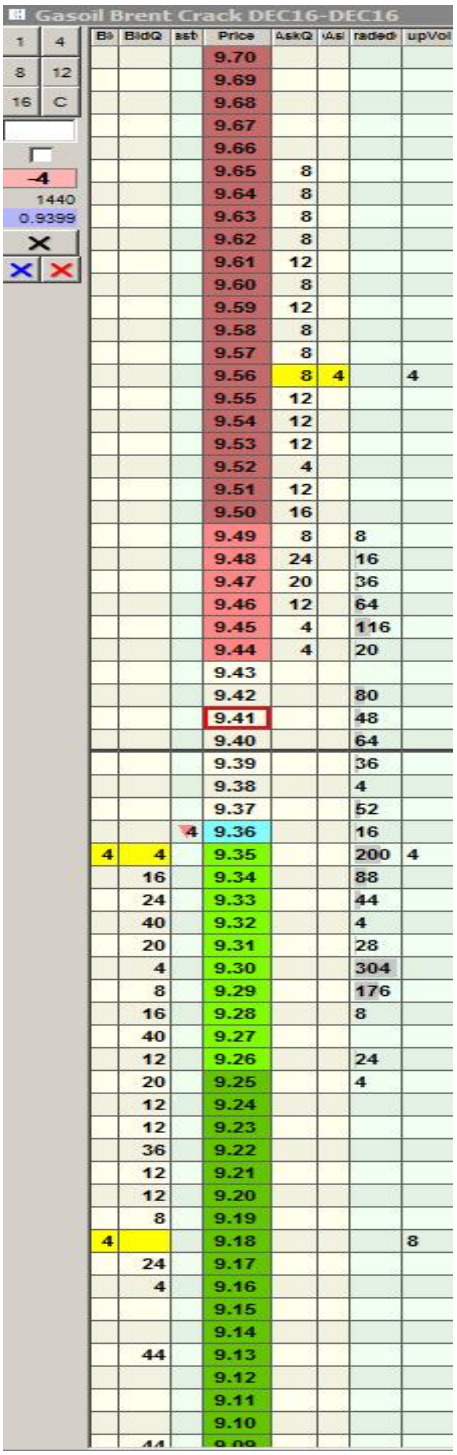
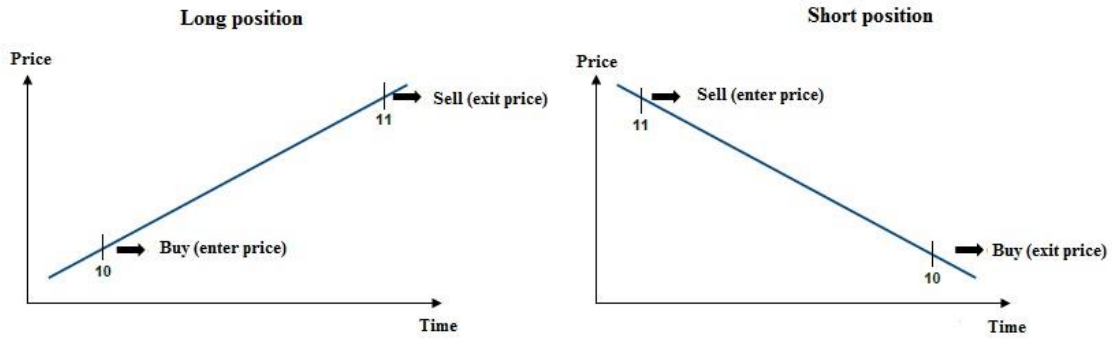


Figure 14 is a trading print screen in which shows the Stellar platform. The red rectangles are the ask price levels, which represent prices sellers are willing to sell. The green rectangles are bid price levels that show there are buyers willing to buy at that price. And it was through a simple click that we could sell and purchase orders. The yellow rectangles symbolize the orders placed. The white rectangles represent the choice levels. These choice levels are price levels without any buyer or seller interested.

According to the trader analysis and to what he believes to have more chance to happen, you can bet in both directions in the market. This characteristic is explained in greater detail in chapter 2.1.1.1 describing the specifics of future contacts. Therefore there are two types of position: long and short. The image below explains the rational behind them.

Figure 15: Long and short position illustrated – Activotrade e-book (adapted by the author)



As you can see in the depth market image (figure 15) there is a purchase order on the landing of 9.35. In this case it would be a purchase order to close as a short position. At this price level 9.35 there is an exit order from a short position.

There are various order types available, but given the specificities of this product it has only been used four types of orders. Orders can be divided into two types: entry orders and exit orders. The orders used in operations were:

Entry orders

- Limit order – Ensures the entry price but does not guarantee execution. In a long position the price can run as indicated or at a price below the market. In a short position the price can run as indicated or at a price above the market.

- Market order - Does not guarantee entry price but ensures execution. In a long position buys at the lowest price available. In a short position sells at the highest price available in the market.

Exit orders

- Stop loss[12] – It is a market order designed to limit an investor's loss on a position in a security. With a stop loss order for a long position, a market order to sell is triggered when the stocks trades below a certain price, it will be sold at the next available price. In case of a short position, a market order to buy is triggered when the stocks trades above a certain price, it will be bought at the next available price.
- Take profit – A take profit order is an order that closes your trade once it reaches a certain level of profit. It is a limit order.

[12] http://www.investopedia.com/terms/s/stop-lossorder.asp

Operations – Evaluation of the results

This chapter presents the results of the Technical Analysis test validity. Considering the information provided from the profitability obtained, it will be possible to conclude the Technical Analysis validity.

The image below is a resume of the results of operations performed.

