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Trading System Development on Foreign Exchange Market

Xiang Pan

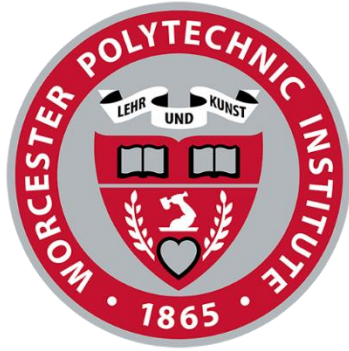
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Interactive Qualifying Project of Trading System Development on Foreign Exchange Market

Xiang Pan

Professor Michael Radzicki

Professor Hossein Hakim

Professor Frederick Hutson

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Abstract

Developing a system/strategy to earn stable profits in Forex market is always widely concerned by traders. In order to give the field traders a better opportunity to earn profits, a system was developed being aimed at Forex market.

The trading system on Forex market was based on KDJ and MACD indicator, pattern analysis and evolutionary analysis. The system/strategy shown considerable feasibility in operation and capability in profit-gaining.

Chapter 1: Introduction

The purpose of this interactive qualifying project on trading systems is to increase common citizens' personal finance awareness. According to research carried out by St. Louis Federal Reserve, the personal savings rate in 2016 was 5.7%, and 62% of the respondents had less than \$1,000 in their savings [1]. In fact, many Americans (34% of the respondents had nothing in their saving account) have been saving next to nothing, and that is without taking into account that saving is mediocre [2].

It is a good habit to keep some money in saving account for emergencies. But as for some people, for instance those believe in Keynesianism (increase spending, especially for the country, to achieve financial deficit, which can further bring economic stimulus and prosperity), spending money makes money more valuable than saving it in personal accounts in both short and long-term consideration [3]. According to statistics published by Bureau of Labor Statistics, the annual inflation rate of US dollar was 1.99% in 2016 [4]. It means that the same commodities was approximately 2% more expensive at the beginning of the year 2017 than its price at the beginning of the year 2016. It also reminds people that even saving is a good habit, it sometimes brings loss at the same time.

If the majority of the citizens in the United States are reluctant to saving their personal wealth in banks, how to handle the spare money in people's pocket becomes something important. Many people always live in the moment and spend their spare money to increase their quality of lives. However there has been another option to make spare money "lay extra eggs" by carrying out trades. In 2016, the volume of trade in foreign exchange market was approximately 5.1 billion dollars per day [5]. The main goal of this interactive qualifying

program was to develop a system in foreign exchange markets to achieve the financial well-being in the present and in the future.

Nonetheless, getting involved and making profits in forex markets has never been easy to everyone. With the great development in technology, it seems that trading has become extremely close to ordinary people's daily life. At this moment, many ordinary people with computers or smartphones believe that trading has been easier than ever and anybody could acquire profits without any work or analysis. The US economy momentum is solid contemporarily, and Federal Reserve's third federal-funds interest rate was increased by 0.25% at the beginning of 2017 [6]. These trends suggest that at this moment experts might be confident in the robustness of the economy and its resilience to shocks in both short and long-term. In addition, as a benign cycle, the more the ordinary people spend in the market, the higher the economic boost. People spend less in recreational activities, such as spending in luxuries, vacations and other nonessential goods, and spend their money in the market, which affect businesses adding revenues and profits.

In the contemporary world, accessing information is easier than ever. The Internet is a tool that traders can use with more feedback, lower fees and faster trading. All type of resources is accessible to traders. There is no longer verbose paper work, meeting with brokers and significant commissions. Moreover, people can download free APP and software, such as MetaTrader 5, on their smartphones and personal computers without any entrance fee and limitation [7]. Furthermore, everyone has access to information that reveals the pattern of the market and the reasons bankers make their choices. In addition, relevant theories such as Monte Carlo experiments could be found and used online.

Chapter 2: Trading

Trading vs investing

Money, as one of the most essential part in modern people's life, has become an important instrument for trade and evaluation. In capitalistic and early socialistic society, almost everything, including education, housing, and medical treatment, has a label. Therefore money is an essential aspect in satisfying people's desire and the amount of money a person has is one of the aspects that result in his or her social position and superiority. Due to this factor, finding a way to accumulate extra wealth in addition to periodic payment is always an essential objective for majority of ordinary people. Trading and investing are two feasible and legal methods.

Trading and investing are two time-honored actions that can be traced back to thousands of years ago, when human being understand the meaning of profits, wealth and the quality of life. The overall goal of trading and investing is the same, which is to achieve the increase of personal wealth with money flow. And the expectation of both actions will not be stopped because of the satisfaction of petty profits. However before entering forex markets, the difference between trading and investing is something that traders must be aware of.

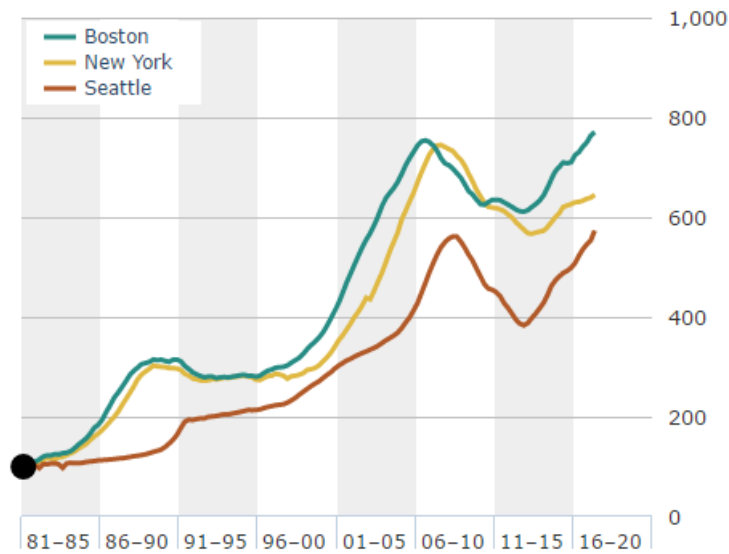
Although in the broadest sense, trading and investing could be regarded as two similar actions, but if they are differentiated more sensitively, investment is considered more on the long-term increase of wealth, with the methods of buying-in and holding. The goal of investing is to accumulate wealth on an extended period, for days, months and years. Investors buy in currencies if they think the overall trend of the price of the financial asset that they are investing is uptrend. And similarly, they would sell out after a certain period of time, when they found

the price of the financial asset will experience depreciation or the market is fluctuating inevitably and dramatically.

The concept of investment was first introduced in the code of Hammurabi. It recorded the related law about investing and pledging land for profits [8]. Buwei Lü, a well-known outstanding businessman in the Warring States Period of ancient China, has been known for investing Yiren, who later on became King Xiaowen of Qin [9]. The modern risk investment of the United States was developed in 1792, when 24 stockbrokers signed a protocol called Buttonwood Agreement. The system they created later became NYSE, New York Stock Exchange [10].

According to Professor Zvi Bodie's theory, investment is the process that people consume a certain amount of currency and time in order to acquire a larger amount of profits in the future [11]. More specifically, it includes stocks, futures and bonds. No one can guarantee to earn profits without taking any deficit. In fact, due to the presence of risk, deficits are as usual as profits. Take the house prices in the United States as an example, as shown in the figure below, the average house prices in Boston, New York, and Seattle all had an overall upward trend during 1980 to 2016. The average house price in Boston even increased approximately seven times. However, it can also be determined from the figure that the prices also experienced trough periods around 1991 to 1995 and 2006 to 2010. In these two periods, the average house prices experienced negative growth.

Figure 1: The average house prices in Boston, New York and Seattle during 1980 to 2016 [12]



In fact, the average house price in 2016 had no large increase compared to the average house price in 2006. And in New York, the average house price was even lower in 2016. Taking inflation and devaluation of the currency as consideration, if a person invested a house and kept it for 35 years from 1980, the profits would not be impressive, even if the quality and age of that house were not taken into consideration. Therefore, the ability to analyze and maximize profits is one of the primary criteria to determine if an investor is successful or not.

Compared to investing, trading is more frequent in buying and selling. Unlike investors who consider more on the long-term expectation of the macroeconomic situation and willing to take short-term turmoil, traders are targeting at much higher profits and avoid as much loss as possible. Sell out, which means selling at higher price and buying at lower price later, is a method most traders would like to use when they feel that their objects will experience depreciation soon. Generally speaking, although there is a huge difference between investing and trading, they also share more common features. Many investing techniques and strategies

can also be used in short-term trading. And a trading can also become investing if its time frame is large.

Traveling with the market

Economists with conflicting views over the functioning of financial markets had been jointly awarded the prestigious Nobel economics prize in 2013. Professor Eugene Fama, one of the fathers of the efficient market hypothesis holds that prices of currencies always tend to reflect everything known about the prospects the economy as a whole, therefore, are rational. Professor Fama's approach implies that one of the feasible strategies is buying and holding an index fund that tracks the overall market rather than trading a lot, which increases your brokerage fees without increasing your expected return. Relying on the inherent strategy of an index fund, which is parallel to traveling with the market, is a safe and easy way to avoid volatility and earn constant passive income.

Basic Macroeconomics

The past year 2016 was a "bustling" year in many ways, especially from the point of view of world economics. For one, the world economics was suffering from turbulence. Asset shortage, asset bubble and negative interest rates existed in the majority part of the world currency market. International Monetary Fund also lowered the forecast for global economic growth for three times (an overall decrease of 5%, from 3.6% to 3.1%). The main factor that caused the instability can be concluded as the great issues. From the abnormal changes in global financial markets at the beginning of the year, to British's referendum of quitting EU, to

Trump's "enthronization" at the end of the year, a high volatility was caused by these drastic, political changes [13, 14].

For another, miscellaneous catalysts also took place all over the world. On July 14th, IS initiated a terrorist attack at Nice, France, and caused 84 deaths and 202 injuries. It raised a huge wave of industry shock in related markets and increased the security spending, while business confidence was dramatically reduced. Other upheavals such as refugee crisis in Europe and coup in Turkey also brought negative effects to the stability of world economic market [15, 16, 17].

