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—

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The 4pm Theory:
How to trade on opening breakouts.

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To my family, who has given me dreams
to look forward to.
And to Sally, loyal friend.



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*Investing in yourself is the best thing you can do.
Anything that improves your own talents;
nobody can tax it or
take it away from you.
They can run up huge deficits
and the dollar can become worth far less.
You can have all kinds of things happen.
But if you've got talent yourself,
and you've maximized your talent,
you've got a tremendous asset that can return ten-fold.*

Warren Buffett.



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Martina.

Venice, October the 8th 2015.



INTRODUCTION

The starting idea of this thesis is to suggest a different point of view to the wide literature about the trading on the opening rage breakout.

The main goal is to create and test a code made with Visual Basic for Applications (VBA) in the Excel environment, for six stock indexes belonging to two of the main markets in the world: Europe and America.

The six stock indexes considered are: FTSE MIB (Milan, Blue Chips), EUROSTOXX50 (Europe, Blue Chips), DAX30 (Germany, Blue Chips), DOW JONES 30 (New York, Blue Chips), NASDAQ100 (Blue Chips, USA tech sector), S&P 500 (Blue Chips, USA Mid Caps, Small Caps).

Prices of these indexes have been recorded on an hourly basis from October the 31st, 2013 to September the 18th 2015, for the three American indexes, 470 days, and from March the 13th, 2014 to September 18th 2015, 385 days, for the three European ones.

In the first chapters some basic concepts are explained: an overview on the financial markets, their analysis, the definition of trend and breakout.

Then, chapter 5 explains what an index is and how it can be computed; it also provides details for the six indexes considered. Chapter 6 concerns the costs and commissions of trading, in particular the famous Tobin Tax; chapter 7 introduces futures contracts and the paramount concept of margin.

The practical analysis is explained in chapter 8, where all the computations are exposed and resumed in tables.

Concludes the thesis the appendix with the codes used and, of course, the conclusions: does the strategy presented work well for the markets considered?



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CHAPTER 1.

Introduction to the financial markets.

*A second reason why science
cannot replace judgment
is the behavior of financial markets.
M. Feldstein*

1.1 Why do we study financial markets?

We have all heard or read about financial markets: a financial market is a broad term describing any marketplace where buyers and sellers participate in the trade of assets such as equities, bonds, currencies and derivatives. In some sense we can say that they are virtual places where the operators make their transfers to funds, from who has the money availability to who needs money. They are important because they make possible to use funds with a lot of money in a productive way. That's why a key word for an efficient market is a continue economic growth.¹

What happens there has a direct effect also on the personal wealth of operators, on the behavior of enterprises and consumers, and on the cycle trend of the economy.

1.2 How financial markets are classified

Financial markets can be structured as²:

- capital market

¹ F.S.Mishkin, S.G.Eakins, G.Forestieri, Istituzioni e Mercati Finanziari, Pearson, 3rd edition.

² F.S.Mishkin, S.G.Eakins, G.Forestieri, Istituzioni e Mercati Finanziari, Pearson, 3rd edition.



- money market
- spot market
- derivatives market
- forex and interbank market
- the OTC market

Generally, we distinguish between *primary* and *secondary* market. Corporations and Governments finance their activities by issuing stocks or bonds which are purchased by the public directly from the issuing corporation or government entity. This is considered the primary market, which provided investors their first chance to purchase a new security. These sales are usually refer to as an initial public offering (IPO).

The initial demand is hard to predict, thus the initial sale prices are often set too low, which makes the primary market very volatile.

Once the securities are sold to the public to primary market, any sequence of sales of the stocks or bonds take place in the secondary markets, such as the New York Stock Exchange or Nasdaq.

The secondary market also refers to the exchanges themselves, where these transactions take place.

In the primary markets, the initial price is set by the bank, while, in the secondary market, the price is determined by the supply and demand of buyers and sellers.

In the next paragraph we will see more in detail the other classifications of financial markets.



1.2.1 Capital market

Capital markets channel savings and investments between suppliers of capital, such as retail investors and institutional investors, to users of capital like businesses, governments and individuals.³

They do this by selling financial products like equity, also called stocks, and debt securities, such as bonds.

Capital markets include primary and secondary markets, and they are concentrated in some financial centre, such as New York, London, Singapore and Hong Kong; because capital markets move money from people who have it to organizations that need it for product, they are critical to the effective functioning of a modern economy.

1.2.2 Stock Markets

A stock market is where shares of corporations are issued and traded. Stock markets are a key component of the market economy and they have two functions: from the company's perspective, stock markets provide access to capital, usually in the form of cash. If a company needs to finance major projects, it can sell its shares in the stock markets in order to raise capital, instead of borrowing money from the bank⁴.

From the shareholder's perspective, the stock market provides a way to participate in a company's growth, and also to quickly convert shares into cash.

The two main stock markets in the USA are the NYSE and the Nasdaq, while other stock markets are London Stock Exchange, Hong Kong Stock Exchange, Euronext and Deutsche Bourse.

³ <http://www.investopedia.com>

⁴ <http://www.investopedia.com>



1.2.3 Bond Markets

A bond is a debt investment: an investor loans money to an entity (corporate or governmental), which borrows the funds for a defined period of time at a fixed or variable interest rate. Bonds are used by companies, municipalities, states and U.S. and foreign governments to finance a variety of projects and activities⁵.

Bonds can be bought and sold by investors on credit markets around the world. This market is alternatively referred to as the debt, credit or fixed-income market. It is much larger in nominal terms than the world's stock markets.

The main categories of bonds are corporate bonds, municipal bonds, and U.S. Treasury bonds, notes and bills, which are collectively referred to as "Treasuries."

1.2.4 Money Market

The money market is a segment of the financial market in which financial instruments with high liquidity and very short maturities are traded.⁶

The money market is used by participants as a means for borrowing and lending in the short term, from several days to just under a year. Money market securities consist of negotiable certificates of deposit (CDs), banker's acceptances, U.S. Treasury bills, commercial paper, municipal notes, eurodollars, federal funds and repurchase agreements (repos).

Money market investments are also called cash investments because of their short maturities.

The money market is used by a wide array of participants, from a company raising money by selling commercial paper into the market to an investor purchasing CDs as a safe place to park money in the short term.

The money market is typically seen as a safe place to put money due to the highly liquid nature of the securities and short maturities. Because they are extremely

⁵ <http://www.investopedia.com>

⁶ <http://www.investopedia.com>



conservative, money market securities offer significantly lower returns than most other securities.

However, there are risks in the money market that any investor needs to be aware of, including the risk of default on securities such as commercial paper.

1.2.5 Spot Market

The spot market is a market where a commodity or security is bought or sold and then delivered immediately. In this context, stock market is also called cash market or physical market. Contracts bought and sold on a spot market are immediately effective.

A spot market is different from future markets: if future contracts give to the investors the obligation to buy or sell an asset at certain price in the future, spot market refers to a future transaction in which a commodity is expected to be delivered in one month or less.⁷

1.2.6 Derivatives Markets

Derivatives are assets whose price is not autonomous: indeed: its value is derived from its underlying asset or assets. A derivative is a contract, price derives from the market price of the asset it is referred to. As it might seem, these assets are quite complicated.⁸

The derivatives market adds yet another layer of complexity and is therefore not ideal for inexperienced traders looking for opportunities to speculate. However, it can also be used quite effectively as part of a risk management program.

Examples of derivatives markets are forwards, futures, options, swaps and contracts for difference (CFDs).

⁷ <http://www.investopedia.com>

⁸ <http://www.investopedia.com>



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There are also many derivatives, structured products and collateralized obligations available, mainly in the over-the-counter (non-exchange) market.



www.cartoonstock.com

1.2.7 Forex market

The forex exchange market, or forex market, is also called currency trading market or just FX.

It is a market where participants buy, sell and exchange currencies.

The forex market is the largest, most liquid market in the world with an average traded value that exceeds \$1.9 trillion per day and includes all of the currencies in the world.⁹

The forex market is open 24 hours a day, five days a week and currencies are traded worldwide among the major financial centers of London, New York, Tokyo, Zürich, Frankfurt, Hong Kong, Singapore, Paris and Sydney.

⁹ <http://www.investopedia.com>



1.2.8 The OTC Market

The over-the-counter (OTC) market is a type of secondary market also referred to as a dealer market.¹⁰ The term "over-the-counter" refers to stocks that are not trading on a stock exchange such as the Nasdaq, NYSE or American Stock Exchange (AMEX). This generally means that the stock trades either on the over-the-counter bulletin board (OTCBB) or the pink sheets. Neither of these networks is an exchange; in fact, they describe themselves as providers of pricing information for securities.

1.3 Internationalization of the financial markets

The internationalization of financial markets, known also as globalization of markets, has come with the fall of the technical and administrative barriers that have hindered in the past the exchange of financial instruments and services between operators from different countries.¹¹

The process of internationalization has been accompanied by unprecedented growth of financial flows between different countries.

Three are the factors which have driven to the internationalization: once is the liberalization of capital markets, the second the development of telecommunication systems and data processing and, finally, the institutionalization of the markets.¹²

These developments have encouraged the growing of the competition between the various national markets.

¹⁰ <http://www.investopedia.com>

¹¹ <http://www.treccani.it>

¹² <http://www.treccani.it>

1.4 Function of the financial markets

Financial markets perform the economic function of transfer the financial resources from family, firms, Governments who has a surplus of fund, to who has a lack of money.¹³

This function can be represented in Figure 1: those who have saved and give loan, are called "Lenders-Savers" or creditors, while who needs to borrow to financing their expenses, are called "Borrower-Spenders", or debtors.

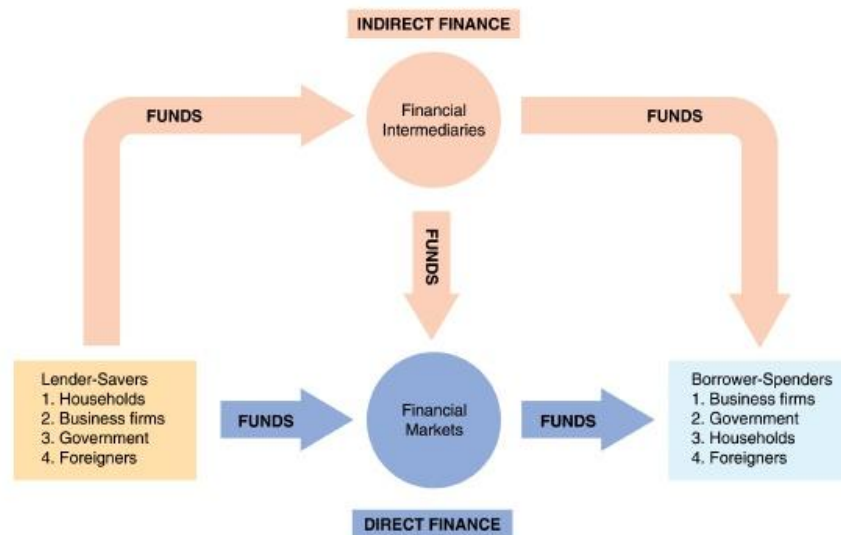


Figure 1. Flows of Funds Through the Financial System

Source: Pearson Prentice Hall.

Those who have saved and are lending funds are on the left, and those who must borrow funds to finance their spending are on the right.

The principal lender-savers are households, business enterprises, foreigners and governments (particularly the Federal Government). The arrow shows that funds

¹³ F.S.Mishkin, S.G.Eakins, G.Forestieri, Istituzioni e Mercati Finanziari, Pearson, 3rd edition.



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flow from lender-savers to borrower-spenders in two ways: direct or indirect finance.¹⁴

With the direct finance, borrowers borrow funds directly from lenders on the financial markets by selling them securities, which are claims on the borrower's future income or asset. The financial instruments are called liabilities for the individual or firm that issues them, but we call them securities for the person who buys them.

It is clear that, in absence of financial markets, it would be hard to transfer funds from a person who has no investment opportunities to one who has them.

The existence of this kind of markets is also beneficial even for who borrow for a purpose, rather than increasing production in a business. Think about young people: may be they have a good job position, but they are too young in order to save money for a new house!

We can see why financial markets have such important function in the economy: they are well-functioning, they also directly improve the well-being of consumers by allowing them to purchase better.¹⁵

¹⁴ F.S.Mishkin, S.G.Eakins, G.Forestieri, Istituzioni e Mercati Finanziari, Pearson, 3rd edition.

¹⁵ F.S.Mishkin, S.G.Eakins, G.Forestieri, Istituzioni e Mercati Finanziari, Pearson, 3rd edition.