Table 2: Summary of the trading results

Trade number	Position	Entry price	Exit price	Profit/Loss tiks	Profit/Loss value (USD)	Account Value (USD)
						10 000
1st	Long	9.47	9.57	**10**	300	10 300
2nd	Short	9.76	9.66	**10**	300	10 600
3rd	Long	9.71	9.76	**5**	150	10 750
4th	Short	9.83	9.94	-11	-330	10 420
5th	Short	9.95	10.04	-9	-270	10 150
6th	Short	10.08	10.00	**8**	240	10 390
7th	Long	9.98	9.93	-5	-150	10 240
8th	Short	9.96	10.01	-5	-150	10 090
9th	Short	10.02	9.97	**5**	150	10 240
10th	Long	9.95	9.83	-12	-360	9 880
11th	Long	9.80	9.91	**11**	330	10 210
12th	Long	9.81	9.90	**9**	270	10 480
13th	Short	9.92	9.83	**9**	270	10 750
14th	Long	9.81	9.75	-6	-180	10 570
15th	Long	9.80	9.89	**9**	270	10 840
16th	Long	9.78	9.90	**12**	360	11 200
17th	Short	9.95	9.85	**10**	300	11 500
18th	Short	9.95	9.85	**10**	300	11 800
19th	Long	9.53	9.39	-14	-420	11 380
20th	Long	9.17	9.28	**11**	330	11 710
21st	Short	9.42	9.35	**7**	210	11 920
22nd	Long	9.20	9.34	**11**	330	12 250
23rd	Short	9.36	9.30	**6**	180	12 430
24th	Long	9.31	9.05	-26	-780	11 650
		9.17	9.05	-12	-360	11 290
25th	Short	9.18	9.08	**10**	300	11 590
26th	Long	8.93	8.77	**16**	480	12 070
27th	Short	9.71	9.73	-2	-60	12 010
28th	Short	8.50	8.33	**17**	510	12 520
29th	Short	8.29	8.20	**9**	270	12 790
30th	Short	8.64	8.75	-11	-330	12 460
31st	Short	8.44	8.30	14	420	12 880
32nd	Long	8.37	8.30	-7	-210	12 670
33rd	Long	8.28	8.42	**14**	420	13 090
34th	Short	8.84	8.64	**20**	600	13 690

Table 2 contains 34 trade transactions held in a 30 day timeline, also includes the individual operation results and the account value variation. After 30 trades, the value of our portfolio grew from $ 10.000 to $ 13.690. With this data we can state that we

obtained a 36.90% return rate. This return rate is obtained from the account value at the end of the 34 transactions divided by the account value before executing the trades.

Converting this profitability obtained in the 30 day timeline for an annual fee:

[((1+36,90%)12)-1)*100] = 4,233.52 %

Another important factor may be considered from this result:

- number of successful trades
- average of gains and losses on each trade

A total of 23 successful trades were made representing a gain of $ 7.290. On the other hand, there were a total of 11 failed trades representing a total loss of $ 3,600. From this data we can assume an earnings average of $ 317 and a loss average of $ 327, obtaining a ratio risk/ reward of 0.97.

3.3. Trading analysis

In this chapter, it will be analyzed the individual analysis of each trade. In total, thirty (30) trades from thirty-four (34) trading operations were accounts. The mismatch of the four trades is explained by the 3 errors of executing the orders at the platform and one trade which did not have the technical analyses support. Therefore, it will not be analyzed any trade opportunity on this 4 operations.

To better recognize the operations on the graph, it was introduced horizontal lines from different colors, in order to achieve a better understanding of trade. The lines differ from color since they have different meanings. Below it is explained the meaning of the different colors.

Red Line – It identifies the main analysis of price action for the short-term. The red line it was used for the purpose of identifying chart formations and important resistances and supports.

Dark Blue line – This line identifies the main analysis of price action for the long-term. It provides the identification for the primary trend for a given time frame. These are the lines that usually keep unchanged for a long period. However, these two lines have a very similar meaning. There are some cases which the distinction of them was not respected.

Green line – It is used to identify the enter price of a gain operation.

Blue line – It is used to define the exit price enter of a gain operation.

Black line – It is used to define the enter price enter of a loss operation.

Pink line – It is used to define the exit price enter of a loss operation.

Another important note regarding the individual analysis and chart visualization is that in some cases there are a big temporal gap between the print screen and the order execution. For this reason, the mouse pointer when visible always indicates the enter price of the trade.

In addition to the mentioned above, there are other specifications which will be referred on the specific individual analysis of each operation.

Below, it will be provided four individual chart analysis of the thirty trading operations. The rest of the analysis will be provided on the appendix. As mentioned on chapter 2.3.6 (Types of technicians), the following analysis will follow the art charting approach.

For a full comprehension of the all operations, on the annexes, it will be provided all the graphs which worked as a support for the trading opportunities as well, all the analysis description regarding the thirty operations.

Below, as a selected sample of the trading operations will be present the four trade operations. They are: 11th, 20th, 24thand the 34th trade.

<u>11th Trades</u>

Appendix:

Day: March 21st

Position: Long

Quantity: 1 strategy

Profit/Loss: +11 ticks

Enter price: 9.80 USD

Exit price: 9.91 USD

Figure 16: Proof of the 20th trade, print screen from the computer of OSTC's office (Stellar platform)

21 Mar 2016 16:29:22	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.91
21 Mar 2016 16:11:00	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.8

Analysis description

Time frame: 60min

Figure 17: 11th Trade. Crack Outright Dec 16, time frame 120 minutes

There is an uptrend line, drawn from the minimums of 2nd February, passing through minimums of 8th February, 1st March, 7thMarch and 15th March. The price did not touch on that line, but it did swing sufficiently close, to makes me enter on 9.80 USD. Adding more information to this support zone, on analysis of 120 time frame, the green line which represents the enter price level is also an old resistance, verified during the month of February.