However one man's loss is another's gain. Because of Abenomics, the price of Japanese Yen over US dollar increased prodigiously during the last year [18]. Although risk for traders has been increased, the chance for earning profits has not be diminished. In fact, it has been raised.

Asset Classes:

The currency being traded most are USD, EUR, JPY and GBP. These four currencies are also called the major currencies According to Bis Preliminary Triennial Survey, 84.9% of the trades used USD, 39.1% used EUR, 19.0% used JPY and 12.9% used GBP in 2010. Among all the foreign exchange pairs, EURUSD was the most, it was 37% of the total volume, followed by USDJPY (13%) and GBPUSD (12%). This project mainly focused on these major currency pairs. Other currencies and markets being tested include CAD, NZD and gold markets [19].

Chapter 3: Trading systems

This trading method was designed as a costumed integration on the technical analysis, fundamental analysis, evolutionary analysis, and so forth. It mainly targeted at intermediate-short-term trades with 1% leverage to achieve the highest profits. Therefore, in order to be risk-adverse and as accurate as possible, practical operations of the method were only performed when certain conditions were satisfied. Manual operation was selected as the main approach, in order to adjust to changing circumstances and avoid risks from high randomness of world economics at that time (such as unexpected policies or Twitter messages posted by President Donald Trump and turbulence in many parts of the world). The following articles in the section would mainly discuss about the specific strategies used in the system and practical result during simulation.

Parabolic SAR (Stop and reverse)

Parabolic SAR is a technical analysis indicator which is relatively easy for beginner in intermediate and short term trades with considerable accuracy. Its principle is similar to that of Moving Average (MA) and Moving Average Convergence-Divergence (MACD). Both price and time are taken part in calculation during analysis.

From the name of SAR, it can be determined that the strategy of Parabolic SAR consists of two parts. The first part, stop, represents the action of setting up a stop price before traders buy-in. It makes sure that the risk could be diminished. Parabolic SAR strategy can successfully help traders to control the potential risk, while the opportunity to obtain further profits could be preserved in a great extent. The second part, reverse, represents the action of reversing and

going short after unwinding when the exchange rate reaches the stop price. With the strategy of selling out and going short at stop price, and buying in when the price index pass through Parabolic SAR from below, the maximization of profits earning could be achieved theoretically.

This project used Parabolic SAR as an important indicator and reference during trading. However in the age with copious amount of emergency events and variables, the change of price in Forex market can be determined by external factors in addition to the expectation of traders. Although using the strategy of SAR could help traders to enjoy profits and avoid complete defeat in the situation of unexpected price fall, Parabolic SAR should still be used with other factors and strategies to achieve the highest accuracy.

Value Investing

Value investor is looking for currency that are trading at an underestimated price. It is believed that the long-term fundamentals are much greater than shot-term appearances. Since the market usually overreacts with good or bad news, the price comes back to its intrinsic value when the market starts to appreciate the actual value resulting in considerable profits to the traders.

It is not surprising that the value investing always surpasses growth investing in the overall market since value investing is much less risky (the price value investors pay less than that by the growth investors). Benjamin Graham, who is the pioneer of this investing, developed the concept of 'margin of safety' (the percentage of the difference between purchase price and intrinsic value), intrinsic value and Mr. Market in his book 'The Intelligent Investor.' He states

that, “If Mr. Market’s price is unreasonably high, then investors have the opportunity to sell. If it is unreasonably low, then investors have the chance to buy” [20].

Risk Management

Risk is virtually the first lesson to learn about finance. There are many risks in the market. Some have been obvious through the history, such as the Financial Crisis, while others are just seasonal or “suddenly” happen, for example, the (temporary or not) “speed down” in the development of Chinese economy.

All these risks stack together, trying to warn people that the market is not a child’s play. Imagine trading as a video game, risk could very likely to be a villain. However, villain always give some clues to hero, which means there is always a solution to happy ending. Through studies about the market, specialists had given many ways to avoid risks.

In order to manage risk, strategy such as tendency investment, formula study, break-even and stop loss methods are often carried out by traders. In this project, tendency investment was regarded as an important reference in the trading strategy. The idea of tendency investment is based on the Dow Theory. It suggests that, when a market tendency is forming, traders should maintain their investments, until the market start to reverse (reach max or min tolerance). As the main tendency of the market changes, traders can move with the tendency in order to earn long-term investment returns.

Another representative of tendency investment being used is Harch Plan Method [21]. The basic content is: for a certain period of time (Usually a month), compare the MAX and MIN of the average price with that of the previous period; sell when 10% higher and buy when 10%

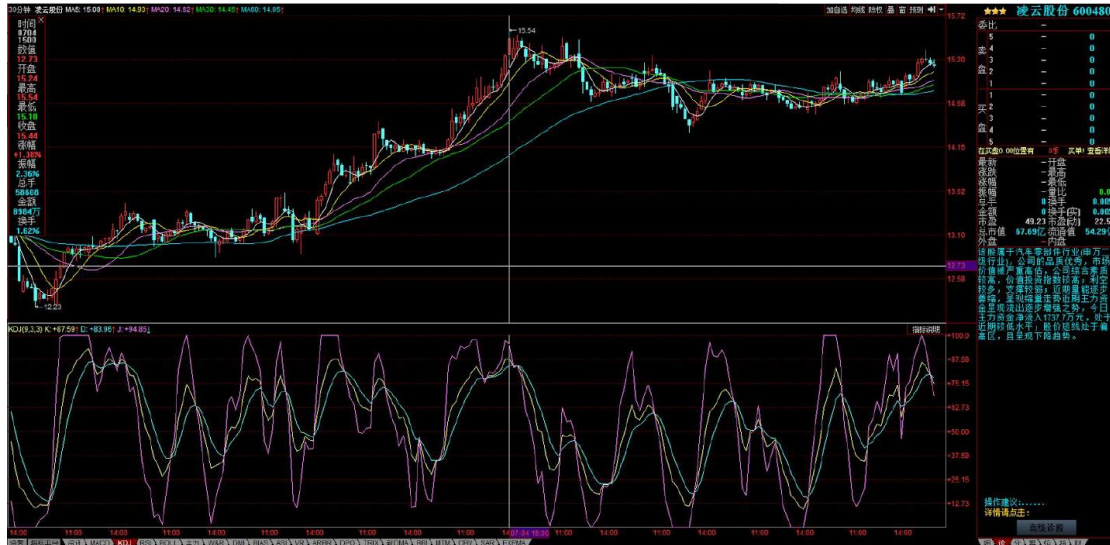
lower (The monthly average price is calculated by taking the average of weekly average).

Stochastic Oscillator (KDJ) indicator analysis

Predicting future in market is dream to all investors and traders, because the best method to keep high profits is knowing when tumbles would take place and sell out before tumbles. It is impossible to predict detailed future. However by analyzing, the general trend of price could be forecasted with massive amount of data.

There are mainly three methods of analysis that has been widely used in market predicting. Stochastic Oscillator is one of the most important index in technical analysis, which focuses on the change of prices with certain equations and analysis to predict the potential index change. It was first introduced by George Lane in 1950 by comparison between closing price and price change range at that day to analyze the probable time that the price trend would start to inverse. It is based on two main regularities of market. When the trend of price goes up, the closing price is often close to the highest transaction price in the price change range at that period. And vice versa, when the trend of price goes down, the closing price is often close to the lowest transaction price in the price change range at that period [22].

Figure 2: Stochastic Oscillator and price index of a Chinese Stock called Lingyun Industrial Corporation Ltd from June 13th, 2016 to July 21, 2016



The figure above mainly contain two curves. The top part represents the price index. And the curves below are K-value (yellow) and D value (blue) curves. The price index, K-value and D-value share the same trend and have high regularity. The reason why they share the similar trend was discussed in more detail in following paragraphs. But first of all, how they are derived should be understood. Specifically, Stochastic Oscillator can be derived with the following equations.

First of all, Raw Stochastic Value (RSV) should be calculated:

$$RSV_n = [(C_n - L_n) / (H_n - L_n)] * 100\%$$

A certain period of time is often selected to carry out Stochastic Oscillator analysis. In the equation above, 'n' is the number of the day. Typically, 5 days, 9 days and 14 days are selected for the period for 'n'. 'C' is the closing price at the nth day. 'H' is the highest price and 'L' is the lowest price in the previous 'n' days. After the Raw Stochastic Value is calculated, the

Three-day Exponential Moving Average of price index (K value) and the Three-day Exponential Moving Average of K-value (D value) should be calculated.

$$K_n = a * RSV_n + (1-a) * K_{n-1}$$

$$D_n = a * K_n + (1-a) * D_{n-1}$$

In the previous two equations, 'a' is a constant that is usually set as 1/3. At the first day, no value of K_{n-1} or D_{n-1} is present, therefore 50% of K_n and D_n is used. If K value is greater than D value, the gradient of the price would have a large possibility to be positive and increasing in the next few days. And vice versa, if K value is less than D value, the gradient of the price would have a large possibility to be negative and decreasing in the next few days, which means the price would go down [23].

K value and D value can also be used to reflect turnover rate and the market optimistic level. When K value and D value are both below 20%, the currency is in Oversold Zone, which means traders are not confident to it and the majority is in short position that they want to sell out. Conversely, when K value and D value are both above 80%, the currency is in Overbought Zone, which means traders are very confident to it and the majority is in long position that they want to buy in. If short position holds majority position, it would be really difficult to sell in a desirable price and the price might go down for traders to buy in. Therefore the reduction of K value and D value could be a strong signal for price fluctuation.

As shown in Figure 2, the price still had an increasing tendency at 2:30, July 4th. However K value and D value had reached stationary point. Two hours after the opening quotation, the

price reached stationary point and started to go down. In this case, instead of using average data for individual days, average data for individual half hours could also be used when thirty minutes moving average is performed.