CHAPTER 2

Understanding the investments: the analysis

Price is what you pay.

Value is what you get.

W. Buffett

2.1 Investments: from today, for tomorrow

Many times we use the word "investment": University, for instance, is an investment on yourself, if you think that what you are spending today (money, time, sacrifices, and so on) it will be useful in your future job.

So, we can see the investments as a today commitment of money and other resources in front of some expected benefits in the future. It is not also related to money, but it concerns also the expected value, the majority of times greater than the initial one.

An investment includes the purchase of bonds, stocks or real estate property. It is important not to confuse 'making an investment' and 'speculating', because investing usually, not always, involves the creation of wealth, whereas in speculating wealth is not created.

Briefly, the main phases of an investment are eight, and they are:

1. to have access to the market: open an account with an intermediate which allows to operate via web
2. to choose the approach to use: does the investor want to operate in the short, middle or long term?
3. to choose the best technique to analyze data
4. to define a money management criterion
5. to define a correct risk management



6. to define a correct profit management
7. to choose the correct financial instruments
8. to send orders to the market and monitor their implementation

After have defined an initial concept of investment, let see what are the main techniques in order to understand better the investments.

2.2 Analysis techniques

The two main approaches of analysis of listed activities are two: the fundamental analysis and the technical analysis.

2.2.1 Technical Analysis

Technical analysis has roots relatively distant in time, linked to the rise of the first future markets. In the early seventeenth century, in fact, in Japan raised the first futures market of rice, and at the same time, were developed the first methods of analysis, then disclosed to the rest of the World.¹⁶

Charles Henry Dow developed some basic principles of analysis of financial markets, proceeding from his personal experience as a trader, and expose the results in some editorials of the late 90's.¹⁷

With the advent of computer, the discipline received a substantial further boost with the development of indicators of the state of the market based on algorithms and graphics that you can now get in a very short time thanks to appropriate supports.

The primary purpose of technical analysis is to analyze the financial markets and synthesize all the information they contain, in a few indicators represented in a graph.

Technical analysis is based on three fundamental assumptions:

¹⁶ <http://www.performancetrading.it>

¹⁷ <http://www.performancetrading.it>



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1. all the relevant information available in the market is summarized in the price of an instrument;
2. under similar initial conditions markets will end up in similar ways the story repeats with same initial conditions (what happened in the past will very likely occur again in the future);
3. the price's movements are not casual: prices tend to move in *trends*.

What is relevant is that the market is the sum of the expectations of those who work there and if positive expectations are greater than negative ones, then the only way is to follow the trend: we must buy.

But until when we should buy? Of course, until the positive expectations are greater than the negatives.

Here we can see the first limit of this kind of analysis: it doesn't anticipate the future, but it follows the flow, it conforms itself.

2.2.2 An important tool: the chart

In every single trading day there no longer is just a point, but a drawing, made of a vertical bar and two small horizontal bars, one pointing left and another pointing right.

The horizontal bar pointing to the left points out to the opening price; the one pointing to the right points out to the closing price.

The vertical bar points out at the daily range: the lower end is the daily minimum, the higher end is the daily maximum.

For a single trading day we no longer have just one information, but six: open, high, low, close, relative position of close versus open, daily range.

In a few words, in a quick sight we have an immediate information about the direction of the price in a day and a measure of the level of stress in the market.



Before explaining the interpretation rules for bar charts we move on to the Japanese candlestick chart, since this last type is just a different way to see the bar chart.

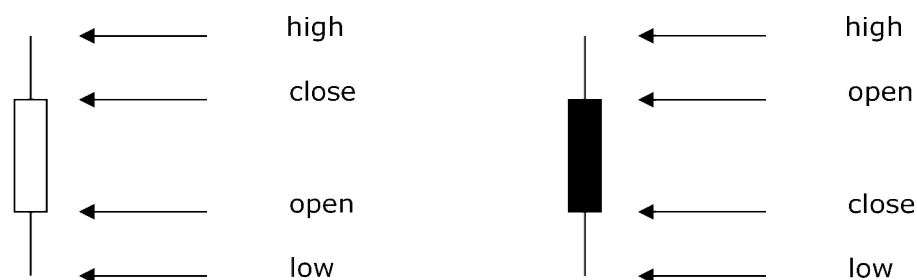
The candlestick chart probably dates back to the 17th century, but became popular in the USA and in Europe only in 1994, after the work of a trader named Steve Nison.

The idea is to represent not only a single information for each single day, but four: open, high, low and close. The difference between the bar chart and the candlestick lies in the shape of the drawing: in this case we have a vertical rectangle and two vertical lines, one on top and one underneath it.

The rectangle is called *body*, the two lines are called *shadows*.

The body is white (or green, depending on the personal preferences of the user) when the close is higher than the open; in the opposite case the body is black (or red).

Both candles and bars can be referred to a day, or fractions of a day (single hours or minutes, aggregates of hours or minutes), weeks, months, quarters, years.



The information included in the candlestick chart – as in the bar chart after all – is indeed much deeper than that, as the specific shape of a candle (bar) brings even more power in the reading of the trend; and as we'll see forward the position of a specific candle (bar) in the trend also matters.



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Moreover candles can be interpreted as a single pattern, or in pairs, series of three or more, and so on. A very famous pattern, called sequential, invented by a trader named Thomas De Mark, can take dozens of candles (bars) to show up.

The body of a candle is a measure of the strength of one side of the barricade against the other one in a trading day (or any other timeframe).

A huge body, in fact, tells that bulls or bears took the lead of the day, pushing clearly the price in the direction they wanted it to go to.

A candle with a tall white body is a sign of strength, while a long black bodied candle is a clear sign of weakness: bears were too strong for bulls and pushed relentlessly down the price.

Candles with short bodies are signs of indecision: it seems the market doesn't know what to do.

In similar situations the shadows can be crucial. Long shadows, for example, mean that bulls and bears tried to push the price on their side but after a while they were defeated by their opponents. Long shadows point out to ferocious fights between buyers and sellers.

Candles given of short bodies and short shadows point out a complete lack of interest for that instrument in that period of time. Either that asset is not attractive at all for all the players in the market, or the price is in a sort of strong equilibrium: until new information comes out the situation is not going to change.

Long shadows aside of a short body require a different interpretation: the market is at an equilibrium point, since any attempt to move the price in a specific direction got promptly neutralized. But that equilibrium is the result of a brave fighting.

The market is very unstable and a strong directional movement may be soon to come.



A different situation happens when only one shadow is long. If, for example, the upper shadow is long and the lower is short, or even null, it means that the bulls tried to push up the price, but got overwhelmed by the bears.

This means that the market is not ready to go up. Vice versa when the upper shadow is very short and the lower shadow is very long: the market is not ready for a price drop.

2.2.3 Time and closing price

Time can be represented by days, but also by weeks, months, years, or as a fraction of a day: hours and minutes.

Trading hours for the stock market vary depending on each specific country: in Italy, for instance, they are exchanged from Monday to Friday, from 9am to 5.35pm.

This is the so called *continuous phase*, in which there do not happen interruptions except for some very particular situations.

Before the continuous phase there is the so called opening auction, during which buyers and sellers show up on the market placing their buying and selling proposals which are then collected by IT systems who aggregate them depending on the price and the time of appearance and match them according to some specific rules, coming to some sort of *equilibrium price*: the opening price for that day.

Then negotiations take place continuously all day long, generating price swings up to an intraday maximum and down to an intraday minimum, not necessarily in this order.

At the end of the day there's a *closing price*, which can be considered as an equilibrium price for that day.

That price is the result of all the expectations of the market on a stock in a day, given all the information available at that time.



2.2.4 Fundamental analysis

In order to better describe what fundamental analysis is, we need to clarify some basic concepts.

Think about an investor who is trading on the market: he will buy a stock under the expectation that the price will increase during the next period, and he will sell a stock if he thinks that the price will fall down in the next period.

Of course, one of the two assumptions will be true! In this case time is fundamental: only the time will demonstrate if the price will increase or not.

It is all related to probability and assumptions, and in particular it is related to four movers:

- expectations
- hypothesis
- information
- probabilities

Now we can define fundamental analysis as a technique that attempts to determine a security's value by focusing on underlying factors that affect a company's actual business and its future prospects.

The steps are:

1. we should analyze the economic and politic scenario, in particular fiscal and labor policies, the monetary relations with foreign countries, etc;
2. then we should analyze the sector, where the company is working in, and in particular we should take into account the life cycle of the product, the level of competition, the ability of the firm to be innovative, research and development activities and so on;
3. finally, we should analyze the balance sheet of the company, so to be able to determine the key-values useful to define the overall situation.



At the end of the process, we will get to define a so called theoretical price, that is the value of the company in that moment given the available information.

2.2.5 The market price and the theoretical price

The theoretical price has to be compared with the market one, in order to find any discrepancies. In fact, the market price is the price the investor is willing to pay in order to have shares and the seller is accepting to get rid of those shares. Of course, theoretical and market price may not coincide: any discrepancies may then be seen as a profit opportunity. The theoretical price may be higher than the market one, meaning that the market is undervaluing the company, or it could be lower than the market price, meaning that the market is overvaluing the company.

2.2.6 The limits of the fundamental analysis

This approach may appear logic: if the real value of a company is a certain number, sooner or later the market price will come near that value.

Of course, it is not easy to determine the real value of a company, so, as a consequence, it will be not univocal, because it will vary depending on the point of view of the analyst.

A first problem is the quantity of data it is necessary to read and interpret: hundreds of pages for each listed company!

Note that, many times, the balance sheets are published in delay, so the data you are going to interpret may lead to obsolete information!

Moreover, this kind of analysis has slow effects, so you will see the results only after months or even years. Thus, in that period new elements may affect the case and change the initial analysis.

We can summarize the key limits of the fundamental analysis in just four words:



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certain facts

information
asymmetries

expectations

probabilities

In the next paragraph we will see what information asymmetries are.

2.2.7 Information asymmetries



harmonicadvisors.com

The cartoon above makes very clear the meaning of information asymmetries (and it makes us laugh and think at the same time).

Generally speaking we can define them as the situation in which some people have more detailed information than others have.



We can look at them as the key of the system: in fact if the information asymmetries did not exist, there will not exist the financial markets!

Let's imagine the case in which we all know that the correct shares value of Ferrero Spa is 20 euro. Do you think there will be someone willing to pay more than 20? And someone willing to sell them for less than 20?

Of course, not. In this case there are not exchanges and so no financial markets.

Information asymmetry can lead to two main problems:

1. *Adverse selection* occurs when one party in a transaction has more information than the others, leading to a negative consequence for the party "in the dark".¹⁸
2. *Moral Hazard* is an immoral behavior that takes advantage of asymmetric information *after* a transaction. For example, if someone has fire insurance they may be more likely to commit arson to reap the benefits of the insurance.
3. insider trading encompasses both illegal and legal trading of securities, and it is monitored by the Securities and Exchange Commission (SEC). It occurs when a person uses material, non-public information to make a decision about buying or selling a security.¹⁹
4. stock manipulation

Expectations and divergences make possible the exchanges: some agents will sell stocks in which they do not trust anymore, and others will buy them because they trust on them.

¹⁸ <http://www.investopedia.com>

¹⁹ <http://www.investopedia.com>



2.3 Technical vs fundamental analysis

As from the concepts seen in previous section, we can say that the approach of fundamental analysis moves in the direction of economic science, while technical analysis refers mainly to considerations of a psychological nature.²⁰

According to the proponents of technical analysis, its main advantages are:

- it is a set of methods of analysis immediately applicable by anyone, not even in possession of knowledge or economic statistics, as of a mainly graphic, while fundamental analysis would require a certain expertise to properly assess the value of financial assets;
- it is applicable to any market and any activity. Using technical analysis you can follow multiple markets simultaneously, because it is easier to analyze many graphics in a short time.

According to the proponents of fundamental analysis, the main criticism focused on technical analysis is essentially the questioning of its foundations and therefore its practical utility.

Even those who well recognize a certain utility, point to the fact that it is almost always able to explain perfectly ex post what happened, while not as effective ex ante.

In the operational reality both approaches are used and a shrewd operator uses both integrating them appropriately, fundamental analysis by assigning the task of selecting the activities under or overvalued, while Technical analysis should take care to select the time you undertake operations .

²⁰ <http://www.performancetrading.it>



CHAPTER 3

Trends

*It is not the strongest of the species that survive,
nor the most intelligent,
but the ones most responsive to change.*

C. Darwin

3.1 Definition of trend

The trend is the most important concept in Technical analysis.

We know from the fundamental principle of the Dow Theory that "prices move according to a trend," the analyst's task is to identify these Technical trends and follow them.