<u>20th Trades</u>

Appendix:

Day: March 29th

Position: Long

Quantity: 1 strategy

Profit/Loss: +11 ticks

Enter price: 9.17 USD

Exit price: 9.28 USD

Figure 18: Proof of the 20th trade, print screen from the computer of OSTC's office (Stellar platform)

29 Mar 2016 17:16:30	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.28
29 Mar 2016 16:16:35	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.17

Analysis description

Time frame: 60min

Figure 19: 20th Trade. Crack Outright Dec 16, time frame 60 minutes

Looking to the graphs of daily time frame and 240 minutes, it is visible a support around 9.16. On the graph of 240 minutes time frame, the horizontal red line has been worked as support in end of February and beginning of Mach. After breaking the support of the potential bullish flag which was never confirmed, the market gives the signals of the end of the uptrend. Since confirming the bullish flag there was the only change of technically continues in the uptrend. Since, a flag is a continuation pattern; the breakout of his support confirmed the end of the middle-term trend. Looking in a

long-term analysis, the downtrend line drawn from maximums of October 2015, passing through maximus in November was respected as resistance zone the middle March. It means that the down trend from long term continues. After respecting this important resistance, the next support zone identified was around 9.16. This was the reason to enter into this trade opportunity.

24th Trades

Appendix:

Day: March 31th

Position: Long

Quantity: 2 strategies

Profit/Loss: -38 ticks

Enter price: 9.36 USD

Exit price: 9.30 USD

Figure 20: Proof of the 24th trade, print screen from the computer of OSTC's office (Stellar platform)

01 Apr 2016 16:02:30.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.05
01 Apr 2016 16:02:28.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.05
01 Apr 2016 14:15:19.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.17
01 Apr 2016 13:28:47.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.31

Analysis description

Time frame: 60min

Figure 21: 24th Trade. Crack Outright Dec 16, time frame 60 minutes

The idea of this trade was to repeat the strategy applied on 20th and 22nd trade. The support identified around 9.17, had been working as support. This was the only trade that was used a quantity bigger than one strategy. It means that the tick value (the minimums possible variation) worth 60 USD for point, instead of 30 USD. Technically, there was identified a support zone around 9.30. It worked as support in the end of February, in the beginning of March and most recently in last days of March. The biggest and the main failure of this trade was the fact of not being disciplined and the respect the technical analysis in the moment that there is a breakout of the 9.30. The idea was even worst, when I have decided to enter in another support zone around 9.17 USD. Technically, the support identified at 9.17, is well justified. The failure of this trade is purely related with money management concept. An important support means a zone which there is a higher probability of the existence of buyers than sellers. Thus, when occurs a breakout, the technical analysis says that investors should close their positions, since buyers lost interest. Thus, the entirely failure of this trade, was not the price enter of the two opened positions, rather than the fact of not being disciplined. The correct situation should be open the first one, close at better placed stop loss. Then reentry with another long position at 9.17 price level and close it again with the stop loss. The result would always be negative, but Technical Analysis not provides the certainty of gains. Rather than, it provides a high probability of gains in the long term. However, study concepts as money management are a complementary of the

practicability of TA. Otherwise, what worth has technical analysis if traders did not respect it?

34th Trades

Appendix:

Day: April 11th

Position: Short

Quantity: 1 strategy

Profit/Loss: +20 ticks

Enter price: 8.84 USD

Exit price: 8.64 USD

Figure 22: Proof of the 34th trade, print screen from the computer of OSTC's office (Stellar platform)

08 Apr 2016 15:40:32.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.84
11 Apr 2016 07:19:15.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.64

Analysis description

Time frame: 60min

Figure 23: 34th Trade. Crack Outright Dec 16, time frame 60 minutes

This analysis basically based on the Fibonacci referred on the 30th trade. Looking to the graph of the 240 minutes time frame, it is visible a consolidation of the price from 9.45 to 9.12. Then, it is visible strong downtrend. After making the minimums at 8.11, we observe a reverse in short term of the trend of the price. Thus, were gathering the conditions to drawn the Fibonacci from 9.45 as maximum until the 8.11 as minimum. The enter price was next to the 50% Fibonacci and the exit price next to the 38.2% Fibonacci which could work now as support zone. It was technically perfect.

3.4. Conclusions of results

This chapter focuses on the results conclusion obtained from the 34 operations that are divided into (30 + 4). Four of these trades had execution errors and consequently did not convert into trade opportunities from the Technical Analysis. However, execution errors are part of the trader's performance itself and it is a risk that every trader has to take.

As mentioned in the introduction, the aim is to prove the TA validity applying it in a single product, The Crack Outright. As previously announced, due to the TA application at the selected product there are two possibilities:

- Hypotheses I: Achieving net profitability (>242% [13]) – The validation of Technical Analysis is proofed;
- Hypotheses II: Not achieving profitability (<242%) – It is not possible to confirm the validation of Technical Analysis;

The profitability rate setting was determined by benchmark made with financial leverage funds. The figure 24 reveals the five financial leveraged funds with higher YTD (Year to Date) return.