The Stochastic Oscillator is called KDJ because there is another index, J index, which was labeled purple in Figure 2. Same as K index and D index. J index can be acquired from certain equation:

$$J = 3 K - 2 D$$

The Oversold Zone and Overbought Zone are usually the signals for buy in and sell out. As for J value, if J value exceed 100, it is the signal for sell out. And if J value is below 0, it is also the signal for sell out. Exchange operation could be carried out if two indexes achieve certain level. However when the three indexes all maintain between 20 to 80, the best solution is taking no action and waiting.

It can be determine from the equation that the J index is actually the correction value of K and D indexes that shows the difference. Consider from the sensibility aspect, J value has the highest sensibility, while D value has the least sensibility to price change. However if individual index is considered, D value is the most reliable index, while J value is the least. But during operation, all the factors should be considered together to acquire a more accurate prediction.

“Head and Shoulder Top” is one general shape of K index, D index and J index that could act as an alert to traders. As shown in Figure 3 below, Head and Shoulder Top is basically formed by a “head” and numerous left and right “shoulders”. The indexes reached maximum

(“head”) in January, 2013. Before that, the indexes had two regional peaks, which are called “left shoulders”. And after that, the indexes had a relatively inferior peak. The price index was stabilized during the whole period, and there was even a great rise during the beginning of the head. However when the detailed information about the rise was checked, it was found that on December 31, which was the New Year’s Eve. The figure was taken from a Chinese state owned enterprise called China Life Insurance (LFC: NYSE). The rise of price could represent the beautiful expectation from ordinary people to the future and that was actually the reason why there was a high volume at that day.

Figure 3: The price index and KDJ Stochastic Oscillator of China Life Insurance during October, 2012 and April, 2013



However after the right shoulder, the price index experienced 3 months’ slide. Therefore watching “Head and Shoulder Top” shape is actually really important. “Head and Shoulder Top” has these typical features:

- The first peak is formed when the price index experiences continuous rise and

immediate fall with large volume.

- The second peak (usually head) is formed when the traders who missed the previous rise buy in and push up the share price. The share price often exceed the maximum of the previous peak and produce a new maximum. However the volume could not be maintained at high level and those traders who acquired profit during the first peak start to sell out. In this way the price index fall back.
- When the price index reduce to the price before the second peak, some traders are stimulated by the low price and start to buy in again. However this time when the peak reaches the first peak (left shoulder), the price could not maintain at that high price and continuous slide is formed.
- Usually the volume is highest in left shoulders and lowest at right shoulder because the power of traders who try to “chase rise” is becoming weaker and weaker.

For a trader, the best solution is sell out during the head as soon as possible before the right shoulder and reverse trader. And “re-buy” in could be carried out certain period of time after the beginning of right shoulder, especially when the gradient become steady (close to 0).

Moving Average Convergence and Divergence (MACD) indicator analysis

MACD indicator is a trend-oriented indicator which is often used for medium-term trades, since its signal is theoretically lagging and could hardly contribute to short-term operations. It consists of long-term average curve MACD, short-term curve DIF (difference), long candles, short candles and zero axis. This method uses the crossover signal of MACD as one of the conditions in operation.

MACD can directly reflect the market trend and economic situation. When both MACD and DIF curves are far below zero axis, the market is often bearish. Therefore when both lines go below zero axis after DIF crosses MACD twice from top, a strategy of selling out is formed. On the contrary, if both lines go above zero and DIF crosses MACD twice from bottom, a strategy of buying in is formed.

Although MACD is an indicator that is applied with the analysis of trader's psychological change, it is only one condition, which should not be overvalued.

Common patterns which shows reverse

Patterns such as head shoulder top and head shoulder bottom were recognized during this project, because their ability to reflect trader's potential transaction behavior in a short period of time of future. The pattern of index shows the progress of engagement of short positions and long positions. As strategies, head shoulder top is recognized as a pattern for sell out and head shoulder bottom is recognized as a pattern for buy in in this method. But practical operation should be followed only as buying in after the index rises above first valley and selling out after the index drops below first peak. Although some profits are missed in this method, to some extent it reduces the risk to be trapped by snares of patterns.

Evolutionary analysis

Unlike stock market, the forex market often shows characteristics of roaming within certain range of price in a certain period of time. If price of currency goes infinitely in one direction it causes huge problem to certain parties, governments and countries. Therefore

governments always intervene forex market with government policies when the currencies of their countries experience infinite devaluation. In this method, a hypothesis is made that the index is more likely to fluctuate between the maximum and minimum value it had reached in the past 60 days. Five days average and ten days average curves were used to carry out the main evolutionary analysis. A buy-in strategy was performed when

- index showed clearly pattern of fluctuating between its maximum and minimum value in past 60 days
- the index went below five days average and ten days average and continue decreasing
- the index was near its regional minimum point

On the contrary, a sell-out or short strategy was performed when

- index showed clearly pattern of fluctuating between its maximum and minimum value in past 60 days
- the index went above five days average and ten days average and continue increasing
- the index was near its regional maximum point

Great news

Similar to stock market, forex market can be easily influenced by government policies and other great news, including officials' speech and information which could change people's life dramatically. Therefore an accurate and speedy channel of information is desired in this method, and great news, such as wars and depletion of some energy resource, should be treated carefully and followed by practical operation immediately.

Take gold market as an example, the price of gold often increases when the politic world is experiencing turbulence and the economic development is confined. Any local currency would easily experience inflation if economic crisis happened. Therefore as a widely accepted medium of exchange, gold often experience increase in its price when the great news, such as war, comes, when people's risk aversion is high. Take the Great Britain's leaving from EU and President Trump's succeed in election as examples, the gold index experienced huge increase during these two events. Although there was no news as important as these two news during simulation, this condition was always considered as an important factor in this strategy, and the evaluation of news like Federal Reserve's statement of increasing interest rate of US dollar, influenced many judgements in this statement. (Take FED's increase in interest rate in March 26th as an example, although the interest rate increased, as other factors such as accurate prediction of increase in interest rate in market, huge increase in treasury bill rate, and inconformity in other conditions, the judgement to buy in NZD was made. The result of profit-gaining actually proved the judgement)

Practical Strategies and Performance

During practical operation of verifying this method, the price of an index often departed from the expected direction in short term. However, instead of setting stop loss and take profit values, a strategy of holding was more likely desired. And in fact, although the price goes in unexpected direction, it often switched back in few days. During holding, deficits were often shown. In order to make profits, following strategies were used during operation.

First of all, risk management was used as the main instruments to ensure profits could be gained at any moment. There is a Chinese saying that do not keep all your eggs in the same basket. If all money is invested in one currency, the result is always unidirectional – either gaining profit or losing principles. However if the principles are separated and invested in different currencies, profits can still be acquired from some currencies when others are in deficit. In real operation, 100,000 dollars were given initially in simulation account. Approximately 10,000 dollars were used in each trade.

Because this method spread capitals in different fields, in order to maintain high profits some technique were needed to be used. First of all, the market of 1% leverage was selected instead of direct trading. In 1% leverage market, profits and losses are all exacerbated for 100 times. In order to make sure the capital will not be engulfed quickly, not all money were used at the same time. When 10,000 dollars were used in one trade, another 20,000 dollars were left unused as its security deposits. In fact, only in the situation of 3% change of index in unexpected direction would result in the loss of all 30,000 dollars, which was far less likely to happen. Fortunately as simulation has been in progress for approximately a month, it had not been observed so far.

Another technique being used in this method was insisting in the first choice/instinct. In many times the analysis showed the correct prediction about market, however it usually could not be proved correct only after a certain period of time, it went back to the expected direction. Giving up easily and fear of loss are two common characteristics of many traders during trading. However in order to avoid complete failure, a stop loss was set at \$ 30,000 for each trade.

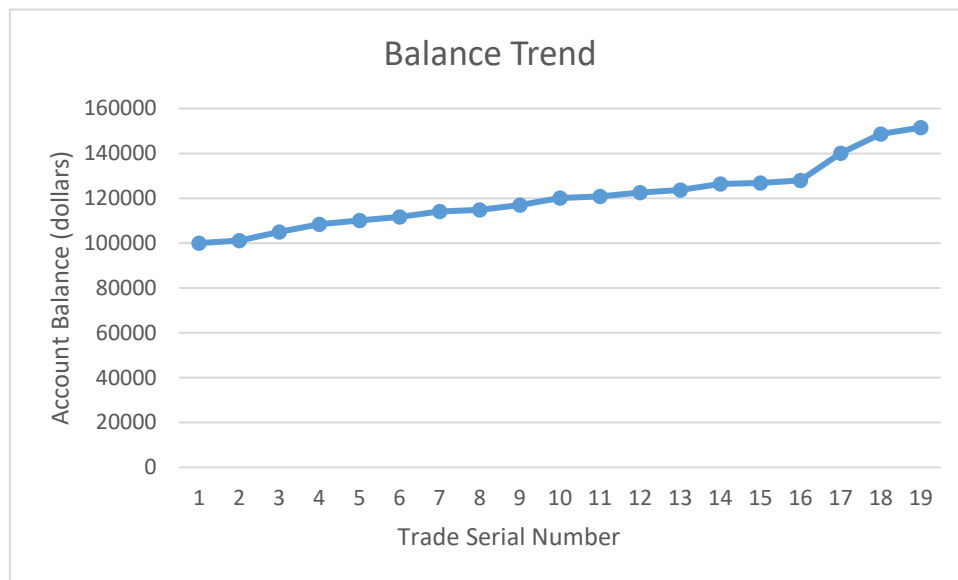
The following table shows the trading record of a simulation used this system from March 23rd to April 10th. 100,000 dollars was acquired as deposit during simulation, and 51,508.26 dollars (51.5%) was gained as profit in approximately two weeks simulation. The greatest two increase in balance (+12125.00 and +8700.00) was gain from trading in gold. Surprisingly, the balance never reduced by loss.