A trend designates the general direction of a market movement. It is important to identify trends in order to negotiate with them instead of against them.

However, many investors, either by the limited financial resources, the effect you want to "casino" of trader online, led gradually into the background the fundamental importance of the analysis of the trend.

The general rule, especially for those who is the first time, may be to follow the market, and not anticipate it. For instance, once we identify an uptrend, we have to buy and follow him, then wait to see what happens.

When the trend changes direction, we must take note and adapt our behavior, selling to exit location.

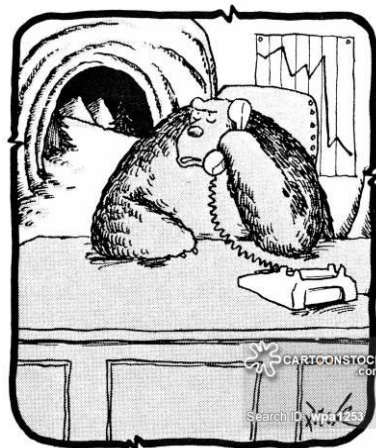
3.2 Bull and bear markets

In the financial markets we usually refer to bull and bear.

What does it mean? Being bullish or being bearish basically refers to be respectively optimistic or pessimistic about the expectations of the financial markets.

We call bull an investor who thinks the market will rise: investors who take a bull approach will purchase securities under the assumption that they can be sold later at a higher price.

On the other hand, a bear is considered to be the opposite of a bull: bear investors believe that the value of a specific security or an industry is likely to decline in the future, so it usually takes a short position in the market.



"Don't give me all that bull about a strong market—I said sell!"

cartoonstock.com

Being a bullish or a bearish depends on some factors:

- global economic concerns
- national economic data
- corporate financial performance

Since bears often feel the markets - or their position- is going to lose value, they will sell to mitigate the losses.²¹

Bulls, on the other hand, see the same economic indicator as a good reason to buy.

²¹ <http://www.investopedia.com>



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The market trend is a reflection of both the current economic situation and the future economic situation. A bull market is the result of a widespread sense of positivity among stockbrokers, who read so optimistic the current and the future economic situation, while a bear market is the product of widespread pessimism in both current and future economic situations.

3.2.1 The direction: up, down and lateral trend

In the presence of an upward trend (or bull market) we have that each relative minimum is greater than the previous year; at this stage grow both prices and volumes traded which gradually attract new investors (also if it is not necessarily, in fact the minimum relative follow each other in different time horizons; looking at those monthly, or yearly, or intra-daily data depends on the attitude of the trader).

An example is the figure below:



Figure 3.1 Up trend chart pattern

www.traderplanet.com

While, a downward trend (bear market) is characterized by falling prices and increasing volumes where each relative maximum is lower than the previous year. Dow explained this phenomenon with a striking analogy with the ebb and flow of the tides, a bull market is growing compared to the phase of the tide during which the face of the waters, while retreating between a wave and the next, constantly gaining ground.



Figure 3.2 down trend chart pattern

www.traderplanet.com

Another kind of trend is the so called neutral or lateral trend: prices move sideways without giving significant operational ideas, in short phases of growth followed by periods of declining prices and remain more or less at the same level.



Figure 3.3 lateral trend chart pattern

www.traderpedia.com

3.2.2 Time, Prices and Trend Line

The waves that appear on charts generate relative maximum and minimum which may be higher than, equal to or lower than the preceding; this information defines the general direction of the price.

We can analyze this kind of information under the technical analysis: if we can see minimum and maximum growing, then the price is climbing; if the maximum



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and minimum are more or less the same level, the trend is lateral; if the maximum and minimum are decreasing, the trend is downward.

It is easy, seeing a graph, where the maximum and the minimum are: a minimum is a point surrounded by upper points to it, both the left and to right, while a maximum is a point surrounded by lower points to it, both the left and to right.

Only certain point are significant: the ones that stand out more than others are more important, because they indicate significant trends.

If we try to join the points with straight lines, we will have a so called *trend line*. A trend line is a way to measure the reaction of investors to the fluctuations of stock prices.



Figure 3.4 Resistance and Support Trendline
www.chartsecret.com

When analyzed, these kind of information give us the best time to buy and the best time to sell in a certain position.

When an investor looks at a price chart of a long period of time, he will see up and down movements on the line: a deep usually represents a point in which large numbers of investors find the stock attractive, and start buying it, while a spike indicates that the stock price is reaching a new level, and investors consider



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useful to sell and liquidate their position. This last activity conduces the prices down, and so on.

Trend lines can indicate support and resistance levels. A resistance is a trendline that keeps the price oriented to the downside: each time the price touches the line from below it is pushed back down. A support is a line that tends to push up the price, that is to keep it up, preventing its fall under some specific level.

We build a *bullish* trend line, also known as dynamic support line, through the conjunction of two or more increasing minimum points.

Of course, the consolidation and the reliability of a trend line is greater the higher is the number of the contact points. In technical terms the trend line that connects minimums is defined trend line of support. It is in fact that line which tends to support the price, keeping its guidance upwards.

Trend lines can help investors to anticipate the future prices of securities and recognize the price that mainly represents the good time to buy or sell the position.

In fact, once you have identify the support and resistance lines, we can see the overall direction of the price: up or down in the time.

In the moment the support is broken we have to deal with two issues: how to manage the risk of losses and how to read the chart from now on.

Empirical observation of the market behavior leads us to state that a broken support tends to become a resistance, while a broken resistance tends to become a support.

This is known as *the state change postulate*: when a trendline is broken it usually changes its state; what once pushed up the price how pushes it down, and vice-versa.



3.3 End of a trend

The breaking of a trend line does not establish uniquely reversal of the trend, we will need to assist the formation of two maximum and two minimum in the same direction.

The breaking of the trend line only partially meets this condition, at this point we could assist to a lateral movement, or rather the formation of a peak, or, after new test levels just broken, we may have a confirmation of the trend.

The breaking of a trend line is one of the most reliable indicators of an anticipate trend: breaking a trend line shows that the dominant forces of the market have lost the control of the situation.

Generally speaking, we can say that an upward trend can be finished when the support line is perforated and a subsequent test confirms the change of state; in the same way, a downtrend can be considered ended when the resistance line is violated and a subsequent test confirms the change of state.

The possible inversions may be:

1. from an up trend line to a down trend line
2. from a down trend line to an up trend line
3. from a down trend line to a lateral trend
4. from an up trend line to a lateral trend

Of course, the change does not have to be the opposite, because we can have a bullish trend that breaks the resistance line and then goes into creating a new peak maximum. in this case we will have a new trend, still bullish.



Figure 3.5 End of a trade line
www.investopedia.com (modified image)

The most important degree of reliability is the angle of a trend line, in fact the degree of the slope of the line expresses the level of control of the market by the bullish forces, rather than the bearish ones.

If a trend line is too steep it means that prices are moving too quickly to draw a sustainable trend. Usually, the break of such a trend line only implies the search for a new equilibrium level. A trend line too flat would be a clear sign of a trend frail and difficult to sustain in the long period.

Another important aspect is the duration of a trend line. This is an important concept because the higher the duration of a trend, the higher the profits you can get. In fact the general conclusion is that the duration of a trend tends to be proportional to its amplitude and inverse to its inclination.

If the waves of price are very large and the angle of the climb is contained, then the trend will tend to last long; vice versa, a trend characterized by strong inclinations of the price and so much narrow will tend to have shorter lives.

3.4 Trend Following Strategy.

The imperative of trend following systems is one: to identify and pursue the trend at all costs. In financial markets, traders and investors use a strategy believing that prices will move upward or downward.



Of course, the main goal of traders is to benefit from these market trends by observing the direction at a given time in order to understand when it's time to buy and sell based on these convictions.

The trend following strategy can be used in both the short and the medium/long term. Obviously, to say *"to jump on the trend and ride it"* makes sense especially in the short term. In fact, the trend following strategy could be defined as the basis of speculation.

You "jump" on a trend when there is a perception that it has been created a trend which responds to your reasons or rules. In practice, given the different factors to be taken into account, there are several variants of the method which explain what are the signs or the conditions that you must wait before opening a position.

For this reason there are "unique" moments when you can entry but they can be different, each of them responding to the logic of a particular trader.

In summary, with the strategy of trend following there are several situations:

- A movement in the same direction of the trend that indicates the need to correctly manage profits
- A movement opposed to the trend calls for the management of risk
- A movement opposed to the trend that indicates to get out and wait for it to resume in the same direction
- A movement opposed to the trend that indicates to get out and invest in the opposite direction, as soon as there will be created the conditions that define a trend.

The elements that are the essence of the trend following are several:



1. Price: one of the first rules of the trend following strategy is that the price is the key, that means it is the most important thing. Only the current price tells how the market is doing, what is happening now.
2. Risk management: risk management in a few words can be explained as "Do you have a plan B? What will you do if you're wrong?" In the exact moment we open a trade we need to have clear in mind the plan B. It is called stop loss, because it is made to limit losses when things do not go in the expected direction.
3. Reduction of losses: another basic rule is to control the risk or reduce losses.
4. Diversification: it helps in risk management, because a portfolio well diversified can combine different types of risk and it can reach a good overall return.

3.6 Volatility breakout

Breakout trading is used by active investors to take a position within a trend's early stages. Generally speaking, this strategy can be the starting point for major price moves, expansions in volatility and can offer limited downside risk. It is particularly suitable also for operations intraday (trades opened and closed in the same trading session) or for the operation overnight on intraday chart (15-30 minutes). Frame time so short enhance the quality of these methods of speculative trading.

The conditions are generally two:

- the existence of a breakout
- and the expansion of the volatility.

Volatility breakout system trading is certainly the most engaging and exciting: gains are rapid and associated with speculative short-term operational management. By a psychological point of view it is difficult to sustain periods of



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ineffectiveness associated with phases of low volatility trading range or the inability to earn markedly during the robust trend.

We will explain more in details the concept of breakout in the next chapter, where we are going to see its definition and the main techniques for the investor who want to trade on them.



CHAPTER 4

Breakouts.

Risk comes from not knowing

what you are doing.

W. Buffett

4.1 Definition of breakout

In the previous chapter we discussed about trendlines and their upward or downward movements, and we ended our argument mentioning the major techniques used to trade. We saw the trend following method, the contrarian and the breakout ones. In this chapter and in the following ones, we are going to discuss about this last system: trading on breakouts.

First of all we need to build a description of what a breakout is: it is simply a new high or low price after a sideways pattern or the violation of an important trendline, a support or a resistance. In the first case, the longer the sideways pattern, the more important the breakout will be. In the other two cases, the more important the support, the more powerful will likely be the next downtrend; on the other side, the more important the resistance, the more powerful will likely be the next uptrend.

Usually, breaking the resistance levels is indicated with the term "breakup" and breaking the support line is indicated with the term "breakdown". More generally we use the term "breakout" to indicate both.

Starting from this definition, we can argue that a breakout is a sign that something is changed: if you are drawing an upward trendline, you will expect that prices will rise accordingly to the line; price will remain upward until the line will be broken.



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How to recognize a "good" breakout? Whenever we are going to perform a trade, the only thing we can be sure of is that we want to take the risk. So it is essentially a matter of establishing how much we are willing to lose on that operation if things go the wrong way. No one can be sure about the behavior of the stock, in which direction it will move, for instance. The only thing that is absolutely necessary to set is, of course, our level of risk.

The figure below can help us to understand better:



Figure 4.1 source: "A short course in technical reading" by Perry J. Kaufman

The trend remains the same until prices cross the support or resistance lines going to the other direction: if a new high price crosses the resistance line, we have a new upward trend breakout, while, if the low crosses the support line, we have a new downward trend.

So, if the trend is a bearish one, we look at the resistance line, if instead the trend is a bullish one we should consider the support line. What happens if the trend is lateral? In this case, looking at the support line or at the resistance one is the same: in the moment one of them will be broken, we will have, respectively, a bearish trend or a bullish trend.

Generally speaking, if we want to identify some rules, we have to take into consideration these points:



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- Buy when prices make a new high above the previous resistance level.
- Sell when prices make a new low below the previous support level.
- Do nothing in between

A question raise spontaneously: what happens if after the breakout the price comes back into the previous trend? This leads us to the next topic: false breakouts.

4.1.1 False breakouts

First of all, it is important to precise that the breakout phenomena are never so distinct and clear, but sometimes it can happen that the price of a return breaks a certain level (this can be either the support or the resistance line) but then continues in the expected direction: this is called false breakout.

See figure 4.2.