[13] It was defined considering a benchmark of the best performances of the leverage funds http://etfdb.com/compare/highest-ytd-returns

Figure 24: The 5 highest performance YTD of funds leverage in 2016 - http://etfdb.com/compare/highest-ytd-returns

Symbol	Name	YTD Return	AUM	Avg Volume
BRZU	Direxion Daily Brazil Bull 3x Shares ETF	308.17%	$76,202.50	263,185
JNUG	Direxion Daily Junior Gold Miners Index Bull 3x Shares ETF	291.63%	$646,537.30	16,737,408
GDJJ	Ultra Junior Miners ETF	228.43%	$8,060.90	6,871
UBR	Ultra MSCI Brazil ETF	191.16%	$33,984.50	12,239
NUGT	Direxion Daily Gold Miners Index Bull 3x Shares ETF	189.54%	$1,465,139.10	27,691,715

The set rate was calculated from the average YTD return of these 5 funds referred in the top image. So we have:

[(308.17%+291.63%+228.43%+191.16%+189.54%)/5] = 242%

Given the specifics of Crack Outright product, the yield definition was based on the benchmark of high-risk leveraged products.

After completing 34 trades a return of 3,075.92% was obtained. This way the hypothesis I is verified as; 3,075.92%> 242%. Thus, we conclude the Technical Analysis validity for the Crack Outright product.

The fact that of having obtained a risk ratio / reward below 1[14], may indicate little sustainability in the long-term performance. In this sense, not much relevance to the annual return will be given. However, the fact that it had obtained success percentage of 67.65% reflects the good performance of the trader using Technical Analysis as a unique source of analysis.

[14] Provides a the ratio between (Average of Gains /Averages of Losses)

Chapter 4: Conclusion

This thesis much reflects the author´s passion regarding the financial markets, particularly the Technical Analysis. Believing there is a great academically scepticism in relation to the TA study, the main challenge of this thesis was to create something academically close to trade world reality.

As mentioned in Chapter 2.3.6 - Types of Technicians and according to John´s Murphy bibliography, the author considers himself a chartist. As such, the primary source of analysis was the chart. The author sees the action price analysis as the basis for any analysis. In this sense, the analyses correspond to a description of what the trader was watching while the operation was happening. The analyses were based on the graphic to identify price levels characterized by higher probability of buyers or sellers. Thus the theoretical part developed in this thesis mainly aimed to sustain the trader style as the author revealed in identifying trading opportunities.

The product transacted, named as The Crack Outright, is a totally unknown product to the author; it emphasizes the idea that the achieved performance was totally derived from technical analysis. At no time, in any trade it was placed as a fundamental analysis as an aid in decision-making.

The main objective of this thesis was to validate the success of technical analysis in a real context, where the back testing of strategies are used to identify real investment opportunities.

The author achieved the desired goal; he proved the validity of technical analysis and the hypothesis I was checked. After conducting 34 trades it was obtained a yield of 3,075.92% and 3,075.92%> 242%. Given the fact that the sample period being a month, the annual rate loses some relevance.

In addition to profitability, other parameters were analysed. The success rate of approximately 68% maintains the good performance achieved through the use of Technical Analysis. Conversely, a negative factor to point out is the ratio risk / reward 0.97. This ratio reflects the average earnings per operation will face the average losses. The value of the ratio obtained is justified in part by emotional factor in the decision making of many operations.

The professional environment in which the trades were developed provided a very real scenario in regards to the Technical Analysis applicability.

“Amateurs want to be right.

Professionals want to make money.”

Alan Greenspan

“Work hard in silence, let your success be your noise”

Frank Ocean

Limitations

The main limitation of this thesis is the visual presentation of the analysis performed on graphics, mostly lack of quality. The fact of having to be in control of the real time market monitor interfered in how quick I could do a print screen without existing too much of a data variation. As a consequence in some it can be noticed a considerable gap between the print screen and the trade operation.

Another difficulty I felt was to set a rate of return as a target to overcome and then set the Technical Analysis validity. Given the specific characteristics of Crack Outright product was difficult to get a benchmark.

Finally, the non-approach at the theoretical part in regards to the psychological factor and the concept of money management, as they both are two very important factors in decision-making.

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Appendix 1

1st Trade

Appendix:

Day: March 15th

Position: Long

Quantity: 1 strategy

Profit/Loss: + 10 ticks

Enter price: 9.47 USD

Exit price: 9.57 USD

Analysis description

Time frame: daily

There is a horizontal red line at 9.51 USD, drawn which worked as support from the first days of January. Then, at middle of January there is a breakout and the old support becomes the new resistance. At beginning of February this zone works as resistance on the first attempt, and then there is a false breakout. Since price is trading only a few days above that 9.51 area and the backed below that are. Lastly, at beginning of March the price breaks that area and the trade is executed on the first time that price backs to the support line, previous resistance in end of February, after the last breakout.

Time frame: 240min

There is an uptrend line, drawn from the minimums of 2nd February, passing through minimums of 8th February, 1st March, 7thMarch. The potential bullish flag identified which their support was exactly at the enter price 9.47.

The daily analysis provided an important support zone. The uptrend line from minimums of 2nd February, and the support of the bullish flag were the trigger to enter in a long position at 9.47USD. To refer that the exit price was not good, by the technical analysis there was indications to sell around 9.70, since were the next resistance zone. The fact of being the first trade, I felt emotionally affected.

2nd Trade

Appendix:

Day: March 15th

Position: Short

Quantity: 1 strategy

Profit/Loss: + 10 ticks

Enter price: 9.76 USD

Exit price: 9.66 USD

15 Mar 2016 16:30:25	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.66
15 Mar 2016 15:37:38	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.76

Analysis description

Time frame: 120min

Considering the resistance of the bullish flag, it was identified a resistance around 9.76 level. This opportunity was based on two facts: the resistance line of the bullish flag and the fact of this price level have been worked as resistance from 13th to 23rd of February.