Table 1: Trading record during March 23rd – April 10th

Category	Start Date	End Date	Long/short	Leverage	Standard Lot	Start Price	End Price	Profits /\$	Trading cost/\$	Balance
Gold	2017 0323	2017 0324	Short	1:100	10	1244.84	1244.40	1100.00	31110	101100
EURUSD	2017 0324	2017 0330	Short	1:100	10	1.07644	1.07255	3890.00	10725.5	104990
Gold	2017 0324	2017 0324	Short	1:100	10	1244.61	1243.28	3325.00	31082	108315
NZDUSD	2017 0327	2017 0331	Short	1:100	10	0.70113	0.69942	1710.00	6694.2	110025
NZDUSD	2017 0331	2017 0403	Long	1:100	10	0.69949	0.70112	1630.00	6994.9	111655
GBPUSD	2017 0331	2017 0404	Short	1:100	10	1.24619	1.24375	2440.00	12437.5	114095
USDJPY	2017 0331	2017 0331	Long	1:100	10	111.789	111.871	732.99	9992.7	114827.99
USDCAD	2017 0331	2017 0331	Short	1:100	10	1.33293	1.33009	2135.19	9999.98	116963.18
USDJPY	2017 0331	2017 0404	Short	1:100	10	111.270	110.916	3191.60	9999.99	120154.78
NZDUSD	2017 0403	2017 0403	Long	1:100	10	0.69921	0.69984	630.00	6992.1	120784.78
USDCAD	2017 0404	2017 0407	Short	1:100	10	1.33790	1.33553	1774.58	10000.02	122559.36
USDJPY	2017 0404	2017 0404	Long	1:100	10	110.560	110.681	1093.23	9999.98	123652.59
Gold	2017 0404	2017 0405	Short	1:100	10	1255.71	1254.64	2675.00	31366	126327.59
NZDUSD	2017 0406	2017 0407	Long	1:100	10	0.69687	0.69741	540.00	6968.7	126867.59
USDCAD	2017	2017	Short	1:100	10	1.34312	1.34176	1013.59	9999.96	127881.18

	0406	0407								
Gold	2017 0406	2017 0407	Short	1:100	10	1259.05	1254.20	12125.00	31355	140006.18
Gold	2017 0407	2017 0408	Short	1:100	10	1253.79	1250.31	8700.00	31257.75	148706.18
USDJPY	2017 0410	2017 0410	Short	1:100	10	111.300	110.989	2802.08	10000	151508.26
Deposit:								100000.00		
Total Profits:								51508.26		
Final Balance:								151508.26		

Figure 4: Balance Trend on demo account during simulation



Consider the fact that the standard lot was set as constant as 10, and free capital was prepared to fill up gaps when price went down (security deposit is required in trades with leverage when lose goes below the capital) for future come-back, the expectancy should only calculated by geometrical multiples instead of power multiples:

$$51.5\% * 365 \text{ day} / 20 \text{ days} = 939.875\%$$

The calculated result of expectancy of annual profit is abnormally higher than general knowledge about trading in forex market. Ordinarily, the annual profit, based on the achievement of the strategy, often lies below 100% per year. The higher the expectancy is, the more risky the strategy is. For this method in long-term simulation, loss could also happen when the market is more instable. Therefore one of the reason that result in this kind of high value was that the situation of economy and politics was relatively tranquil at the period during simulation. If the simulation was carried out for one or more year, when more data was collected, the actual return rate should be lower than this value.

Chapter 4: Discussion

Monte Carlo Experiment

In order to estimate the future expectation of return rate for the method, Monte Carlo Experiment was carried out on Market System Analyzer 3.5.0 (MSA). Monte Carlo Experiment is based on a theory that the possibility of an event could be estimated from its frequency in experiments which contain huge sample. When the sample size is huge enough, the frequency of the event could be considered as the possibility of the event. Therefore random sampling is given on random variables which could influence its reliability, followed by inputting sampled value into functions to test the possibility of failure of the event. The more Monte Carlo Experiment has “scrambled” and the more data is given, the more accurate the estimation is.

The result was shown in following graphs. It can be indicated from figure 5 that at all confidence level the rate of return of the trading method was 51.51%. The reason for same reading in all confidence level was cause that the trade method hasn't meet any huge loss. Therefore the expectation of rate of return is equal to the actual rate of return after 18 trades. This phenomenon indicated that the method requires further verification on more data and trades. The red, grey and green line in the graph are 5% confidence level, 50% confidence level and 95% confidence level respectively. It can be seen that as the confidence level increases, the curve can be more fluctuated and closer to the inputted sequence. A lower confidence level curve included unexpected events and change in the strategy, which are less likely to happen as well.

Figure 5: Equity curve (blue) with 5% (red), 50% (grey) and 95% (green) confidence level

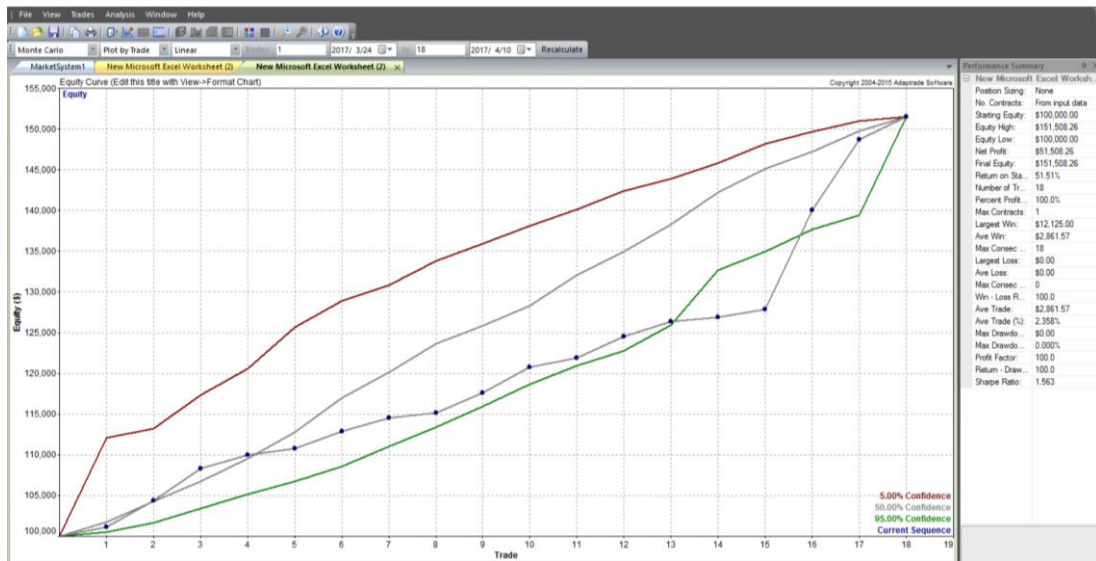


Figure 6: Market system analysis of Monte Carlo Experiment on the trading method

Monte Carlo Results: Market System

File Edit Help

Market System: New Microsoft Excel Worksheet (2)

Trading Parameters

Initial Account Equity: \$100,000.00
 Trading Vehicle: Futures
 Initial Margin: \$0.00
 Round-turn slippage per contract: \$0.00
 Round-turn commissions and fees per contract: \$0.00

Position Sizing Method: None
 No. Contracts: From input data
 Number of Monte Carlo Samples: 500

Key Results at Select Confidence Levels

Confidence (%)	Rate of Return (%)	Max Drawdown (%)	Return-DD Ratio	Mod. Sharpe Ratio
50	51.51	0.000	100.0	0.9334
60	51.51	0.000	100.0	0.9116
70	51.51	0.000	100.0	0.8937
80	51.51	0.000	100.0	0.8664
85	51.51	0.000	100.0	0.8587
90	51.51	0.000	100.0	0.8475
91	51.51	0.000	100.0	0.8458
92	51.51	0.000	100.0	0.8411
93	51.51	0.000	100.0	0.8361
94	51.51	0.000	100.0	0.8340
95	51.51	0.000	100.0	0.8333
96	51.51	0.000	100.0	0.8263
97	51.51	0.000	100.0	0.8254
98	51.51	0.000	100.0	0.8159
99	51.51	0.000	100.0	0.8151
100	51.51	0.000	100.0	0.8032

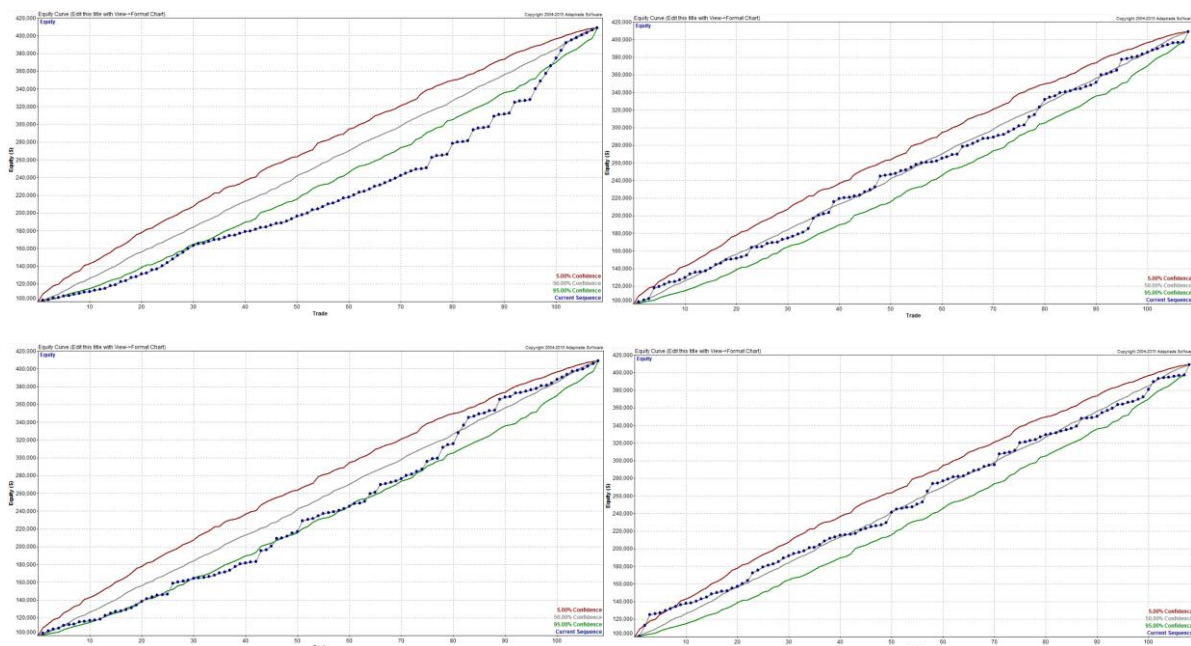
Monte Carlo Results at 95.00% Confidence