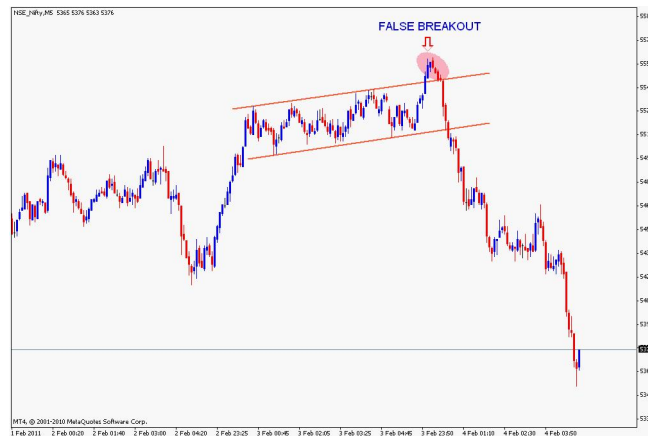


Figure 4.2 False breakout pattern

Source: niftychartsandpatterns.blogspot.com

There are volatile days in which prices are pushed to new highs. By the end of the day those higher prices could not be reinforced by fact and so prices return to previously lower levels inside the range.



Generally, we should not consider valid a breakout unless the closing price confirms the direction by staying above the high of the sideways range.

4.1.2. Bull and Bear Traps

Bull trap literally means "trap for buyers" and identifies a false breakout of resistance. The bull trap are classic pattern of 1-4 candles, which need to be combined with a signal forex price action, in order to get a precise and reliable setup.

Best bull trap are those who has the candle that effectively shows the breakout at the end of the day, but then these traps deny the signal in the next session. Sometimes the false break is already seen in the same day of the break, as it forms a long upper tail that identifies the end of the push from the buyers.

Let we see this kind of trap using the candlestick graph:



Figure 4.3 Bull Trap
Source: Traderpedia.it (modified image)

The bear trap identifies the scenario diametrically opposed to bull trap. It 's a "trap for sellers ". The structure of the pattern is identical to the bull trap, but in this case occurs mirrored on the support line.



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Figure 4.4 Bear Trap

Source: traderpedia.it (modified image)

4.2 Finding a technique on breakouts

Before building any trading strategy it is crucial to understand a universal concept which is often true: not any strategy always works.

On the basis of technical analysis, we must therefore being preventive and understand in which phase the market is. This will determine the success of our strategy. Basically we can divide the market conditions in three main areas:

- trending phases
- phase of range
- breakout phase.

The question is more related to the capability of reading the graphs, but also the psychological strength of the investor, his character and his previous experiences.

It is obvious that the ability of a trader is not only due to a particular moment of the market: a good trader has to change and adapt his characteristics when market changes.

With this statement, we try to analyze a possible trading strategy based on breakouts. Of course, it is necessary to confirm that there is not a unique



technique which is good for every trader, because each trader is different from the others and markets change every time.

So, it is easy to understand that if we would to check all the techniques, probably we will have many models as the number of the traders!

By the way, there is a risk of using the breakout method for trading: it is the difference between the high price and the low price. Of course, it is during volatile periods that the risk significantly increases; while during quiet times the risk is small.

For our project, therefore, we should consider only the main techniques used: the stop loss, the take profit model, and the theory of the first hour.

4.2.1 The Stop Loss Strategy

The stop loss can be defined as the maximum loss that the trader decides a priori to suffer if the operation does not go in the desired direction.

A stop loss can be explained in different ways: on a points basis, 5€ below the entry price, for instance, or on a percentage basis, 4% of loss from the entry price, for example.

Of course, the best stop loss technique may not be the same for any strategy, since the best stop loss practice is a function of a specific strategy, a specific market, and so on.

However, the stop loss should be "smart", meaning that it should be placed on strategic points of the chart we are observing. We can affirm that the stop loss should be positioned below (for *long* operations) or above (for *short* operations) some important point, which may be the resistance or the support line in the graph.

Stop loss strategy has, like any other strategy, advantages and disadvantages. The advantage is the fact that you don't have to monitor on a daily basis how a



stock is performing, and this is useful because it prevents you from watching your stocks for an extended period of time.

The disadvantage is that the stop price could be activated by a short-term fluctuation in a stock's price. The main important thing is picking a stop-loss percentage that allows a stock to fluctuate day to day, and at the same time it prevents the downside risk.

If we set, for instance, a 4% stop loss on a stock that has a history of fluctuating 10% or more in a week, it is not the best strategy.

There are no particular rules for the level at which stops should be placed: it totally depends on your individual investing style.

Another thing to keep in mind, especially in a fast-moving market where stock prices can change rapidly, is that once your stop price is reached, your stop order becomes a market order and the price at which you sell may be much different from the stop price you expected.

Another issue to take care of is how to manage profits; see next paragraph for that.

4.2.2 Take Profit Strategy

Contrary to what we said about the instrument of the stop loss, and as the name suggests, take profit orders are used to lock in profits in the event the price moves in a favorable direction. For example, if you are long a currency pair position and believe the price will rise to a certain level, but are unsure what it will do beyond that level, placing a take-profit order at that point will automatically close out your position allowing you to lock in profit.

The main advantages of using the take profit strategy are:

- Get a gain compliant with initial prerogatives
- Conclude an operation before it reaches excessive levels of stress.



Before placing a take profit strategy, the investor must always regards at his psychology and at his desires, especially in terms of risk aversion.

4.2.3 The 60-minutes breakout strategy.

The six stock indexes considered in the strategy are:

- FTSE MIB (Milan, Blue Chips)
- EUROSTOXX50 (Europe, Blue Chips)
- DAX30 (Germany, Blue Chips)
- DOW JONES 30 (New York, Blue Chips)
- NASDAQ100 (Blue Chips, USA tech sector)
- S&P 500 (Blue Chips, USA Mid Caps, Small Caps)

Prices of these indexes have been recorded on an hourly basis from October the 31st, 2013 to September the 18th 2015, for the three American indexes, 470 days, and from March the 13th, 2014 to September 18th 2015, 385 days, for the three European ones. European indexes start trading 9am, GMT; American indexes start trading 3.30pm, GMT.

This means that the first hour on the latter is just half an hour. In order to do this, we will start considering the first 60-90 minutes in the Stock Exchange of six indexes and then I tried to define a price range of them. Generally, international stock exchanges are open for about 7 hours per day from Monday to Friday.

The hour of the observations is between 10am and 6pm for the European indexes, and between 4pm and 10pm for the American indexes. The time frame is 60 minutes. That's why we called the strategy *60-minutes breakout*.

At 17 we look at the range of the first 90 minutes and at the breakout from one side or the other side, then we operate.



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We will put the stop on the opposite side of the channel, and the target equals to the risk. If at the closing of the market, there were not affected neither the target nor the stop, we will exit at the closing price.



CHAPTER 5

Indexes

The first rule is not to lose.

The second rule is not to forget the first rule.

W. Buffett

5.1 The working method

The starting idea is to demonstrate that it is possible to trade on breakouts of the first hour's range. We want to suggest a different idea to the wide literature about the trading on the opening range breakout. The main goal is to create and test a code made with *Visual Basic for Applications* (VBA) in the Excel environment, using six indexes from two different markets.

European indexes start trading 9am, GMT; American indexes start trading 3.30pm, GMT. This means that the first hour on the latter is just half an hour. In order to do this, I started considering the first 60-90 minutes in the Stock Exchange of six indexes and then I tried to define a price range of them.

Generally, international stock exchanges are open for about 7 hours per day from Monday to Friday. All markets have a stage called pre-market where you can place orders (that are not executed until the official opening).

COUNTRY	CITY	OPEN	CLOSE	COUNTRY	CITY	OPEN	CLOSE
IT	Milano	9 am	5.30 pm	FR	Paris	9am	5,30pm
DE	Frankfurt	9am	5,30pm	GB	London	9am*	5,30pm*
USA	New York	3,30pm*	10pm*	J	Tokyo	2am*	8am *

source: Borsaitaliana.it
*local hour of Rome, Italy



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The six stock indexes considered are:

- FTSE MIB (Milan, Blue Chips)
- EUROSTOXX50 (Europe, Blue Chips)
- DAX30 (Germany, Blue Chips)
- DOW JONES 30 (New York, Blue Chips)
- NASDAQ100 (Blue Chips, USA tech sector)
- S&P 500 (Blue Chips, USA Mid Caps, Small Caps)

Prices of these indexes have been recorded on an hourly basis from October the 31st, 2013 to September the 18th 2015, for the three indexes, 470 days, and from March the 13th, 2014 to September 18th 2015, 385 days, for the three ones. The total number of observations is then 2565.

5.2 The indexes

5.2.1 Definition of index

Generally speaking, we can define an index as a synthetic value of all the information about an economy or a market at some time. It is typically a weighted average.

If we set:

$I_t =$ the index at time t

$P_{it} =$ price of the index at time t

$P_{i0} =$ price of the index at time 0

Then we can say that if we start from the definition of a simple index:

$$I_t = \frac{P_{it}}{P_{i0}}$$



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$$I_{t+1} = I_t \left(\sum_{i=1}^n w_i \frac{P_{i,t+1}}{P_{i,t}} \right)$$

There are numerous indexes that cover a broad range of markets and sectors within those markets.

In the same way, we can say that values of *stock* indices are the result of the value of the basket of shares they represent, or, in different words, a stock index tracks changes in the value of a hypothetical portfolio of stocks. The percentage increase in the index over a small interval of time shows the percentage increase in the value of the portfolio.

One of the most famous index is the Standard & Poor's 500, which is often used as a proxy for the whole U.S. stock market. There are other indexes, such as S&P 100 which tracks a global baskets of stocks, while the Japanese Nikkei 225 and the British FTSE 100 are country-based indexes.²²

Other kind of indexes are for regions, such as Asia/Pacific, as well as investment classes such as precious metals index.²³

5.2.2 How an index is computed

Each index is calculated in a slightly different way, and changes are calculated from a base value. Each index has a different base value, so the numeric numbers are not as significant as the index's percentage changes.

²² <http://www.investopedia.com>

²³ <http://www.investopedia.com>



Note that if the portfolio of stocks remains fixed, the same is not for the weights of individual stocks: when the price of one particular stock in the portfolio rises more sharply than others, a higher weight is given to that stock.²⁴

The construction of an index implies the definition of some variables:²⁵

- a) stock basket
- b) weighting structure and calculation
- c) reference period
- d) basket update
- e) valuation prices

Let see them more in detail.

- a) stock basket

In the determination of a basket of securities we need to keep into account several elements, in particular:

- geographic area of reference: we must distinguish between national (as MIB30) and international indexes (as DOW JONES EUROSTOXX50).
- numerosness of the basket: distinguish between universal and samples indexes: the first consider all the shares listed in a given financial market (as Mibtel), the second considers a subset among listed shares in a given financial market.
- selection criteria of the basket: the criteria are based on different variables such as liquidity, capitalization and sector representation.

- b) weighting structure and calculation

²⁴ <http://www.investopedia.com>

²⁵ <http://www.borsaitaliana.it>



The aggregation of prices which form an index can occur in different ways, in particular, depending on the weighting factor, we can therefore distinguish between:

- Equally weighted indexes: these are characterized by the equality of the weighting factors for all the securities in the index . No matter the capitalization of the companies included, because all the stocks in the index have the same weight;
 - Price-weighted indices: in this case the weight associated to each title varies as a function of its price (if the price of a title increases more than the other, automatically it also increases its weight within the index). They are very simple to calculate because they are given by the sum of the prices of the securities comprising the index. These indices, however, have the disadvantage of not accurately reflect the performance of the entire portfolio: it is represented more titles more "expensive", regardless of the number of shares present and the size of the company;
 - Value-weighted indices: they solve the problems of the previous ones in that the weight of each stock is proportional to its market capitalization. Unlike the other calculation methods, in this case the indices are adjusted and adjusted as a result of corporate actions such as splits, reverse splits, payment of extraordinary dividends, splits, bonus issues and new issues.
- c) reference period: the reference period, or base period, is the period with respect to which are measured the variations of the basket.

The starting level, or base, of a stock index is by convention a reference value fixed in a base period. Starting from this level variation from the basic level is the yield obtainable by an investor with a portfolio that replicates the index structure.

- d) basket update



Updating the weighting structure of the basket may have a different frequency. The arrangements may provide for the entry and exit at any time or only in certain circumstances: for instance, an open index is the Mibtel, while close indexes are the Mib30 and the SP / Mib.

With the occasion of the updates of the basket, to maintain the continuity of the index, the value of the base is multiplied by the coefficient of coupling, represented by the last value of the index with the old composition.

e) valuation prices.