3rd Trade

Appendix:

Day: March 16th

Position: Long

Quantity: 1 strategy

Profit/Loss: + 5 ticks

Enter price: 9.71 USD

Exit price: 9.76 USD

16 Mar 2016 08:55:49	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.76
16 Mar 2016 08:28:38	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.71

Analysis description

Time frame: 60min

There was a trade entirely based on the market depth, which was provided by the platform Stellar. For this reason, the 5 ticks profit will not be accounted for the trading results.

4th Trade

Appendix:

Day: March 16th

Position: Short

Quantity: 1 strategy

Profit/Loss: - 11 ticks

Enter price: 9.83 USD

Exit price: 9.94 USD

16 Mar 2016 14:01:27	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.94
16 Mar 2016 10:39:04	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.83

Analysis description

Time frame: 240min

There was a breakout of the resistance of the bullish flag, which means the high probability of the price continues to rise. However, the area around 9.83, have been worked as previous resistance, during January and February. The fact of the breakout of the bullish flag not have been well confirmed, I have supposed a false breakout. At the moment of decision taking, I have focused on the important of this zone as a resistance. Looking to shorter times frames, 60 minutes and 120minutes, it is more perceived the weakness of the price after the confirmation of the bullish flag.

Anyway, this operation was too risky, since was a trade betting against the trend direction, after a continuation pattern.

5th Trade

Appendix:

Day: March 16th

Position: Short

Quantity: 1 strategy

Profit/Loss: - 9 ticks

Enter price: 9.95 USD

Exit price: 10.04 USD

16 Mar 2016 14:53:56	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	10.04
16 Mar 2016 14:02:17	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.95

Analysis description

Time frame: 240min

On the time frame of 240 minutes, is visible the historically importance of this zone on previous months. It worked as a support on December 15, resistance in February and March.

The unprecise enter price lead to a loss on this trade. However, the exit price after the price breaking the maximus of the month was a rational decision.

6^{th} , 7^{th} and 8^{th} Trades

Day: March 16^{th} and 17^{th}

These operations were derivate from errors of executing the orders at the platform. For this reasons it will not be account, neither analyzed.

9th Trades

Appendix:

Day: March 18th

Position: Short

Quantity: 1 strategy

Profit/Loss: +5 ticks

Enter price: 10.02 USD

Exit price: 9.97 USD

18 Mar 2016 18:26:06	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.97
18 Mar 2016 15:08:06	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	10.02

Analysis description

Time frame: 60min

The identification of the clearly sideways trend, from a range between 10.10 and 9.93 was the base for this trading opportunity. The exit price was very technical precise. Contrary, the enter price was not at the most desired level. The timing was the responsible the unprecise enter price level. The emotionally and the fear of losing this opportunity leads me to failed the timing of enter. However, the stop loss was placed above 10.10 and the current trend was respected.

10th Trades

Appendix:

Day: March 21st

Position: Long

Quantity: 1 strategy

Profit/Loss: -12 ticks

Enter price: 9.95 USD

Exit price: 9.87 USD

21 Mar 2016 15:56:25	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.83
21 Mar 2016 14:22:53	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.95

Analysis description

Time frame: 60min

There was identified a sideways trend, more precisely a rectangle, resistance around 10.08, and support area around 9.92. Being a small range, with 7 ticks from 10.08 to 9.92, trading the trend becomes hard. Since there are no error margin allowed regarding price execution. It requires a high level of accuracy, relatively to order execution of enter and exit price. Since a rectangle means a consolidation of price, there is a certainty that the price will breaks the resistance or support. The main doubt is regarding the time of the breakout. There is a positive correlation between the probability of breakout and duration of the sideway trend, in other words, over time the probability of a break out of the rectangle. However, the main reasons for the failure of this trade were the timing of

enter in the trend and the stop loss execution. Being the first attempt of enters in this trend, it was too late. Secondly, being a small range, the strong breakout means that I was unable to close the position at better price level.

11th Trades

Appendix:

Day: March 21st

Position: Long

Quantity: 1 strategy

Profit/Loss: +11 ticks

Enter price: 9.80 USD

Exit price: 9.91 USD

21 Mar 2016 16:29:22	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.91
21 Mar 2016 16:11:00	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.8

Analysis description

Time frame: 60min

There is an uptrend line, drawn from the minimums of 2nd February, passing through minimums of 8th February, 1st March, 7thMarch and 15th March. The price did not touch on that line, but it did swing sufficiently close, to makes me enter on 9.80 USD. Adding more information to this support zone, on analysis of 120 time frame, the green line which represents the enter price level is also an old resistance, verified during the month of February.

12th Trades

Appendix:

Day: March 21st/March 22nd

Position: Long

Quantity: 1 strategy

Profit/Loss: +9 ticks

Enter price: 9.81 USD

Exit price: 9.90 USD

22 Mar 2016 13:31:52	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.9
21 Mar 2016 18:26:34	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.81

Analysis description

Time frame: 240min

This analysis is pretty similar with the previous trade (11st trade), since the price came to the same support zone. This the price touched on the uptrend support line, the same referred on the previous trade. It also visible the SMA (Simple Moving Average) of 200 periods working as support, on 60 minutes time frame. The exit price is around the old support of the rectangle, which could be worked as a new resistance.