Total Net Profit: \$51,508.26	Max Number of Contracts: 1
Final Account Equity: \$151,508.26	Minimum Number of Contracts: 1
Return on Starting Equity: 51.51%	Average Number of Contracts: 1
Profit Factor: 100.0	
Largest Winning Trade: \$12,125.00	Largest Losing Trade: \$0.00
Largest Winning Trade (%): 8.768%	Largest Losing Trade (%): 0.000%

Due to the lack of data (only 18 closed trades were acquired), the same data was inputted 5 more times (108 trades now) for another Monte Carlo Experiment. The data was randomized 3 more times for comparison. As shown in figure below, the actual curve is actually far below

95% confidence curve in the mid period. After the data had been scrambled, the data actually lies between 5% confidence level and 95% confidence level, with some part overlaps with 50% confidence curve. Compare to actual data, the scrambled data is more similar to expectancy. However due to the fact that there was no loss record in original data, the multiplication and statistical simulation could not form loss trade data as well. Therefore the maximum continuous loss is still zero for this simulation.

Figure 7: Scrambled data after multiplication of inputting data



Although it shows a huge return rate in the 18 given trades during simulation, whether the trade method can be conducted as a successful method should be further discussed and verified. First of all, Monte Carlo Experiment can only show the actual rate of return instead of estimation of future prediction. It was mentioned in the method of the trade that unlike normal trading method, this manual trading system has not triggered stop loss and require accurate prediction and analysis for the market from the trader. There is a Chinese saying that failure is a parent of success. Unfortunately this system had not experienced failure during simulation.

And although the result of the simulation shows the colorable success of the system, it actually experienced struggle. For example, the short of trading in gold (entered at April 6th) once experienced loss more than 10000 dollars. In normal trading method, the loss of over 30% of the risk level was often stopped by stop loss switch. However as the trend continuing moving up, which further left the expectation level of average indexes, and stochastic oscillator showed that the market was in overbought zone, a trade of further short was made according to Professor Hakim's advice. The result was glorious, but this also shows that the system was also working like an investing method. And the system was not compatible to gold market, due to its high volatility in profit/loss rate. A waiting strategy might cause huge lose trading with gold of 1% leverage.

There are several differences that should also be taken into consideration during comparison of simulations and operations in reality. First of all, different brokers and platforms might charges different amount of commission fees because they might offer different amount of spreads. In this project, commission fees were not taken into consideration. However in reality it might also triggers huge difference in operation. Moreover, people might have different understanding about great news under different situations. During simulation, after other factors were found to be satisfied, USD was immediately went long when the news of Federal Reserve's proposal of increasing interest rates was heard, without further worry and anxiety. However in reality, when all judgements are related to substantial wealth, the majority of ordinary people might panic about their choice. Take Federal Reserve's proposal of increasing interest rates as an example, some people might consider about its negative impacts if Federal Reserve is not able to achieve the target in the future, while some others are skeptical

and have low confidence in US dollars. Even though sometimes people's intuitive analysis to a piece of news is correct, they might also worry about the future, because no matter how hard people try to reduce risks, risks still exist.

On another aspect, the trading method might not be perfectly instantaneous to important news. Slow human response to news in manual trading system with no stop loss mechanism is dangerous. There was no huge news during simulation, therefore the volatility of indexes of currencies were relatively low. However imagine if the system was used during economic crisis, the rate of return might not be that appreciable, and the system might be switched from short term trading to long-term investing. The stop loss switch should be established when more data and simulation trade is given. However it would not be similar to stop loss mechanism of majority systems. A far larger "chance" should be given to the trades at loss and give them time to react to "recover" to the expectation. However due to the lack of data, the exact amount of stop loss could not be deducted from this trading method, since in majority trades the indexes followed expectation trend and achieved profits.

System Quality, Expectancy and Optimal Allocation of the system on different markets

Due to the fact that only one system was developed in this project, the comparison between the system quality and expectancy of the system with those of other strategy could not be carried out. However, the comparison between the system quality and expectancy of results that the system applied on different market could be carried out. Expectancy is the profit or loss per dollar being risked in simulation. It is calculated by adding up ratio between the net profit for each trade (it would become negative if loss) and average loss (the sum of all loss

divide by number of loss). The annual expectancy is then calculated by getting the product of number of opportunities and expectancy per trade. The results were recorded in the table below.

Table 2: Expectancy and system quality of the system on different currency market

Category	Number of trades made	First trade	Last trade	Strategy days	Opportunities
Gold	5 (+1=6)	20170323	20170407	15	146.00
EURUSD	1 (+1=2)	20170324	20170324	0	N/A
NZDUSD	4 (+1=5)	20170327	20170404	8	273.75
GBPUSD	1 (+1=2)	20170331	20170331	0	N/A
USDJPY	4 (+1=5)	20170331	20170410	10	182.50
USDCAD	3 (+1=4)	20170331	20170406	6	243.33

Category	Average Loss/\$	Largest Loss/\$	Expectancy	Annualized Expectancy	System Quality
Gold	3123.415	3123.415	1.32	193.22	1.853
EURUSD	1072.55	1072.55	1.50	N/A	N/A
NZDUSD	691.25	691.25	1.10	252.05	1.745
GBPUSD	1243.75	1243.75	0.16	N/A	N/A
USDJPY	999.82	999.82	1.36	248.98	1.801
USDCAD	1000.00	1000.00	0.98	238.67	1.521

As mentioned in the previous chapter, no loss was acquired during simulation with this system and all 18 trades exhibited profits. In order to successfully carry out this analysis (if there is no loss, expectancy would become not available because the denominator is zero), a “fabricated” loss was added to each trade. The loss was used as 1/10 of the trading cost on that market. However, the system quality and annualized expectancy of the trading system on EURUSD market and GBPUSD market were still not available. This is because only one trade was performed during simulation on these two markets, therefore the strategy period for these two market was zero. Strategy period is acquired by calculating the time difference between the last day for the first trade and start day of the last trade. Because only one trade was

performed, the start day for the first trade was also the start day of the last trade in that market.

In order to see how to reach the maximum profit while operating in different market at the same time, the allocation of money on different markets was calculated and recorded in the table below. Because the data of trades in EURUSD and GBPUSD was not enough, this further analysis was only carried on Gold, NZDUSD, USDJPY and USDCAD markets.

Table 3: Allocation of capital money on different markets

	Gold	NZDUSD	USDJPY	USDCAD
Expectancy	1.32	1.10	1.36	0.98
Annualized Expectancy	193.22	252.05	248.98	238.67
System Quality	1.85	1.75	1.80	1.52
Fraction Money Allocated to Different markets	0.27	0.25	0.26	0.22

The fracture of money allocated on different market was calculated by using the system quality of the trading system on different markets. It is equal to the fracture of its system quality over the summation of system quality in all markets. The table above shows that the difference between the percentages of optimal allocation of money in different market was not large. Gold market was concluded as the market that should allocate most money in (27%) compared to other markets, while USDCAD market was concluded as the market that should allocate least money in (22%) compared to other markets.

Although the analysis showed a fair result, it should be noticed that due to the lack of data on number of trades performed and loss, the result of the analysis was not accurate and is still required to get improved. And because other strategies were not used in this project, whether this system could be concluded as “successful” could not be concluded.

Reference

- [1] Fred.stlouisfed.org. (2017). *Personal Saving Rate*. [online] Available at: <https://fred.stlouisfed.org/series/PSAVERT> [Accessed 29 Sep. 2017].
- [2] Williams, S. (2017). Nearly 7 in 10 Americans Have Less Than \$1,000 in Savings, New Study Shows. [online] The Motley Fool. Available at: <https://www.fool.com/retirement/2016/09/25/nearly-7-in-10-americans-have-less-than-1000-in-sa.aspx> [Accessed 26 Sep. 2017].
- [3] Farrell, Henry, and John Quiggin. "Consensus, Dissensus, and Economic Ideas: Economic Crisis and the Rise and Fall of Keynesianism." *International Studies Quarterly* (2017).
- [4] Statistics, B. and Index, C. (2017). 2016 dollars in 2017 | Inflation Calculator. [online] In2013dollars.com. Available at: <http://www.in2013dollars.com/2016-dollars-in-2017> [Accessed 26 Sep. 2017].
- [5] U.S. (2017). *Daily FX trading volume falls 5.5 pct to \$5.1 trillion -BIS*. [online] Available at: <https://www.reuters.com/article/bis-currency/daily-fx-trading-volume-falls-5-5-pct-to-5-1-trillion-bis-idUSL8N1BC4PL> [Accessed 29 Sep. 2017].
- [6] BBC News. (2017). *US Fed raises interest rates by 0.25%*. [online] Available at: <http://www.bbc.com/news/business-35117405> [Accessed 6 Nov. 2017].
- [7] Metatrader5.com. (2017). *MetaTrader 5 Multi-Asset Trading Platform*. [online] Available at: <https://www.metatrader5.com/en> [Accessed 6 Nov. 2017].
- [8] Amen, S. (2014). The Code of Hammurabi: Reducing Risk. In *Trading Thalesians* (pp. 61-82). Palgrave Macmillan UK.
- [9] Wen-jie, S. O. N. G. (2011). The Theories of Five-Elements and Chinese Fantasy Literature's World Structure: A Diachronic Study of Lvshichunqiu for a Starting point [J]. *Journal of Chongqing Three Gorges University*, 2, 011.
- [10] Hart, M. A. (1992). Decimal stock pricing: dragging the securities industry into the twenty-first century. *Loy. LAL Rev.*, 26, 843.
- [14] Bodie, Z. (2009). *Investments*. Tata McGraw-Hill Education.
- [11] Economist.com. (2017). *Cite a Website - Cite This For Me*. [online] Available at: <https://www.economist.com/blogs/graphicdetail/2016/08/daily-chart-20> [Accessed 1 Oct. 2017].
- [12] Nobelprize.org. (2017). *The Prize in Economic Sciences 2013*. [online] Available at: https://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2013/ [Accessed 29 Sep. 2017].
- [13] BBC News. (2017). *Brexit: All you need to know*. [online] Available at: <http://www.bbc.com/news/uk-politics-32810887> [Accessed 29 Sep. 2017].
- [14] Kass, D. (2017). *Trump Will Make Volatility Great Again*. [online] TheStreet. Available at: <https://www.thestreet.com/story/14055580/1/trump-will-make-volatility-great-again.html> [Accessed 29 Sep. 2017].
- [15] BBC News. (2017). *Attack in Nice: What we know*. [online] Available at: <http://www.bbc.com/news/world-europe-36801671> [Accessed 29 Sep. 2017].
- [16] Jazeera, A. (2017). *Turkey's failed coup attempt: All you need to know*. [online] Aljazeera.com. Available at: <http://www.aljazeera.com/news/2016/12/turkey-failed-coup-attempt-161217032345594.html> [Accessed 29 Sep. 2017].
- [17] BBC News. (2017). *EU migration: Crisis in seven charts*. [online] Available at: <http://www.bbc.com/news/world-europe-34131911> [Accessed 29 Sep. 2017].