Index calculation can be done by enhancing the individual actions with different types of prices related to the daily performance of shares. Some of them are:

- last price: is price of the last contract concluded. In order to enhance the index, you consider the price of the last contract concluded at the end of a set period of time and configurable. This is currently equal to a minute to index Mibtel and Mib30, and equal to 30 seconds for the S & P / MIB.
- official price: is the arithmetic mean of all contracts concluded during the trading day, weighted by the amount of securities traded.
- reference price: it is the weighted average price for the last 10% of the amount traded during the trading day.

The algorithm underlying the calculation of the indices of stock market is represented by the following formula, called Laspeyres formula:²⁶

Most of the major world indices are therefore calculated with the value-weighted methodology; among these we remember the Americans S & P 500

²⁶ <http://www.borsaitaliana.it>



and NYSE Composite indices, the Italian S & P MIB, the FTSE100 (UK), the CAC40 (France), the DAX30 (Germany) and the Topix (Japan). Among the few remaining price-weighted indices, the two most important are the Dow Jones (USA), the stock index's oldest history and the Nikkei 225 (Japan).

5.2.3 Blue chips indexes

Describing a business a blue chip comes from the game of poker, where the blue chips have the highest value. A blue chip corporation is large and stable, and most recognize nationally or even internationally, as it produces well known products or services, and generally it has a market value in billions of dollars.

Their stock usually perform similarly to the stock market as a whole, as measured by the S&P 500 index.

Usually, blue chips are considered safer than lesser-known companies, although it is not always true, because, although it is not required, it is common for blue chips stock to pay dividend: this means they are giving some profits to shareholders, because the profits are steady and reliable.

The main blue chips indexes are in Western countries: for example the DJIA 30 is an index with 30 blue chips stocks, including General Electric, Boeing, American Express, AT&T, Procter&Gamble, Coca Cola and so on.

Because blue chips companies are established and mature, they tend to be the type of company that pays regular dividends that often increase from year to year. Thus, investors who seek regular, dependable dividends, and don't like to risk their investments are drawn to blue chip stocks.

In addition to dividend payouts, blue chip stocks are what investors seek when searching for the highest quality stocks that hold their value, while blue chips tend to recover faster than other less quality stocks.

There is no formal list of blue chips stocks, but many of the company names are well known, such as Intel, JP Morgan Chase & Co., Wal-Mart, American Express.



5.2.4 The New York Stock Exchange

The New York Stock Exchange (NYSE) is also called "big board" and for good reasons: it is the largest, oldest, best-known stock exchange in the world. We can define a stock exchange as a regulated auction market, where stocks, bonds and other securities are bought and sold.

The market capitalization determines the value of all the outstanding shares of the NYSE listed companies.

The stock index representative of the New York Stock Exchange is the NYSE Composite, one of the most followed by international operators and analysts in America together with the Dow Jones, Nasdaq and S & P 500. On the NYSE trades are made by physical auction continues guided by a specialist. The specialist, in addition to driving the rod toward the balance between buyers and sellers, also has an obligation to ensure that the market is conducted in a fair and orderly, intervening with their prices to compensate for any temporary imbalance between supply and offer.

The NYSE is open from Monday to Friday, from 9.30am to 4 pm, and it is closed during nine holidays.

5.3 The tools

5.3.1 FTSE MIB

Previous called MIB 30 and then S & P Mib40, since June 2009 the index has changed its name and became FTSE MIB Index, following the merger of the Italian Stock Exchange and the London Stock Exchange.²⁷

FTSE MIB is the principal benchmark index for the Italian equity markets. This index, which captures about 80%²⁸ of the domestic market capitalization, is composed of major corporations with high liquidity across ICB sectors in Italy.

²⁷ <http://www.investopedia.com>

²⁸ <http://www.investopedia.com>



The FTSE MIB Index measures the performance of 40 Italian equities and seeks to replicate the broad sector weights of the Italian stock market. The Index is derived from the universe of stocks trading on the main market of the Italian Stock Exchange . Each stock is analyzed for size and liquidity, and the overall Index has appropriate sector representation. The FTSE MIB Index is weighted by market capitalization after adjusting constituents for float.²⁹

Some of the companies of the Ftse Mib are Banca Popolare, Enel, Fiat, Generali Assicurazioni, Mediaset Spa, Parmalat and Telecom Italia.

5.3.2 DAX 30

The Dax index (Deutscher Aktien Index) is composed of 30 German securities with the highest capitalization and liquidity traded on Segment 'Prime Standard' of the Frankfurt Stock Exchange and traded continuously on Xetra platform.³⁰

Introduced in 1988, the Dax is the main stock index of the German Stock Exchange: trading on securities included in this index are in fact 80% of the total value.

Companies included in the DAX index have historically included household names such as Adidas, BMW, Deutsche Bank, Siemens and Volkswagen. By virtue of being a proxy for the performance of the German stock market, the DAX index is one of the most important equity indexes in Europe and worldwide.³¹

The securities included in the index are selected based on criteria of capitalization, trading volume and other criteria of verification designed to avoid assigning too much weight in the index to a few companies and may belong either to traditional sectors or to the technology sectors.³²

²⁹ <http://www.investopedia.com>

³⁰ <http://www.investopedia.com>

³¹ <http://www.investopedia.com>

³² <http://www.investopedia.com>



It is, however, necessary that the company is listed at least three years and that the float is at least 15%. Once it is verified the criterions (ownership of a business residence registered in Germany, admission to the segment 'Prime Standard' of the Frankfurt stock exchange, the share price on Xetra, fulfillment of international standards on transparency), those are evaluated for admission: the total volume traded on Xetra and on the Frankfurt Stock Exchange over the last 12 months and the capitalization of the shares floating last trading day of the month.³³

The list also includes other German indexes: the DAX 100, the M-Dax (the one that includes the titles mid-cap) and the C-Dax (Dax Composite), divided into 16 sub-indices.

5.3.3 DOW JONES 30

The Dow Jones Industrial Average (DJIA) is a price-weighted average of 30 significant stocks traded on the New York Stock Exchange and the Nasdaq. The DJIA was invented by Charles Dow back in 1896. It is a weighted index of the market price of the 30 largest publicity - traded companies on the NYSE.³⁴

All of these stocks are big American blue chip companies characterized by large market capitalization and stable earnings history.

The Dow Jones is such an important figure that a number of index funds try to replicate the performances, because the largest industrial stocks in the US are great indicators of the economic growth of the activity

Suppose an investor in the stock market owns several different large stocks, including Coca Cola, Jhonson&Jhonson and General Electric.³⁵

³³ <http://www.investopedia.com>

³⁴ <http://www.investopedia.com>

³⁵ <http://www.investopedia.com>



He would know how the stock market feel in a certain date: he may read the stock prices of the companies or, simply, he may look at the DJIA and this would give an idea of how would the stock perform.

If the Dow close up, it was a good day for the stock market and the portfolio of our investor probably increases in value.

In the Dow close down, it was a bad day for the stock market and the portfolio probably would drop.

The 30 stocks in the DJIA dictate the movement of the entire stock market.³⁶

5.3.4 NASDAQ 100

NASDAQ stands for National Association of Securities Dealers Automated Quotation and was established in Wall Street on February 8th, 1971 and was the first stock exchange in the world exclusively electronic.³⁷

Today, Nasdaq is associated to technology stocks, in fact few of the companies listed on are Apple, Ebay, Google and Microsoft.³⁸

The Nasdaq is not traded in the NYSE, rather buying and selling take place electronically in the Nasdaq system: the processor electronically send its orders to market makers, who post the bid and ask prices for securities. When the price is accepted, the trade is made electronically. In addition trades can be made for commodities, debt, derivatives, ETFs and structure products.³⁹

Recently, Nasdaq merged with OMX Abo: the combination is called Nasdaq OMX, and now list over 4,000 companies, with Nasdaq itself listing 3,100 companies.

The Nasdaq 100 index, which includes 100 of the largest non-financial companies listed on the Nasdaq, ⁴⁰includes securities related to the US and foreign companies that are not holding companies, financial companies, banks or

³⁶ <http://www.investopedia.com>

³⁷ <http://www.investopedia.com>

³⁸ <http://www.investopedia.com>

³⁹ <http://www.investopedia.com>

⁴⁰ <http://www.investopedia.com>



investment companies; sectors most are technological (hardware and software), telecommunications, biotechnologist and the trade is retail, at wholesale.

Nasdaq is often used to refer to the Nasdaq 3000 which is a composite index of 3,000 stocks listed on the Nasdaq exchange.⁴¹

5.3.5 STANDARD&POOR'S 500

Standard&Poor's (or S&P500) is one of the most commonly used benchmarks for the US stock market, and it comprises 500 large hat stocks, representing the leading industries of the US economy. They are chosen for such factors, as market sides and liquidity or, in other words, as easily an asset or security can be bought or sold in the market without affecting the asset price.

In tending to be a leading gage of US equities, the S&P500 is also used to reflect the risk and the return associated with large companies.

Many people consider the S&P500 to be the better representation of the US market than the Dow Jones Industrial Average, since the latter only includes 30 companies while the S&P500 is considered to be *the* definition of the market. Other popular Standard & Poor's indexes include the S&P 600, an index of small cap companies with market capitalizations between \$300 million and \$2 billion, and the S&P 400, an index of mid cap companies with market capitalizations of \$2 billion to \$10 billion.

5.3.6 EUROSTOXX 50

The Eurostoxx 50 Index is an equity index comprising stocks listed on stock markets in the Eurozone.⁴²

They are the most important stocks not only for liquidity, but also for their level of capitalization.

⁴¹ <http://www.investopedia.com>

⁴² <http://www.investopedia.com>



The Eurostoxx 50 was created by Stoxx Limited, a company formed by a joint venture composed by the SWX Group, Dow Jones & Company and Deutsche Börse AG.

In the Eurostoxx 50 there are listed stocks belonging to the French, German, Spanish, Italian, Dutch, Finnish and Luxembourgian markets. Among the most important are those of the European giants of the banking and insurance sector, but also of the energetic and industrial, including major automotive majors such as Renault, Daimler and Volkswagen.⁴³

Also giants of the food industry such as Danone and Carrefour belong here.

5.4 The negotiation phases

A trading day begins with an auction of opening, then there is the continuous phase and finally a closing auction. The common element in all three phases is the book, an electronic table showing the proposed purchase and sale sent to the market by operators at any given time.

The phase of the opening auction on the Italian Stock Exchange market lasts from 8 to 9 and it is divided into three phases: pre-auction, validation, opening.

A curious element is that the end of the auction is not set at a specific moment: it happens randomly in any second of the minute from 9 to 9:00:59 am.

The continuous phase is important for us, because it is the phase in which we will develop our strategy. It starts from 9.01am, immediately after the auction, it lasts all the day until 5.25pm.

This phase is very dynamic: any order that can be executed is executed instantaneously; if a buyer and a seller come into play offering and asking the same price they are immediately matched, for the quantity that suits them both; if the two quantities are different they will trade the common part, and one of them will have a partial execution.

⁴³ <http://www.investopedia.com>



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At the end of the continuous phase there is another auction, whose goal is to define the closing price of the day.

The closing auction lasts only 5 minutes: if at the end no price is found, then the systems calculate the reference price, equal to the weighted average of the last 10% of the daily trade volume.

In the closing auction there's the random minute: from 17:30 to 17:30:59



CHAPTER 6

Costs, Commissions and Taxes.

*Most people spend more time and energy
going around problems
than in trying to solve them.*

H. Ford

6.1 Capital gain

With the term capital gain we identify the difference, in case it is positive, between the selling price of a financial instrument and its purchase price.⁴⁴ Thus, there is a capital gain when you sell the stock at a higher price than the one you purchased it for. This value, though, is only a part of the total return of an investment, since it does not account for the possible collection of dividends.

The capital loss is, instead, the loss resulting from an asset sale for a price below the one it's been purchased for, minus any accrued interest, plus costs.

Talking about costs, commissions and taxes, we can distinguish between three kind of costs:

1. commissions paid on each trade;
2. tax on trades that go overnight (the so called Tobin tax)
3. tax on profits.

In the next paragraphs we will discuss them.

6.2 Trading commissions

Trading commissions, or brokerage commissions, can be fixed or variable.

⁴⁴ Domenico Dall'Olio, Nicola De Florio, "In Borsa non si gioca!", Franco Angeli, 2015.



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In the first case you pay a certain amount, such as 5 Euros, for each order execution. Orders that are canceled or modified do not involve the payment of a commission, but if there is a partial execution and during next time you move the remaining order and have it executed, you pay a second commission.