13th Trades

Appendix:

Day: March 22st/March 23nd

Position: Short

Quantity: 1 strategy

Profit/Loss: +9 ticks

Enter price: 9.92 USD

Exit price: 9.83 USD

22 Mar 2016 13:55:12	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.92
23 Mar 2016 08:05:20	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.83

Analysis description

Time frame: 60min

There was identified a resistance zone around 9.95, which it the old support from the previous rectangle identified. Also, a resistance of a potential bullish flag was identified in that area, well visible on 240 minutes time frame. The exit price was defined based on the identification of a support zone around 8.83 (uptrend line). Also, believing that there was a bullish flag, it could be more risky short positions than long positions. For this reasons I have defined the exit price at 9.83 USD.

14th Trades

Appendix:

Day: March 23rd

Position: Long

Quantity: 1 strategy

Profit/Loss: -6 ticks

Enter price: 9.81 USD

Exit price: 9.75 USD

23 Mar 2016 14:35:49	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.75
23 Mar 2016 14:33:59	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.81

Analysis description

Time frame: 60min

The horizontal green line at 9.92 should be ignored, since that was not drawn purposely. The idea was to trade the potential bullish flag identified. However the enter price was not good, it should had been around the support of the potential bullish flag at 9.70. Another reason for the failure of this trade was the stop loss. I did respect the analysis, once the signal for exit this position would be only after the break of the support (9.70). The failure of the entry point, lead me to be more emotional than rational.

15th Trades

Appendix:

Day: March23rd

Position: Long

Quantity: 1 strategy

Profit/Loss: +9 ticks

Enter price: 9.80 USD

Exit price: 9.89 USD

23 Mar 2016 16:32:12	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.89
23 Mar 2016 14:48:44	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.8

Analysis description

Time frame: 60min

This trade was based in the support identified around 9.80. The uptrend line, the same which defined the main trend since January of 2016, was the reference for this trade. The fact the price did not break the 9.75 zone, provides the information that the buyers could be willing to enter on the market. The zone was placed below the support of the potential bullish flag. The SMA of the 50 periods on 60 minutes time frame worked as resistance, it was a reference to define the price exit.

16th Trades

Appendix:

Day: March 24th

Position: Long

Quantity: 1 strategy

Profit/Loss: +12 ticks

Enter price: 9.78 USD

Exit price: 9.90 USD

24 Mar 2016 05:35:51	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.9
24 Mar 2016 03:12:00	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.78

Analysis description

Time frame: 60min

Once again, the price respected the support of the potential bullish flag. On the graph of 240 minutes time frame, it is visible the importance of the zone of 9.75. It worked as support and resistance in January, worked as resistance during February and now becomes a zone of support. The exit price was based on the resistance area around 9.93. This area has resistance of the bullish flag and the old support of the rectangle. Another point is regarding the technical indicator MACD, which gave a buy signal when price was in support area. The blue line crosses the purple line) below the green line. It worked as a confirmation of my price analysis and provided even more confident to enter on this trading opportunity.

17th Trades

Appendix:

Day: March 24th

Position: Short

Quantity: 1 strategy

Profit/Loss: +10 ticks

Enter price: 9.95 USD

Exit price: 9.85 USD

24 Mar 2016 09:19:40	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.85
24 Mar 2016 08:24:32	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.95

Analysis description

Time frame: 60min

The identification of the resistance zone was provided by the resistance of the potential bullish flag. The stop loss was placed above that area, at 9.99. Looking in a long-term analysis, the downtrend line drawn from maximums of October 2015, passing through maximus in November was respected as resistance zone. The enter price was perfect, well executed price enter exactly on the resistance zone. The price, once again respected very well the resistance line drawn. Being a potential bullish flag, I have decided being more cautions regarding short position. For this reason, the exit price was around 8.85.

18th Trades

Appendix:

Day: March 24th

Position: Short

Quantity: 1 strategy

Profit/Loss: +10 ticks

Enter price: 9.95 USD

Exit price: 9.85 USD

24 Mar 2016 13:04:07	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.85
24 Mar 2016 12:51:52	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.95

Analysis description

Time frame: 60min

The market gave the opportunity to repeat the previous trade. The rational behind was exactly the same as the 17th trade.

19th Trades

Appendix:

Day: March 28th /29th

Position: Long

Quantity: 1 strategy

Profit/Loss: -14 ticks

Enter price: 9.53 USD

Exit price: 9.39 USD

29 Mar 2016 12:58:36	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.39
28 Mar 2016 14:04:51	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.53

Analysis description

Time frame: 60min

On the graph of 240 minutes time frame, it is visible the black line which represents the enter price. This line also defined a potential support that have been worked as support in middle January, resistance in the beginning of February and beginning of March and in the middle of March worked again as support. Technically it is a support zone, which makes sense to attempt a long position, if price breaks the support, close position. The main failure was the fact of did not close the positon after the break. It did not make sense close 14 levels below the price enter. However as mention on the chapter 3.2, on this product the price execution is not always easy. Anyway, the emotional factor has very relevance on this trade.

20th Trades

Appendix:

Day: March 29th

Position: Long

Quantity: 1 strategy

Profit/Loss: +11 ticks

Enter price: 9.17 USD

Exit price: 9.28 USD

29 Mar 2016 17:16:30	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.28
29 Mar 2016 16:16:35	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.17

Analysis description

Time frame: 60min

Looking to the graphs of daily time frame and 240 minutes, it is visible a support around 9.16. On the graph of 240 minutes time frame, the horizontal red line has been worked as support in end of February and beginning of Mach. After breaking the support of the potential bullish flag which was never confirmed, the market gives the signals of the end of the uptrend. Since confirming the bullish flag there was the only change of technically continues in the uptrend. Since, a flag is a continuation pattern; the breakout of his support confirmed the end of the middle-term trend. Looking in a long-term analysis, the downtrend line drawn from maximums of October 2015, passing through maximus in November was respected as resistance zone the middle March. It means that the down trend from long term continues. After respecting this important

resistance, the next support zone identified was around 9.16. This was the reason to enter into this trade opportunity.