- [18] Suzuki, Y. (2017). Return of the Japan premium in the abenomics period. *Economics Bulletin*, 37(2), 1401-1414.
- [19] User, S. (2017). *Forex Statistics*. [online] Fxpros.net. Available at: <http://fxpros.net/index.php/forex-research/forex-statistics> [Accessed 6 Nov. 2017].
- [20] Graham B. *The Intelligent Investor*, Rev[M]. Harper Collins, 2009.
- [21] Wiki.mbalib.com. (2017). 哈奇计划法 - MBA 智库百科. [online] Available at: <http://wiki.mbalib.com/wiki/%E5%93%88%E5%A5%87%E8%AE%A1%E5%88%92%E6%B3%95> [Accessed 3 Oct. 2017].
- [22] Wu, M., & Diao, X. (2015, December). Technical analysis of three stock oscillators testing MACD, RSI and KDJ rules in SH & SZ stock markets. In 2015 4th International Conference on Computer Science and Network Technology (ICCSNT) (Vol. 1, pp. 320-323).
- [23] Hayes, R. L., Wu, J., Chaysiri, R., Bae, J., Beling, P. A., & Scherer, W. T. (2016). Effects of time horizon and asset condition on the profitability of technical trading rules. *Journal of Economics and Finance*, 40(1), 41-59.

Appendix A: Detailed Trading record

Day		Week		Month		Custom	
<input type="text" value="enter symbol for search"/>							
Balance		2017.03.23 21:37:50		111.270 → 110.916			3 191.60
Deposit				NZDUSD, buy 10.00		2017.04.03 10:49:01	
				0.69921 → 0.69984			630.00
GOLD, sell 10.00		2017.03.23 23:44:09		USDCAD, sell 10.00		2017.04.04 00:57:35	
1244.84 → 1244.40				1.33790 → 1.33553			1 774.58
				USDJPY, buy 10.00		2017.04.04 10:30:05	
EURUSD, sell 10.00		2017.03.24 06:43:50		110.560 → 110.681			1 093.23
1.07644 → 1.07255				GOLD, sell 10.00		2017.04.04 18:34:22	
				1255.71 → 1254.64			2 675.00
GOLD, sell 10.00		2017.03.24 15:20:08		NZDUSD, buy 10.00		2017.04.06 00:44:38	
1244.61 → 1243.28				0.69687 → 0.69741			540.00
				USDCAD, sell 10.00		2017.04.06 01:35:44	
NZDUSD, sell 10.00		2017.03.30 16:20:39		1.34312 → 1.34176			1 013.59
0.70113 → 0.69942				GOLD, sell 10.00		2017.04.07 20:03:41	
				1259.05 → 1254.20			12 125.00
NZDUSD, buy 10.00		2017.03.31 10:12:19		GOLD, sell 10.00		2017.04.07 21:51:31	
0.69949 → 0.70112				1253.79 → 1250.31			8 700.00
				USDJPY, sell 10.00		2017.04.10 14:47:13	
GBPUSD, sell 10.00		2017.03.31 10:13:12		111.300 → 110.989			2 802.08
1.24619 → 1.24375				Profit:			52 687.88
				Credit:			0.00
USDJPY, buy 10.00		2017.03.31 10:13:53		Deposit:			100 000.00
111.789 → 111.871				Withdrawal:			0.00
				Balance:			152 687.88
USDCAD, sell 10.00		2017.03.31 10:15:23					
1.33293 → 1.33009							
USDJPY, sell 10.00		2017.03.31 21:27:09					
111.270 → 110.916							
NZDUSD, buy 10.00		2017.04.03 10:49:01					
0.69921 → 0.69984							
USDCAD, sell 10.00		2017.04.04 00:57:35					

Appendix B: Weekly reports

Weekly report for interactive qualifying project of trading system (1): 02/08/17

Trump has been in office for just under 3 weeks now and his policies are shifting the markets like we have never seen before, in both good and bad ways. An important article this week in the wall street journal by James Mackintosh focused on Donald Trump's confusing policy on weakening and strengthening the dollar. Trump has spoken publicly about how he would like us to weaken the U.S dollar so that the U.S can compete with other major trading countries like China, Japan and Germany who use manipulation to weaken their currencies to get more value out of their exports. However Trump's policies conflict with his words, the new policies he is promising in the form of tax cuts and infrastructure spending should help strengthen the dollar not weaken it. Trump's trade policy also helps the dollar. His verbal assaults on Mexico and threat of tariffs have pushed the peso to record lows and help strengthen the dollar. Knowing this a good trade to make possibly in the upcoming weeks would to buy or sell depending on how to market is moving on a USD/MXN pair. In the coming weeks depending on how Trump and the Mexican president's ongoing talks go this currency pair may be a very lucrative option.

Another great article on how Trump's policies may be affecting the currency trade was written by Jon Sindreu on how Trump's border tax and other policies make predicting trading currencies even harder. Financial analysts are arguing that Trump's attempt to promote American exports and limit imports should boost the dollar. After Trump's victory the U.S dollar was up almost 6% by December against the Euro however since then it dropped back down and is now only up 2%. These numbers show that Trump's words and policies have made

the market react violently in both directions. Knowing this our while trading we should be paying close attention to breaking news because the markets today can shift at a moment's notice depending on what Trump says that day.

One of the most important events took place in the past week was the exposure of the monthly inflation rate of US dollar in December and the annual inflation rate in 2016. According to statistical data from the Federal Reserve, the inflation rate of USD increased 0.2% in December and 1.6% in the past year³. The inflation was mainly caused by the rising gasoline price. Although the increase of inflation had no significant change comparing to the corresponding period of the year before (2015) and it was within the Federal Reserve's expectation, the event still has its significance and should be paid attention by investors and traders.

The inflation rate, although specifically exhibited in the aspect of raising price of commodities and CPI, is still the cause and foundation of the change in foreign exchange rate between other strong currencies. If inflation rate remains at a high level, the purchasing power of the currency in the country would be suppressed and internal devaluation would be resulted in. In certain circumstances of other conditions remains at the same level, internal devaluation could cause external devaluation. On foreign exchange market, the demand for foreign currency would be increased and the demand for domestic currency would be reduced, which would cause the reduction of foreign exchange rate. Speak with facts, the exchange rate of USD to JPY has been decreasing for approximately 5% since December, 2016. The reduction of the exchange rate of USD/JPY has various causes, and inflation is one of them.

The following diagram can clearly show the foreign exchange rate of USD/JPY in the past

two months. The reducing foreign exchange rate is shown clearly after the channel was labeled. Although this phenomenon directly shows the weakening of US dollar, it still created copious amount of trading opportunities. It does not take a genius to work out that the decreasing trend was in the channel in the majority of the time. Therefore every time the trend touches the bottom line, it could be regarded as a buying signal. And every time it gets close to the top line, it could be regarded as a selling signal.



Figure 1: The exchange foreign exchange index of USD/JPY in past 2 months (4 hours' time frame)

Since the 2008 recession, there have been doubts on the potential ‘unconventional’ tools by the Fed during and after the financial crisis. Some may argue that the Federal Reserve was more responsible of the recession than what it is ‘charged’ of. However, in the present time, the economy of the United States is stable; there is low unemployment, moderate-high growth and rising inflation. Even though the Fed regulators sometimes need to adjust plans and forecasts due to unforeseen events, 5 of the 12 Fed presidents said they see 2 to 4 quarter-percentage-point rate increases this 2017.

We based our forex and stock picks based on the decisions of the Federal Reserve and

President Donald Trump.

As higher rates make investing in Treasuries and other safe, dollar-denominated assets are more attractive, capital floods out of other countries, especially risky emerging markets. The result short term is that the dollar gains against other currencies. Nevertheless, as we saw on the December 2016 Fed rate increase, the other currencies, particularly ‘powerful’ ones, as the euro, recover and gain against the dollar.

The Fed’s key policy rates affect lending between banks, since it becomes more expensive for banks to borrow money from the Fed. However, it doesn’t affect consumer or any other non-bank business borrowing directly. Nevertheless, indirectly, the customers will be affected because the banks will increase the rates they charge to borrow money. In other words, credit cards and mortgage interest rates will be affected. This benefits the economy because it decreases the amount of money consumers can spend. This means that people will spend less ‘discretionary money’ (the money spend in luxury, vacations and other nonessential goods) which will affect businesses adding revenues and profits. If to this we sum Trump’s plan to cut taxes without raising debt, the economy will experience an increase in spending without reducing revenue.