The commission on entry is followed by the exit one: when you resell what you previously purchased back you pay brokerage commission.

Variable commissions are, generally, preferable because they are linked to the amount actually invested. Think, for example, how much do 5 euro influence on an invested capital of € 500: 1%.

If every time you make a transaction you pay a 2% total commission on entry and exit you can be sure that your trading will not be profitable at all, unless you put up a strategy very valid. Sometimes to make tolerable the amount you pay with fixed fees you need to invest a capital too high per transaction.

We must, therefore, pay attention: many intermediaries apply variable fees with a minimum threshold and a maximum one; the minimum threshold can be quite high, though, then you may find yourself again forced to raise the capital in every trade to not seeing profits eroded dramatically by costs.⁴⁵

6.3 Tax on overnight trading or Tobin tax, and profit tax

The name Tobin Tax comes after the American economist James Tobin, who designed and proposed it for the first time in 1972. The initial idea was to thwart purely speculative trading by means of a tax that hit the transactions making them less affordable. That idea was quickly abandoned due to the lack of effectiveness in pursuing the original purposes: in order to be an efficient transaction tax it should be applied to all markets; the only effect it showed was to encourage a shifting of traders from some markets to others.⁴⁶

⁴⁵ Domenico Dall'Olio, Nicola De Florio, "In Borsa non si gioca!", Franco Angeli, 2015.

⁴⁶ www.Tobin-tax.it



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Following the 2008 crisis, considered a symptom of sick finance and speculation, they began to speak of the Tobin Tax until then developing it in 2013.

Once you pay the entry and exit fees and the Tobin Tax, what remains is the net result of the trade. If this net result is positive we have a so-called capital gains. On it we apply a tax, which was 12.5%, then it became 20%, and by July 2014, 26% on the stock market. Let us consider an example.

Suppose we buy 1,000 shares of a stock that share 25 Euros per share, using a broker that charges a fixed trading fee of 10 Euros for execution. After a certain time we close the position at 26 Euros per share.

When we purchased we spend 10 Euros of commission and 25 Euros of Tobin Tax. Selling again we spend 10 euro fee, and have a gross capital gain of EUR 1,000. We cut off all expenses incurred, EUR 45, and then we remain with 955 Euros, which represent the actual return before tax. To this we apply the tax rate of 26%, making EUR 248.3. Therefore, we remain with 706.7 Euros, that is our net return.

The capital gain is paid only on the total profits earned over a period of time. For instance, if today we get € 1,000 in a stock market transaction, but yesterday we lost 800 in another trade, then the tax applies only to the actual total profit, that is, 200 Euros; in substance the tax is imposed only on the positive difference between capital gains and losses over some time period.

The management of taxes on capital gains is generally monthly: in the beginning it is determined the total gain or loss for the previous month. If in the previous month we get a capital loss, then it can be used to offset capital gains in the current month; but if there is a capital gain, then taxation depends on the presence of previous losses or not.

With regard to the derivatives' market, the tobin tax is applied in a totally different way: it follows rates specified in the table provided by the ministry; for instance, the Tobin Tax is 0,75€ for trades up to a million euro in value.



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The domestic investor who wants to continue to invest in the financial markets not paying the Tobin Tax, can choose within three alternatives:

- 1) he can choose to operate in foreign markets;
- 2) he can devote to stock Italian trading with a market capitalization of less than 500 million euro;
- 3) he can make intraday trades, that make the trades of purchase / sale of Italian equities in the same day.



CHAPTER 7

Futures Contracts and Margins.

*When you combine
ignorance and leverage
you get some pretty interest results.*

W. Buffett

7.1 Futures contracts

We can define a futures contract as an agreement between two parties to buy or sell some good (that can be financial or physic) at some date in the future, at some specific price; it is a derivative contract, that is, its behavior is linked to the one of another asset, named underlying.

This is the classic definition of futures contract, but to be stringent it applies only in a specific context: when the two parties keep the contract opened till its maturity, the good is physic, and it can be delivered. This behavior, indeed, is the answer to a specific need: the need for the underlying at some date in the future at some price decided in advance; this is a typical need for companies willing to hedge a risk of some sort.

To the contrary, in most of the circumstances a futures contract is just a way to speculate on the trend of an asset, on a short or very short term, with a huge leverage.

The trend of a futures contract is substantially linear, very similar to that of the underlying, but its price is generally different: it can be higher or lower than the price of the underlying, depending on some contingent situations and some peculiar features of the underlying good.

Futures are standardized contracts, quoted on regulated markets.



This means that for any contract everything is set in advance: the good to be traded, the quantity, the quality (in case of physical goods), delivery dates, price, minimum price variation, maximum daily price ranges, and so on.

Futures are given of a maturity, at which they are closed, regulated and retired from negotiation.

If the underlying is physical (like cereals, metals, stocks) there happens to be a physical delivery of the underlying; in many cases though there is just a cash settlement.

7.1.1 An example

Futures contract written on the FTSE MIB index:

- underlying: FTSE Mib index
- quotes: in index points
- value of a point: 5€
- minimum price variation (tick): 5 points (25€)
- contract size: price of the futures times the value of a point (for example, if the index quotes 20000 points, its value is 100000€)
- maturities: every quarter of a year (March, June, September and December)
- expiration day: third Friday of the expiration month
- settlement price at maturity: opening price of the expiration day
- settlement: cash
- initial margin (since September the 22nd, 2014): 10.25%

The 10.25% initial margin applies under normal market conditions, which happen when there are no shocks of any sort (tsunami in Japan, twin towers, Lehman Brothers, and the like...); when markets can be very volatile the stock exchange has the right to increase the size of the initial margin, for precautionary reasons.

Let's see what does it mean initial margin in the next paragraph.



7.2 Margins

7.2.1 Initial margin

The initial margin is the money needed to open a position on the FTSE Mib futures.

Under normal market conditions the margin required is 10.25%. This means that to open a position valued 100000€ we just need 10250€.

About 10000 euros are enough to open a position valued 100000, that is, to face profits and losses linked to the second amount, not to the really used money: a 10% gain means a profit equal to the money used to get it, a 10% loss means to lose all the money invested. And moreover, the money invested is not an expense: it is just a safe deposit.

This is the main peculiar feature of futures, then: they have a huge intrinsic leverage: in this case the need for capital is about a tenth of the value of the position on the market (there are futures with leverages higher than 100...). The leverage is what makes futures very attractive for speculators.

But pay attention: the initial margin not always represents the maximum need for money in order to manage a futures position: as we'll see forward there might happen to be needed more capital.

In order to understand this issue we need to introduce the role of the clearing house (Cassa di Compensazione e Garanzia, in Italy). But first we need to sort out some more matters.

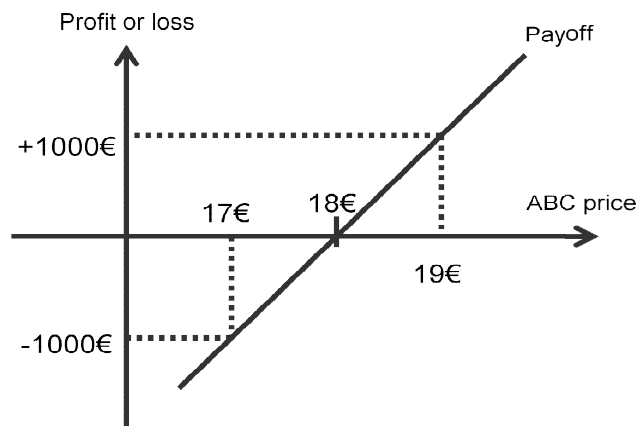
7.2.2 The Payoff

The payoff is a chart that shows the result – in terms of money – of an investment, depending on the price of the asset at some date. In the field of derivatives, the payoff is used to visualize the profit or loss of a trade at the maturity of contracts for several prices of the underlying. It's a way to see what happens in case of some possible outcomes. On the horizontal axis we place the



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prices of the underlying on arbitrary intervals, on the vertical axis we place the economic result of the position.



Let's first consider the case of a stock: suppose you buy 1000 shares of the stock ABC at 18€ each. The payoff of this position is a straight line, with a 45° slope, growing from bottom left to top right: profits and losses are straight proportional to the movement (up or down) of the stock: In case of futures things are slightly different, since the futures' price is not equal to the underlying's price (spot price), for reasons that we'll see.

In passing from stocks to futures, to understand the payoff we have to first understand a key difference in terms of potential profits and losses and real profits and losses. Here we need to focus on a paramount concept: on the stock market, on an ordinary account (no leverage) till a trade doesn't get closed, profits and losses are only nominal.

If we buy a stock at 10€ and the price rises to 11€, if we do not sell those shares the profit is not real; at the same time, if the price drops to 9€, the loss is not real, if we do not close the trade.

This means that trades that generate nominal profits or losses do not have any impact on the capital of the investor while they are opened: only when they are closed they generate a real profit or loss.



Moreover, in a stock position there is no insolvency risk: the value of a position is totally paid in the moment of purchasing, so the only individual exposed to a risk is who holds the stock in his hands: his counter party, who sold the stock to him, already got paid of the whole amount, so he doesn't need to care about that stock anymore. In other words, if a stock holder loses money it is just his business: no one else is at risk in that case.

7.2.3 Potential profits and losses

In passing from stocks to futures, to understand the payoff we have to first understand a key difference in terms of potential profits and losses and real profits and losses. Here we need to focus on a paramount concept: on the stock market, on an ordinary account till a trade doesn't get closed, profits and losses are only nominal.

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7.2.4 Insolvency risk

A very strong source of risk is given by the leverage, that puts the market in front of the insolvency risk, originated by the possibility for losses to be higher than the available money.

The problem is that if, for instance, the buyer faces a loss higher than the money deposited and has no money to pay for those losses, the writer could not be paid the money he gains. This issue involves the need of some sort of risk management policies.

There is a paramount difference between buying a stock and buying a futures written on that stock: to buy 1000 shares of ABC at 18€ each we have to pay 18000€ cash immediately, and this provides a full coverage of the maximum potential risk of the trade (the stock goes bankrupt and its price falls to zero).

Now let's consider a futures written on ABC, assuming it's lot is 1000 shares (on stock futures there are minimum lots) and the initial margin is 10%. The investment is valued 18000€, but to open it we just need 1800€. This means that the risk is covered only up to a 10%. This generates a risk for both parties: the buyer faces the risk to be not paid if the price rises more than a 10%; the writer faces the risk to be not paid if the price drops more than a 10%.

Generally speaking: both the buyer and the writer are exposed to insolvency risk.

7.2.5 Marketing to market

The management of insolvency risks requires the use of a specific methodology, called marking to market.

Marking to market is applied to all regulated derivatives and is based on a daily regulation of profits and losses: as the market closes, every day, nominal profits are immediately credited, nominal losses have to be immediately paid.

Daily profits and losses are managed by the clearing house, that daily asks banks to calculate the net positions of their clients and collect the losses: the



intermediary picks up money from the accounts of investors with losing positions on futures, and sends that money to the clearing house. The clearing house then sends money to banks whose clients have profiting positions of futures, and finally the banks credit that money on the accounts of traders with positions in gain.

The clearing house acts then as counter party in all the trades opened on the market at some time: the buyer and the writer of a futures are not bound the one to the other, because if any of them cannot deal with his losses the clearing house ensures that the other party gets paid of the money he earned. Then the clearing house will manage the insolvency with the insolvent investor.

7.3 How do margins work

In the moment a position is opened, both parties have to deposit the so called initial margin. The initial margin is a measure of the statistical risk of a position from the moment it is opened till the next day: it's a statistical measure of the maximum possible loss in a single day in a specific market, with a very high probability (about 99.7%).

In order to keep risk always under control, then, it needs to be managed every day. At the market close, then, every day, the clearing house calculates again the risk of all the positions in futures.

Who is facing losses has to pay immediately a money amount equal to the loss, so to keep unchanged the coverage of the statistical risk (the initial margin); who is having a profit has to be immediately paid; the risk remains fully covered in this case too.

Crediting and debiting of daily profits and losses are called *variation margins*.



7.3.1 Maintenance margins

Every day then the initial margin is adjusted with a so called maintenance margin. To better understand margins we need to understand their specific goals. Initial margin is a measure of insolvency risk, that gets covered with a safe deposit. This deposit is not an expense: it is just a safe deposit that is required till the position is open: it gets restituted to the investor in the exact moment the trade gets closed. It is not an expense, then. The same applies to the maintenance margin, that is, just an integration to the initial margin.

Variation margins are the real profit or loss of a position: they are needed to keep unchanged the safe deposit from a day to another in order to ensure the coverage of risks for the whole market.