21st Trades

Appendix:

Day: March 30th

Position: Short

Quantity: 1 strategy

Profit/Loss: +7 ticks

Enter price: 9.42 USD

Exit price: 9.35 USD

30 Mar 2016 15:49:05	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.35
30 Mar 2016 14:06:36	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.42

Analysis description

Time frame: 240min

The identification of this resistance is provided by the horizontal green line at 9.42, which represents the enter price level. This line identifies an important zone. It worked as resistance in beginning of February, then support in middle of February, support in middle of March and recently has been worked as resistance. The exit price on this trade could be better. There was margin until to the probable support zone.

22nd Trades

Appendix:

Day: March 30th

Position: Long

Quantity: 1 strategy

Profit/Loss: +14 ticks

Enter price: 9.20 USD

Exit price: 9.34 USD

Analysis description

Time frame: 240min

The price came to the same support zone identified and described on the 20th trade. The idea was based on the believing that will not break this zone. For this reason, an enter price at 9.20, as it was too well respected on first time after the break of the 9.70 zone on March 24th. The exit price could be better. The emotional factor affected my decision taken. It is not easy keeping an opening position with 14 levels profit (420 USD).

23rd Trades

Appendix:

Day: March 31th

Position: Short

Quantity: 1 strategy

Profit/Loss: +6 ticks

Enter price: 9.36 USD

Exit price: 9.30 USD

Analysis description

Time frame: 240min

There was a resistance zone identified around 9.45 USD. It worked as resistance in beginning of February, then support in the middle of March, later on the end of March as worked as resistance. The enter price distant from the identified zone. The inaccuracy of price enter, leads to emotional trade. The fact of the stop loss was placed above 9.45, become this trade too risky.

24th Trades

Appendix:

Day: March 31th

Position: Long

Quantity: 2 strategies

Profit/Loss: -38 ticks

Enter price: 9.36 USD

Exit price: 9.30 USD

01 Apr 2016 16:02:30.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.05
01 Apr 2016 16:02:28.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.05
01 Apr 2016 14:15:19.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.17
01 Apr 2016 13:28:47.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.31

Analysis description

Time frame: 60min

The idea of this trade was to repeat the strategy applied on 20th and 22nd trade. The support identified around 9.17, had been working as support. This was the only trade that was used a quantity bigger than one strategy. It means that the tick value (the minimums possible variation) worth 60 USD for point, instead of 30 USD . Technically, there was identified a support zone around 9.30. It worked as support in the end of February, in the beginning of March and most recently in last days of March. The biggest and the main failure of this trade was the fact of not being disciplined and the respect the technical analysis in the moment that there is a breakout of the 9.30. The idea was even worst, when I have decided to enter in another support zone around 9.17

USD. Technically, the support identified at 9.17, is well justified. The failure of this trade is purely related with money management concept. An important support means a zone which there is a higher probability of the existence of buyers than sellers. Thus, when occurs a breakout, the technical analysis says that investors should close their positions, since buyers lost interest. Thus, the entirely failure of this trade, was not the price enter of the two opened positions, rather than the fact of not being disciplined. The correct situation should be open the first one, close at better placed stop loss. Then reentry with another long position at 9.17 price level and close it again with the stop loss. The result would always be negative, but Technical Analysis not provides the certainty of gains. Rather than, it provides a high probability of gains in the long term. However, study concepts as money management are a complementary of the practicability of TA. Otherwise, what worth has technical analysis if traders did not respect it?

25th Trades

Appendix:

Day: April 4th

Position: Short

Quantity: 1 strategy

Profit/Loss: +10 ticks

Enter price: 9.18 USD

Exit price: 9.08 USD

04 Apr 2016 12:25:42.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.08
04 Apr 2016 09:49:44.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	9.18

Analysis description

Time frame: 60min

There was a breakout of an important support zone at 9.17 price level, already described on the previous trade (24th). The price falls until 9.02 price level and then starts to rise. During this period it was identified a possibility of drawing a Fibonacci in order to predict the possible zones of resistance. Then, it was identified as the first zone of resistance the 38.20% of Fibonacci at 9.18. This zone is exactly the same described in the previous trade as the important support zone, and the now had the probability of work as resistance. The Fibonacci was drawn from the maximus at 9.45 (important zone described on the 23rd trade), to the minimums of 9.02. Thus, for being an important reference zone and also the 38.2% of Fibonacci and an importance zone by itself, 9.18 worked well as a resistance.

26th Trades

Appendix:

Day: April 4th

Position: Long

Quantity: 1 strategy

Profit/Loss: -16 ticks

Enter price: 8.93 USD

Exit price: 8.77 USD

04 Apr 2016 19:03:05.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.77
04 Apr 2016 17:38:55.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.93

Analysis description

Time frame: 240min

There was identified as potential support the zone around 9.93. This worked as resistance in the end of January, then support in beginning of February. The stop loss was executed at 8.77, because the entire zone from 8.93 until 8.77, was identified as a support zone. Technically, by my own judge it was a decision accepted.

27th Trades

Appendix:

Day: April 4th

Position: Short

Quantity: 1 strategy

Profit/Loss: -2 ticks

Enter price: 8.71 USD

Exit price: 8.73 USD

04 Apr 2016 19:30:55.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.73
04 Apr 2016 19:24:08.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.71

This trade will not be analyzed since it is one of the errors by executing the order, what is called as fat-finger, which means a trading error execution.