Due to this one of our conservative stock picks is S&P 500, which is a stock that normally yields between 5 to 10% increase per year. In addition, growth stocks may be better performers than value when the Fed increases rates. Other two of our picks are founder-led companies with reliable mission statements, mega-gap growth and excellent balance sheets: Amazon and Facebook. Jeff Bezos leads Amazon, which, more than anything, has a mega-cap growth with a market capitalization of \$360 billion. Facebook, on the other hand, led by Zuckerberg, has an

impressive strong network effect of almost 2 billion active users per month and growing.

“The U.S. economy continues to move forward, and it’ll take the stock market with it,” said Brent Schulte, chief investment strategist at Northwestern Mutual. (Wall Street Journal)

The latest data about the US economy signals a solid and growth momentum for the economy. Investors based on the potential quarter-point rate increase by the Federal Reserve, are aggressively buying financial stocks, trusting that the interest rates would boost profit at lenders especially the ones in the S&P 500. In 2017, the economy has grown stronger than expected due to stronger consumer spending, rising factory production and the more-than-expected inflation boost the Fed will cause by raising interest rates. In addition, a stronger than expected growth in retail stores as well as an increase in factory output is causing US economy to look more stable. To all this, it is important to add President Trump’s plans for tax cuts, deregulation and increased government spending.

The Dow Jones Industrial Average reflects the momentum of the US economy. The stock close at all-time record, 20611.86, with a 0.5% increase. Based on this data we came to the conclusion that we want to invest long term. Despite its temporary political distresses, Wells Fargo is the best bank stock out there. And right now, it is dirt-cheap. Even though the company fired more than 5,000 employees and had to pay almost \$200 million to settle for creating over 2 million fake accounts, Wells Fargo is the most diversified financial stock. In addition, Warren Buffett holds around 10% of the company and has no intentions of selling, actually, he is more of a buyer when this kind of situations appear. As an example, when he hold on to American Express stocks when there was the salad oil scandal. Not to mention, Wells Fargo has an ‘unshakable’ yield of around 3.3% as well as earnings-per-share average growth estimates are

unchanged at 7.65% annually for the next five years.

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[1] James Mackintosh. 2017. "President's Plain Talk on Dollar is Muddled." Wall Street Journal. February 3rd. Pages B1-B2.

<https://www.wsj.com/articles/the-confused-mixed-up-world-of-donald-trumps-weaker-dollar-1486049327>

[2] Jon Sindreu. 2017. "Forecast for Dollar? It's Anyone's Guess." Wall Street Journal. February 3rd. Page B11.

<http://blogs.wsj.com/moneybeat/2017/02/02/why-forecasting-the-dollars-reaction-to-a-trump-border-tax-is-a-difficult-job/>

[3] Morath, E. (2017, January 30). U.S. Consumer Inflation Firmly, Spending Accelerated in December. Retrieved February 07, 2017, from <http://www.wsj.com/articles/u-s-consumer-inflation-firmed-spending-accelerated-in-december-1485783234>

[4] Mueller, Jim. "How Interest Rates Affect The Stock Market." *Investopedia*. N.p., 15 Dec. 2016. Web. 08 Feb. 2017

Weekly report for interactive qualifying project of trading system (2): 02/15/17

“The U.S. economy continues to move forward, and it’ll take the stock market with it,” said Brent Schulte, chief investment strategist at Northwestern Mutual. (Wall Street Journal)

The latest data about the US economy signals a solid and growth momentum for the economy. Investors based on the potential quarter-point rate increase by the Federal Reserve, are aggressively buying financial stocks, trusting that the interest rates would boost profit at lenders especially the ones in the S&P 500. In 2017, the economy has grown stronger than expected due to stronger consumer spending, rising factory production and the more-than-expected inflation boost the Fed will cause by raising interest rates. In addition, a stronger than expected growth in retail stores as well as an increase in factory output is causing US economy to look more stable. To all this, it is important to add President Trump’s plans for tax cuts, deregulation and increased government spending.

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One of the most important news nowadays is the raising price of gold. The price of gold had reached maximum in three month record. Dominic Schneider, the head of commodities in UBS, indicates that because of the risk factors such as politics and interest rates, the price of gold might have a huge increase in the future. Dominic Schneider predicted that the speed of inflation would exceed the Federal Reserve’s plan of raising interest rate, which would result in the overall weakening of the US dollars, which would be good news for the real assets. In order to be more familiar about gold market investment, I tried 2 attempts in simulation account. The attempts were interesting and they revealed many important points for me.

113.416 → 113.397	167.55
USDJPY, sell 10.00	2017.02.13 19:50:46
113.711 → 113.587	1 091.67
USDJPY, sell 10.00	2017.02.13 21:44:10
113.597 → 113.490	942.81
GOLD, buy 10.00	2017.02.14 01:44:21
1226.19 → 1228.58	5 975.00
USDJPY, buy 10.00	2017.02.14 17:49:53
114.381 → 114.520	1 213.76
GOLD, buy 10.00	2017.02.14 21:08:44
1225.90 → 1227.66	4 400.00

Figure 1: Two attempts in gold market simulation

Generally, Professor Hakim's method of watching the chart of candle bars and deciding whether buy or sell by drawing channels were used. Generally, when the trend line hits the upper part of the channel after the general tendency had been held for a certain amount of time, I would sell or go short gold. And when the trend line hits the bottom part of the channel, I would buy in gold. Further decision about whether I should keep trading depend on whether the trend was going to revert. The two attempts were successful, it also revealed few interesting points for me.

First of all, comparing to other currency trading with the same amount of leverage (1% leverage), the overall changing in profits and gains is massive. It could be clearly seen from the figure that when investments in all other currencies made me hundreds of dollars of profits, trading in gold could easily make me more than 10 times of the profits in 5 minutes. With the high profits, risks are also high, it means I might lose all of my principle in half an hour. Therefore trading in gold must be careful.

Moreover, since the time for holding gold should not be too long, long-term chart such as 30 minutes chart and 1 hour chart should not be used. Maybe it is true that the tendency goes in one direction in the long term. However any fluctuation would result in a great amount of lose. On the contrary, sometimes investing in one direction using stop and reverse strategy could also bring me massive amount of profits.

Trump has been in office for almost a month now and his decisions keep shaking the market. One of the most important pieces of news this week came about with the resignation of Flynn who was rumored to be keeping information from Trump and trading intelligence with the Russian's. News like this tends to not help the economy and we may see backlash in the

stock and forex market in the days to come. An important article in the wall street journal this week was written by Chelsey Delaney about the strength of the dollar. Despite the outlook for higher U.S interest rates and better than expected U.S economic data the WSJ Dollar index; a compilation of 16 other currencies measured against the dollar was down this week by over 0.4% after reaching its highest level since January 20th. Knowing this it may be a good time to buy the dollar since it is likely going to bottom out soon and with the good outlook for the dollar minus any crazy incidents from Trump now may be the time to buy.

In other news Snapchat one of the largest social media apps in the world is getting ready to launch its IPO with its stocks likely to start at around 14 to 16 dollars a share. Just like when Facebook had its IPO I think Snapchat can make investors a lot of money if they get in on the ground floor so buying this stock and holding it for a long term investment would be a wise idea. Snap Inc. has set a valuation for itself between 19.5 billion and 22.2 billion. If snapchat launches its IPO in this range it will be one of the largest IPOs since 2014. Snap Inc. is set to launch its IPO in August so eagle eyed investors so be ready and prepared.

Reference

- [1] "Here are 3 reasons to buy beaten-down Wells Fargo with both hands", TheStreet, 2017. [Online]. Available: <https://www.thestreet.com/story/13835958/1/here-are-3-reasons-to-buy-beaten-down-wells-fargo-with-both-hands.html>. [Accessed: 31- May- 2017].

Weekly report for interactive qualifying project of trading system (3): 02/22/17

As we have discussed in our IQP meetings, if Trump is able to accomplish the majority of his plans in his four years period we would see an increase in the economy as a whole. However, there are a few we have pointed out that could have the most benefit of Trump's infrastructure spending, tax cut, and consumption. The banks, the energy, the luxury and the infrastructure stocks, bonds and whatsoever will be benefit.

Google, now known as Alphabet, is such a dominant brand that consumers refer to online searching as "googling". Google is still growing, is still dominant and is still innovating. The company has our vote of faith due to its numbers, which actually speak for them. Google has over 1 billion users per month and is the company behind brands like Android, Maps, Chrome, YouTube, Google Play and Gmail [1].

Financially speaking, the company is pretty solid. There has been a 20% increase in sales per year for the last 5 years as well as an operating profit of around \$5 billion per quarter for the last years. Google as well has a total of \$70 billion net cash of which \$5.2 billion of the free cash flow earned during the first quarter of 2016.

Another important data about Google: Forward P/E of 17.9, PEG of 1.8 and P/BV= 4.1.

Twenty years ago around just six drugs generated over half of the Pfizer's total revenue. Today, the top six products generate less than a third of the company's revenue. In addition, the top selling product 'Prevnar/Prevnar 13' generates less than 12% of the total revenue for the pharmaceutical company. Our study of the Pfizer stock is based on its innovative business as well as an outstanding financial standing. The company that used to depend on only six products to generate revenue now develops diabetes drugs, cancer drugs, autoimmune drugs,

rare-disease drugs, and some other. Furthermore, the pharmaceutical company has over 90 clinical programs and prioritizes rewarding shareholders. Financially speaking, Pfizer has a dividend yield of over 4% and usually generates an excess of \$15 billion in free cash flow yearly. Pfizer, moreover, generates impressive operating margins. In the last five years, Pfizer's operating margin has been above 22% [2].