7.4 Intraday margins

In recent times financial intermediaries granted a lower margins for intra-day operations, with respect to the initial margin, by allowing investors to close their position within 5.10 pm.

The intraday operations let an investor to operate with reduced margin requirements and stop loss; according to the following table, as an example:

Index	Minimum margin	Minimum stop loss
FTSE MIB	2.50%	1%
Eurostoxx500	2.50%	1%
Dax	2.50%	1%

source: <http://helpfineco.it>

The lower margins allow, for example, to open a position on the Dax by using a liquid amount of about 4500 € (with margin of 2.5%) rather than around 12,600 €.



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Intraday transactions on derivatives must be closed before 17:10, for IDEM market and around 21:30 for the EUREX and CME markets. Any open positions will be closed automatically by the financial intermediates no later than 17:25 for the IDEM market and no later than 9.45pm for EUREX and not before 9.30pm for CME markets⁴⁷.

⁴⁷ <http://www.help.fineco.it>



CHAPTER 8

Practical Analysis and Results.

*Someone is sitting in the shade today,
because someone planted a tree
a long time ago.
W. Buffett.*

8.1 Writing the code

In this chapter we will see all the practical work. In particular, we will discuss the simulation, starting from the data analyzed and the code used.

As we saw in chapter 5, the indexes taken into consideration are six: FTSE MIB (Milan, Blue Chips), EUROSTOXX50 (Europe, Blue Chips), DAX30 (Germany, Blue Chips), DOW JONES 30 (New York, Blue Chips), NASDAQ100 (Blue Chips, USA tech sector), S&P 500 (Blue Chips, USA Mid Caps, Small Caps).

Prices of these indexes have been recorded on an hourly basis from October the 31st, 2013 to September the 18th 2015, for the three American indexes, for a total of 470 days, and from March the 13th, 2014 to September 18th 2015, for a total of 385 days, for the three European ones. The total number of observations is then 2565.

All these historical data were given by the platform QuickTrade, provided by IW Bank.⁴⁸

The software used to show all the data and to compute the results was Excel, with spreadsheets divided into seven columns:

⁴⁸ https://www.iwbank.it/installazione_iwquicktrade; available for clients of the bank only



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	A	B	C	D	E	F	G
1	DATE	TIME	OPEN	HIGH	LOW	CLOSE	VOLUME
2	13/03/2014	10	20781,46	20879,27	20767,54	20854,71	238916673
3	13/03/2014	11	20854,36	20967,17	20845,41	20920,12	145165461
4	13/03/2014	12	20920,12	20945,56	20897,88	20914,72	133414328
5	13/03/2014	13	20914,56	20942,89	20907,95	20921,72	101578613
6	13/03/2014	14	20921,72	20971,02	20918,41	20956,96	78044234
7	13/03/2014	15	20957,10	20963,57	20928,98	20937,72	119932333
8	13/03/2014	16	20937,72	20955,13	20808,57	20810,45	141537441
9	13/03/2014	17	20811,50	20877,24	20703,10	20715,09	156862961
10	13/03/2014	18	20715,09	20737,15	20591,82	20591,82	156172322

Table 8.1 Example of spreadsheet.

- date: the day the observation refers to;
- time: the hour of the observation, between 10am and 6pm for the European indexes, and between 4pm and 10pm for the American indexes. In the picture above time is explained following the European system (24h). The time frame is 60 minutes;
- open: opening price recorded in the time frame of 60 minutes, index points based;
- high: the maximum price achieved in that time frame, index points based;
- low: the minimum price achieved in that time frame, index points based;
- close: closing price recorded in the time frame of 60 minutes;
- volume: number of transactions occurred in that time frame.

It is important to specify here that the opening and closing hours of the European Stock Exchange is from 9am to 5.25pm (see the table in chapter 5). But our observations are hourly based, thus the first range of observation starts from 10am (referring to the interval from 9 to 10), and as a consequence, the last observation finishes at 6pm (referring to the interval 5-5.25pm). The same is for the Americans: the time 4pm refers to the time frame from 3.30 to 4 pm, and so on.



Until now we have seen how it is structured the grid in excel, now we move on, and we consider how to simulate the process.

The next step is, by using visual basic for application (VBA), to write a code able to read all the data, and regarding the first hour of each day, taking into consideration maximum and minimum.

The goal of the code is to find if and where maximum and minimum are violated. The complete code is available in the Appendix, here we will see only few part of it.

Steps in order to build the code are:

1. to take into consideration each hourly interval;
2. to look at the maximum and the minimum and go on until there is a violation, either of the maximum or the minimum;
3. then, two cases can occur:
 - i) there is no violation of the maximum and minimum. In that case the code jumps directly to the end of the trading day, that is 6pm for European indexes, and 10pm for American ones. Then it restarts with another day (that is, from 10am in the case of European index, and from 4pm for American ones);
 - ii) there is a violation, then we have a trade to manage: if there is a stop loss, then the system exits at the stop, if there is a target, it exits at the target price, otherwise it exits at the closing price (no trades go overnight, then).
4. to write for each day of trading the direction of each trade taken (short/long), the price in and the price out, the time in and the time out, the stop loss and the target profit values, and finally the profit or loss.



8.2 Breaking down the code

Because of the difference in the time period of the two kinds of index, the Europeans and the Americans, it is useful to write two different codes for each type. So, in the Appendix, we can find first the code used for the European indexes, called *Sub breakout_60min_europa()*, then we have the code for the American indexes, called *Sub breakout_60min_usa()*.

8.2.1 The European Code

The European code, like the American one, starts from the first data available in the price history:

```
Range("A2").Select
```

Then, using a *do until* cycle, it performs a check on the time field, line after line, till the end of the database.

What it first looks for is the first hour of a day:

```
Do Until ActiveCell.Value = ""  
If ActiveCell.Offset(0, 1).Value = 10 Then
```

In the moment the first hour of trading is identified, the program records the maximum and the minimum of that first hour:

```
massimo = ActiveCell.Offset(0, 3).Value  
minimo = ActiveCell.Offset(0, 4).Value
```

The operative idea is then to buy if the price breakouts the maximum, setting the stop loss below the minimum, and vice-versa: to short sell if the price breakouts



the minimum, setting the stop loss above the maximum. Given the distance between the entry point and the stop loss, either way, we define the target price as the maximum risk suffered added to (cut from, in case of short selling) the entry point. Applying two very simple formulas, then, we have stop loss and take profit recorded in two variables. Generally speaking, the violation of each of the two thresholds is coded adding or cutting 1 point from them:

$$\begin{aligned}\text{stoploss} &= \text{minimo} - 1 \\ \text{targetprofit} &= \text{massimo} + 1 + (\text{massimo} + 1 - \text{stoploss})\end{aligned}$$

Once a trade is open, either long or short, the system monitors the two levels for stop loss and take profit till the end of the day. The first reached makes the system get out from the trade.

One exception might arise here: neither the stop loss nor the target price are reached before the end of the day. In that case the trade is closed for the closing price of the day.

8.2.2 The American code

It works exactly like the other one, with only one difference: since trading on the US markets starts 3.30 pm European time, the first hour is not a full hour. Then the system does not consider only the range of the first bar, but that of the first two bars: the maximum is the highest of the maximums of the first two bars, the minimum is the lowest of the minimums of the first two bars.

All other things are equal.

8.3 Results

At the end of each index's historical data analysis, four factors are computed, in order to compare globally the six indexes:



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1. gross global result: it is the sum of all the profits and losses for that index, point based;
2. number of historical trades: total number of trades generated in the past on available data according to the strategy rules;
3. better historical profit: the highest value of profits occurred;
4. worse historical loss: the lowest value of losses occurred;
5. average trade: the ratio between the gross global result and the number of historical trades;
6. total profits: sum of all the profits of all the time period;
7. total losses: sum of all the losses of all the time period;
8. number of positive operations: the number of profits occurred;
9. number of negative operations: the number of losses occurred

The results are reported in the table below:

A	B	C	D	E	F	G	H
index	gross global result	num.historical op	average trade	# positive op	# negative op	sum of profits	sum of losses
ftse mib	14644,15	377	38,84	226	151	35283,29	-20639,14
dax	3704,06	379	9,77	216	162	11784,08	-8080,02
eurostoxx 50	1092,7	384	2,85	210	174	3859,24	-2766,54
dow jones	1809,45	408	4,43	215	193	10213,64	-8404,19
nasdaq 100	52,11	432	0,12	225	207	3224,41	-3172,30
s&p500	-16,33	430	-0,04	206	224	1211,94	-1244,60

Table 8.2 Results

In order to give a better evaluation for the strategy on each market, in terms of profitability and risk, there are some more information required:

- the point value: the value of each point of profit or loss; it is expressed in Euros or Dollars;
- value of the average profit/loss: it is the ratio between the global final profit/loss and the total number of trades, times the value of a point in all the time period considered;



- the minimum margin: the minimum money amount needed to trade a specific asset in the time period considered;
- the maximum margin: the maximum money amount needed to trade a specific asset in the time period considered;
- the minimum profitability: it is the product between the gross global result and the point value, divided by the maximum margin;
- the maximum profitability: it is the product between the gross global result and the point value, divided by the minimum margin;
- the winning share: the ratio between the number of positive trades and the total number of historical trades;
- the average profit: the ratio between the sum of all the profits and the total number of positive trades;
- the average loss: the ratio between the sum of all the losses and the total number of negative trades;
- the average profit/average loss ratio: the ratio between the average gain on profitable trades and the average loss on losing ones.

A	B	C	D	E	F	G	H	I	J	K
index	point value	average profit/loss	min margin	max margin	min profitability	max profitability	winning share	average profit	average loss	average profit / average loss
ftse mib	5	194,22	8997	12381	591,4%	813,8%	59,9%	156,1	136,7	1,14
dax	25	244,33	21410	31751	291,6%	432,5%	57,0%	54,6	49,9	1,09
eurostoxx 50	25	71,14	7148	9830	277,9%	382,1%	54,7%	18,4	15,9	1,16
dow jones	5	22,17	7862	9405	96,2%	115,1%	52,7%	47,5	43,5	1,09
nasdaq 100	25	3,02	8503	12029	10,8%	15,3%	52,1%	14,3	15,3	0,94
s&p500	50	-1,90	8907	10940	-7,5%	-9,2%	47,9%	5,9	5,6	1,06

Table 8.3 Global results

As we can see from the table above, the results are quite clear: while for the European markets the system seems to work very well, for the American markets it is not the same.



index	min profitability	max profitability	average profit	average loss
ftse mib	5,914122184	8,138051256	156,1207522	136,6830464
dax	2,91646355	4,325230459	54,55592593	49,87666667
eurostoxx 50	2,778860721	3,821470161	18,37733333	15,89965517
dow jones	0,961954358	1,150741638	47,50530233	43,54502591
nasdaq 100	0,108303401	0,153203425	14,33071111	15,32512077
s&p500	-0,074631368	-0,09167112	5,883203883	5,55625

Table 8.4 Profitability results

Looking at the profitability we have that:

- the American indexes have the lower values, with respect to all the indexes, either of the minimum and the maximum profitability;
- in particular, the index S&P500 is the only who has a negative profitability (minimum and maximum);
- the highest values are detained by the European index Ftse Mib, that has the highest value both on the minimum and the maximum profitability;
- Looking at the average profit and loss, the results don't change: the better are the European indexes, with a peak of 156,1207522 of the Ftse Mib, and the worst are the Americans, in particular the S&P500 have an average profit of 1/26 of the Fste Mib;
- With regard to the average loss, the Ftse Mib has the highest value, probably due to the highest value on the profits;
- the other indexes are quite stable, and the values of average loss and profit are pretty equal.

In order to complete the analysis with regards to the profits and losses, we should look at the ratio between the average profit and the average loss: this ratio refers to the size of the average profit compared to the size of the average loss



per trade⁴⁹. This will give a better idea of how well trading systems are performing. The lower the number, the lesser the probability for the strategy to be profitable in the future. Many books advocate at least a 2:1 ratio.⁵⁰

In our case we have that more or less all the six indexes are pretty close to 1, (the highest is still the Ftse Mib) as we can see from the table below:

index	AP/ AL
ftse mib	1,14
dax	1,09
eurostoxx 50	1,15
dow jones	1,09
nasdaq 100	0,93
s&p500	1,05

Table 8.5 Average profit/average loss.

Another overall idea of the performance can be given by looking at the number of positive and negative operations, and in particular, at the winning share.

The first indicates how many positive situations (that is, how many profits) occurred, and the second is related to how many losses occurred, of course in the time period considered.

While, the winning share, is the ratio between the number of positive operations over the total operations.