28th Trades

Appendix:

Day: April 4th

Position: Long

Quantity: 1 strategy

Profit/Loss: +17 ticks

Enter price: 8.50 USD

Exit price: 8.33 USD

05 Apr 2016 18:31:36.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.33
05 Apr 2016 14:13:51.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.5

Analysis description

Time frame: 60min

The price has fallen dramatically from the breakout of 9.00, which technically represents an important zone. The inexistence of any relevant support during this powerful intraday downtrend gave the arguments to going short. It was one the most stressful successful trades reported on this thesis.

29th Trades

Appendix:

Day: April 5th

Position: Short

Quantity: 1 strategy

Profit/Loss: +9 ticks

Enter price: 8.29 USD

Exit price: 8.20 USD

06 Apr 2016 08:08:24.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.2
05 Apr 2016 18:52:23.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.29

Analysis description

Time frame: 60min

The fact entering on this trade was merely following the daily trend. The concept of money management was entirely applied on this trade. If I had not gain 17 ticks in the previous trade, I would not be entered on this trade. However, the instance of any relevant support was the technically justification for this trade

30th Trades

Appendix:

Day: April 7th

Position: Short

Quantity: 1 strategy

Profit/Loss: -11 ticks

Enter price: 8.64 USD

Exit price: 8.75 USD

07 Apr 2016 09:46:51.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.75
07 Apr 2016 09:01:00.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.64

Analysis description

Time frame: 60min

After the breakout of the zone of the 9.00 price level, the price fallen almost in a vertical way until 8.11. Then the price started to increase. At the time, it was identified the possibility of drawing a Fibonacci. The Fibonacci was drawn from the 9.45 (important zone described on 23rd trade) as maximum and the 8.11 as minimum. The first resistance zone identified was the 38.2% of Fibonacci at 8.62. The main issue on this trade was the exit price. The fact of being disciplined, made me close ate another resistance zone, since the price exit was exactly on the 50% of Fibonacci at 9.75 USD. Also this price level, worked as resistance in the end of January. The main failure in my own opinion was the fact of not opened a new short position after closing the initial one. However, better have this frustration rather than, the performance verified on 24th trade.

31th Trades

Appendix:

Day: April 7th

Position: Short

Quantity: 1 strategy

Profit/Loss: +14 ticks

Enter price: 8.44 USD

Exit price: 8.30 USD

07 Apr 2016 16:25:05.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.3
07 Apr 2016 14:21:38.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.44

Analysis description

Time frame: 60min

This was one of the most risky trades I had. Technically, the exit price is the most interesting thing. The main reason to entered short at 8.44 USD was the fact of the price after resisted on 50%, already explained on the 30th trade. Then, I believed in the possibility of the price falls until the next relevant support at 8.30 price level. The exit price was perfect.

32nd Trades

Appendix:

Day: April 7th

Position: Long

Quantity: 1 strategy

Profit/Loss: -7 ticks

Enter price: 8.37 USD

Exit price: 8.30 USD

07 Apr 2016 17:02:20.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.3
07 Apr 2016 16:46:57.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.37

Analysis description

Time frame: 60min

The 8.30 price level, an old support from end of January and beginning of February was identified as a support zone as the previous analysis. This failure failed not because of technically aspects. The entirely reason for the loss on this trade was the price execution and the emotional factor. Technically, there were conditions to success on this trade.

33rd Trades

Appendix:

Day: April 7th

Position: Long

Quantity: 1 strategy

Profit/Loss: +14 ticks

Enter price: 8.28 USD

Exit price: 8.42 USD

07 Apr 2016 18:38:08.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.42
07 Apr 2016 18:17:57.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.28

Analysis description

Time frame: 60min

The fact of the price was supported on the previous important zone of the 8.30 price level. I strongly believed that price would increase from that zone. It basically was the correction of the previous trade. The analysis behind is the same of the previous trade.

34th Trades

Appendix:

Day: April 11th

Position: Short

Quantity: 1 strategy

Profit/Loss: +20 ticks

Enter price: 8.84 USD

Exit price: 8.64 USD

08 Apr 2016 15:40:32.	Sell	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.84
11 Apr 2016 07:19:15.	Buy	4	STS_ICE LS Gasoil/Brent Crack TSPR-DEC16-[	8.64

Analysis description

Time frame: 60min

This analysis basically based on the Fibonacci referred on the 30th trade. Looking to the graph of the 240 minutes time frame, it is visible a consolidation of the price from 9.45 to 9.12. Then, it is visible strong downtrend. After making the minimums at 8.11, we observe a reverse in short term of the trend of the price. Thus, were gathering the conditions to drawn the Fibonacci from 9.45 as maximum until the 8.11 as minimum. The enter price was next to the 50% Fibonacci and the exit price next to the 38.2% Fibonacci which could work now as support zone. It was technically perfect.

Appendix 2

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OSTC Trading Portugal

Hereby grants this Certificate of Completion for

The OSTC Futures Trading Lab

and certifies that

Mr. Bernardo Barcelos

Has successfully completed the levels of study indicated below.

Awarded on 29th of April, 2016

Trading Systems	Technical Analysis	Spread Trading Strategies
Level 1	Level 1	Level 1

José Francisco Ferreira
Program Director

Diogo Mourão
Head of Trading

Participated by: LIFFE, ICE, CME and Eurex

Technology Partner: Stellar Trading Systems

NYSE Liffe ICE CME Group Eurex STELLAR