The table below report all these data.

⁴⁹ <http://www.investopedia.com>

⁵⁰ <http://www.investopedia.com>



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index	# positive op	# negative op	winning share
ftse mib	226	151	60%
dax	216	162	57%
eurostoxx 50	210	174	55%
dow jones	215	193	53%
nasdaq 100	225	207	52%
s&p500	206	224	48%

Table 8.6 Positive and negative operations

Also in this case, the highest percentage of positive operations is held by the European indexes, with a peak of 60% for the Ftse Mib. The number of losses occurred seems gradually increase, from the Ftse Mib to the S&P500, reflecting the previous considerations about the profitability.

All these data need to be examine taking into account the contract's value of the indexes: in fact, while Eurostoxx is valued 10€per point, which means around 30 thousand euro to the present days (October 2015), the value of the Ftse Mib is worth about 100 thousand euro.

It is quite clear that if we gain, let say, 100 euros in the Eurostoxx, it is like gaining 300 euros in the Ftse Mib.

That's why the trader has to be careful in the evaluation of results and try not to get to too quick conclusions.



CHAPTER 9

Conclusions

The thesis starts with some basic concepts of financial markets and their analysis, through the definitions of trends and breakouts.

Chapter 5 and chapter 6 concerned the idea of indexes and Stock Exchange, and in particular the types of costs an investor can have to face.

The fundamental idea, also explained in the introduction, was to test a VBA code and to see if it works well either for the European and the American markets.

We took six indexes, three European and three American, and we observed their fluctuations for, more or less, eighteen months, with a time frame of one hour.

Because of the differences in the negotiation times, it was necessary to write a code for each market, so at the end, we run two different codes: the European and the American one. After do that, we computed the major information useful to have an overall idea of the situation.

From the profitability synthesis we noted that the system seems working very well for the European market, but it is not the same for the American market, where the profitability and the winning share are pretty low.

The dissertation about profitability and risk of the strategy is not definitive, though, since to be stringent there should be some other factors to account for.

For instance, we should take into account also the so called slippage concept.

The "slippage" is the difference that exists between the price you expect to buy for, when you place the order, and the actual execution price. In case of market orders, indeed, there could be some difference between the two. The slippage represents an important "hidden cost" of trading which could make strategies apparently profitable on paper become losing in the real trading.⁵¹

⁵¹ <http://www.traderlink.it>



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Of course, this is not the place to develop this argument, we just need to keep in mind that this was only a simulation, there are other elements to consider and, last but not least, like for every situation which involves money, it is always recommended to be careful.

To remove the slippage from any operational strategy is virtually impossible, because the greater the run, especially in closely intraday trading, and the greater the impact of slippage on the final result.⁵²

The causes of slippage are multiple, mainly it takes place by latency, liquidity, manipulations, volatility.

Of course, this is not the place to develop this argument, we just need to keep in mind that this was only a simulation, there are other elements to consider and, last but not least, like for every situation in which you use money, be careful.

⁵² www.traderlink.it



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Appendix

1. European code

Sub breakout_60min_europa()

```
Range("A2").Select
Do Until ActiveCell.Value = ""
  If ActiveCell.Offset(0, 1).Value = 10 Then
    massimo = ActiveCell.Offset(0, 3).Value
    minimo = ActiveCell.Offset(0, 4).Value
    ActiveCell.Offset(1, 0).Select
    Do Until ActiveCell.Offset(0, 1).Value = 10 Or ActiveCell.Offset(0, 3) > massimo Or ActiveCell.Offset(0, 4)
    < minimo
      ActiveCell.Offset(1, 0).Select
      Loop
      orain = ActiveCell.Offset(0, 1).Value
      If ActiveCell.Offset(0, 1).Value <> 10 Then
        If ActiveCell.Offset(0, 3).Value > massimo Then
          stoploss = minimo - 1
          targetprofit = massimo + 1 + (massimo + 1 - stoploss)
          Do Until ActiveCell.Offset(1, 1).Value = 10 Or ActiveCell.Offset(1, 1).Value = "" Or
ActiveCell.Offset(0, 4) < minimo Or ActiveCell.Offset(0, 3).Value >= targetprofit
            ActiveCell.Offset(1, 0).Select
            Loop
            oraout = ActiveCell.Offset(0, 1).Value
            If ActiveCell.Offset(0, 4).Value < minimo Then
              ActiveCell.Offset(0, 7).Select
              ActiveCell.FormulaR1C1 = "long"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = massimo + 1
              Selection.NumberFormat = "0.00"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = orain
              Selection.NumberFormat = "0"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = stoploss
              Selection.NumberFormat = "0.00"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = targetprofit
              Selection.NumberFormat = "0.00"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = stoploss
              Selection.NumberFormat = "0.00"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = oraout
              Selection.NumberFormat = "0"
              ActiveCell.Offset(0, 1).Select
              ActiveCell.FormulaR1C1 = stoploss - (massimo + 1)
              Selection.NumberFormat = "0.00"
              ActiveCell.Offset(0, -14).Select
            Else
              If ActiveCell.Offset(0, 3).Value >= targetprofit Then
```



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```
ActiveCell.Offset(0, 7).Select
ActiveCell.FormulaR1C1 = "long"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = massimo + 1
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = orain
Selection.NumberFormat = "0"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = stoploss
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = targetprofit
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = targetprofit
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = oraout
Selection.NumberFormat = "0"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = targetprofit - (massimo + 1)
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, -14).Select
Else
lastprice = ActiveCell.Offset(0, 5).Value
ActiveCell.Offset(0, 7).Select
ActiveCell.FormulaR1C1 = "long"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = massimo + 1
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = orain
Selection.NumberFormat = "0"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = stoploss
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = targetprofit
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = lastprice
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = oraout
Selection.NumberFormat = "0"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = lastprice - (massimo + 1)
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, -14).Select
End If
End If
Else
stoploss = massimo + 1
targetprofit = minimo - 1 - (stoploss - minimo + 1)
```



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```
Do Until ActiveCell.Offset(1, 1).Value = 10 Or ActiveCell.Offset(1, 1).Value = "" Or
ActiveCell.Offset(0, 4) <= targetprofit Or ActiveCell.Offset(0, 3).Value > massimo
    ActiveCell.Offset(1, 0).Select
Loop
oraout = ActiveCell.Offset(0, 1).Value
If ActiveCell.Offset(0, 4).Value <= targetprofit Then
    ActiveCell.Offset(0, 7).Select
    ActiveCell.FormulaR1C1 = "short"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = minimo - 1
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = orain
    Selection.NumberFormat = "0"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = stoploss
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = targetprofit
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = targetprofit
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = oraout
    Selection.NumberFormat = "0"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = minimo - 1 - targetprofit
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, -14).Select
Else
If ActiveCell.Offset(0, 3).Value <= targetprofit Then
    ActiveCell.Offset(0, 7).Select
    ActiveCell.FormulaR1C1 = "short"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = minimo - 1
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = orain
    Selection.NumberFormat = "0"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = stoploss
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = targetprofit
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = stoploss
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = oraout
    Selection.NumberFormat = "0"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = minimo - 1 - stoploss
    Selection.NumberFormat = "0.00"
```




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```
ActiveCell.Offset(0, -14).Select
Else
lastprice = ActiveCell.Offset(0, 5).Value
ActiveCell.Offset(0, 7).Select
ActiveCell.FormulaR1C1 = "short"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = minimo - 1
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = orain
Selection.NumberFormat = "0"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = stoploss
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = targetprofit
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = lastprice
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = oraout
Selection.NumberFormat = "0"
ActiveCell.Offset(0, 1).Select
ActiveCell.FormulaR1C1 = minimo - 1 - lastprice
Selection.NumberFormat = "0.00"
ActiveCell.Offset(0, -14).Select
End If
End If
End If
End If
Else
ActiveCell.Offset(1, 0).Select
End If
Loop

End Sub
```

2. American code

```
Sub breakout_60min_usa()

Range("A2").Select
Do Until ActiveCell.Value = ""
If ActiveCell.Offset(0, 1).Value = 17 Then
If ActiveCell.Offset(0, 3).Value > ActiveCell.Offset(-1, 3).Value Then
massimo = ActiveCell.Offset(0, 3).Value
Else
massimo = ActiveCell.Offset(-1, 3).Value
End If
If ActiveCell.Offset(0, 4).Value < ActiveCell.Offset(-1, 4).Value Then
minimo = ActiveCell.Offset(0, 4).Value
```



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```
Else
    minimo = ActiveCell.Offset(-1, 4).Value
End If
ActiveCell.Offset(1, 0).Select
Do Until ActiveCell.Offset(0, 1).Value = 16 Or ActiveCell.Offset(0, 3) > massimo Or ActiveCell.Offset(0, 4)
< minimo
    ActiveCell.Offset(1, 0).Select
Loop
orain = ActiveCell.Offset(0, 1).Value
If ActiveCell.Offset(0, 1).Value <> 16 Then
    If ActiveCell.Offset(0, 3).Value > massimo Then
        stoploss = minimo - 1
        targetprofit = massimo + 1 + (massimo + 1 - stoploss)
        Do Until ActiveCell.Offset(1, 1).Value = 16 Or ActiveCell.Offset(1, 1).Value = "" Or
ActiveCell.Offset(0, 4) < minimo Or ActiveCell.Offset(0, 3).Value >= targetprofit
            ActiveCell.Offset(1, 0).Select
Loop
oraout = ActiveCell.Offset(0, 1).Value
If ActiveCell.Offset(0, 4).Value < minimo Then
    ActiveCell.Offset(0, 7).Select
    ActiveCell.FormulaR1C1 = "long"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = massimo + 1
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = orain
    Selection.NumberFormat = "0"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = stoploss
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = targetprofit
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = stoploss
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = oraout
    Selection.NumberFormat = "0"
    ActiveCell.Offset(0, 1).Select
    ActiveCell.FormulaR1C1 = stoploss - (massimo + 1)
    Selection.NumberFormat = "0.00"
    ActiveCell.Offset(0, -14).Select
Else
    If ActiveCell.Offset(0, 3).Value >= targetprofit Then
        ActiveCell.Offset(0, 7).Select
        ActiveCell.FormulaR1C1 = "long"
        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = massimo + 1
        Selection.NumberFormat = "0.00"
        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = orain
        Selection.NumberFormat = "0"
        ActiveCell.Offset(0, 1).Select
        ActiveCell.FormulaR1C1 = stoploss
```



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```
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = oraout  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit - (massimo + 1)  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, -14).Select  
Else  
lastprice = ActiveCell.Offset(0, 5).Value  
ActiveCell.Offset(0, 7).Select  
ActiveCell.FormulaR1C1 = "long"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = massimo + 1  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = orain  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = stoploss  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = lastprice  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = oraout  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = lastprice - (massimo + 1)  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, -14).Select  
End If  
End If  
Else  
stoploss = massimo + 1  
targetprofit = minimo - 1 - (stoploss - minimo + 1)  
Do Until ActiveCell.Offset(1, 1).Value = 16 Or ActiveCell.Offset(1, 1).Value = "" Or  
ActiveCell.Offset(0, 4) <= targetprofit Or ActiveCell.Offset(0, 3).Value > massimo  
ActiveCell.Offset(1, 0).Select  
Loop  
oraout = ActiveCell.Offset(0, 1).Value  
If ActiveCell.Offset(0, 4).Value <= targetprofit Then  
ActiveCell.Offset(0, 7).Select  
ActiveCell.FormulaR1C1 = "short"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = minimo - 1
```



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```
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = orain  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = stoploss  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = oraout  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = minimo - 1 - targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, -14).Select  
Else  
If ActiveCell.Offset(0, 3).Value <= targetprofit Then  
ActiveCell.Offset(0, 7).Select  
ActiveCell.FormulaR1C1 = "short"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = minimo - 1  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = orain  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = stoploss  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = stoploss  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = oraout  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = minimo - 1 - stoploss  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, -14).Select  
Else  
lastprice = ActiveCell.Offset(0, 5).Value  
ActiveCell.Offset(0, 7).Select  
ActiveCell.FormulaR1C1 = "short"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = minimo - 1  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = orain
```



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```
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = stoploss  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = targetprofit  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = lastprice  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = oraout  
Selection.NumberFormat = "0"  
ActiveCell.Offset(0, 1).Select  
ActiveCell.FormulaR1C1 = minimo - 1 - lastprice  
Selection.NumberFormat = "0.00"  
ActiveCell.Offset(0, -14).Select  
End If  
End If  
End If  
End If  
Else  
ActiveCell.Offset(1, 0).Select  
End If  
Loop  
  
End Sub
```