In one aspect, the price of US Dollar went strong in the past week. According to calculation from authorities on the interest rate and futures trend posted by the Federal Funding, the possibility of increasing the interest rate of US Dollar in March is over 20%. Robust economic background and the increasing of the inflation rate had made policymakers in U.S. Federal Reserve, such as Janet Louise Yellen, make speeches about raising interest rate in quite future.

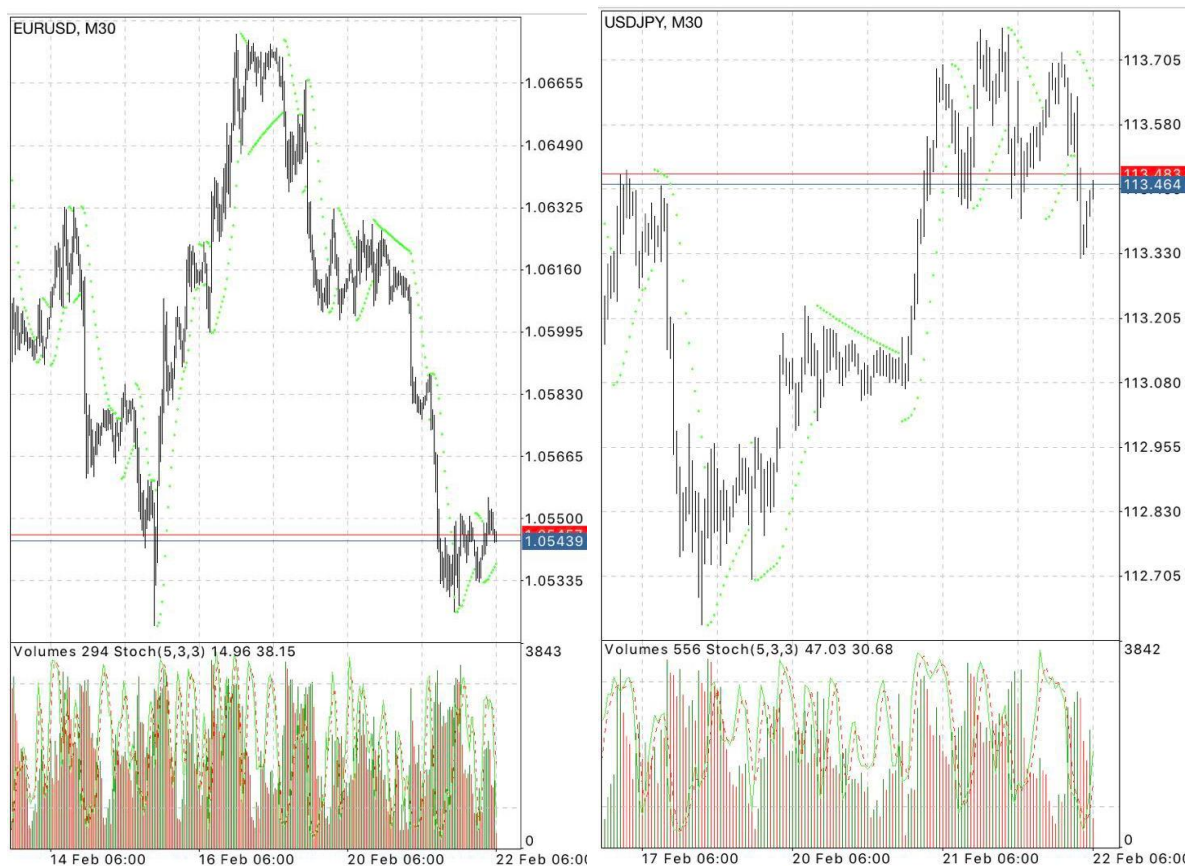


Figure 1: EUR/USD index (left) and USD/JPY index (right) in the past week. It can be determined from the figure that EUR/USD index had almost reached the minimum rate in the

past week, while USD/JPY index had an overall increasing tendency

In another aspect, the first round of the French election will be held on April 23rd and the parliamentary election of Netherlands will also be held on March 15th. Anti-EU comments from the candidate of French president, Marine Le Pen, and the candidate of Dutch president, Geert Wilders, are also increasing the volatility of Euro market. In addition to the speeches from the “hawks” in FED to press Euro, in the short term, investments in Euro market should mainly focus on going short instead of going long [3].

It's been a big week in the Forex market thanks to Trump's accusations of currency manipulation. Since his campaign started Trump has vowed to revive American manufacturing, in part by taking a hard stance on the Chinese and Japanese practice of devaluing their currency. These claims by Trump have not gone unnoticed however and have sparked the response of the Japanese finance minister to say “No one has the right to tell us that the yen is weak.” Knowing this we can expect the Forex market to be extremely volatile over the next few and trades that involve the USD/YEN should be monitored closely since the potential to make a big trade and earn a lot of pips may be possible. According to an article by Saymya Vaishampayan since the election the performance of the yen against the dollar show that it has dropped almost 8 percent which somewhat confirms Trump's accusations [4].

Currency manipulation is becoming a real problem in the world trade market. An article in the Wall Street Journal by Judy Shelton talked about why it has become such a problem. The reason why governments manipulate exchange rates is to get a better deal on their exports when selling to various countries. Knowing that countries like China and Japan are trying to devalue their currency while the US economy is growing allows us as traders to take advantage.

Others would argue though that currency manipulation isn't a problem though. An opinion article this week in the Wall Street Journal argued that all governments manipulate their currencies exchange rate or adopt a fixed exchange rate policy. As a forex trader we want currency manipulation because it allows us to trade exchange rates, assuming you don't live in China.

Reference

- [1] Stewart, Emily. "How Apple, Google and 7 Other Cash-Hoarding Companies Will Spend Their Billions." *TheStreet*. TheStreet, 23 June 2015. Web. 21 Feb. 2017.
- [2] Speights, Keith. "3 Reasons to Buy Pfizer Stock and Never Sell." *The Motley Fool*. The Motley Fool, 29 Jan. 2017. Web. 21 Feb. 2017.
- [3] Schreuer, A. R. (2016, June 24). Geert Wilders Calls for E.U. Referendum in the Netherlands. Retrieved February 21, 2017, from <https://www.nytimes.com/live/eu-referendum/geert-wilders/>
- [4] Saumya Vaishampayan. 2017. "Trump Moves Some Currencies." Wall Street Journal. February 18th-19th. Page B9

Weekly report for interactive qualifying project of trading system (4): 03/01/17

The Federal Reserve has raise short-term interest rate for the second time this year to a range between 0.75% and 1% and that it expects to lift it further at least two more times this year. In addition, officials predicted the Fed would raise three more quarter-percentage-points in 2018, which signals their long-term positive economic outlook.

The Coca-Cola Company is one of America's iconic companies, and its shares have long been among the market most dependable. The company's annual dividend has increased for fifty consecutive years even in unstable years as the 70s stagflation and the 2008 financial crisis. Furthermore, their current dividend yield is fairly on top of the S&P 500 amounting 3.1%. Even though the company is mature and it is unlikely that the shares will notably increase, the stable and secure investor should be attracted to it is dividend yield [1].

After many problems with diabetes and the customers looking for healthier options, the Coca Cola Company has currently twenty brands, of the like of Minute Maid, Dasani and PowerAde, which each generate at least a billion dollars per year. To conclude, the company is a blue chip stock with an 'unshakable' yield which constantly increases year after year and has diversify into multiple world-wide recognize healthier brands.

Healthcare's \$6 trillion marketplace, with positive long-term growth trends is the perfect place for a long-term stock holding. Without including the stock's dividend yield, which is actually pretty good situated at 2.5%, Johnson and Johnson has grown at an 11% compound annual growth rate since 1985 and it is dividend has boosted fifty four consecutive years. Moreover, a share of JNJ 'gives part ownership to a bunch of businesses in one'. Judged as separate businesses, Johnson & Johnson has the world's 5th largest pharmaceutical business,

the 6th biggest consumer health-product seller, the 6th biotech company in the world and, additionally, has a medical-device giant that's worth over \$25 billion in annual sales. As if all this was not enough, Johnson & Johnson is priced at 22 times trailing earnings, a minor discount against comparable stocks as P&G, 27, and 3M, 23 [2].

On the other hand, US Dollar Index continuously decreasing in the past week and reached minimum (90.10) on Tuesday. Although Fed raised interest rate for 25 basis points last week, the lack of successful monetary policy and investor's non-confidence on President Donald Trump was one of the main reason that result in the weakening of US dollar. President Donald Trump has not carry out any policy to fulfill his commitment about cutting tax and increase investment in infrastructure aspects. At the same time, "a net 32% of investors think the U.S. dollar is overvalued". At the same time, the "safe-heaven" demand of Japanese Yen was experienced dramatic raise [3].

In European market, due to the inflation in U.K. the price of GBP/USD index reached its maximum of 1.2468 for the entire March. According to the Office for National Statistics, "annual inflation in the U.K. accelerated to 2.3% in February from 1.8% the previous month". The U.K. inflation had reached its maximum in February since 2014. The graph of 4-hour bar shows that the price had exceeded the Fibonacci Retracement Position of the raise of index in January, and overbought zone has almost been reached. However, due to the fact that the index had reached the maximum point of the month, the risk of increase in price still exist [4].

Although unpredictability still exist, the operation of trading in the following month could mainly focus on the weakening of US dollar and increase in the volatility of British Pound. Unlike stock market, the forex price index often fluctuate in the same range. Therefore the

short-term lose might be recovered by long-term holding and waiting for the price to go back to the same level. Although this strategy is non-scientific, it still obeys the regularity of the forex market, and could be carried out if investors find that the stop loss was missed.

The beginning of this week saw the dollar drop substantially due to rising concerns of Trump’s trade talk. Another reason we saw the dollar drop so much is due to the likelihood of a slower more gradual increase in interest rates. However the prime reason for the bearish attitude toward the dollar was due to world finance chiefs struggling over the weekend to find common ground on boosting trade in the global economy. The G-20 global summit over the weekend saw leaders from major countries including the U.S, Germany, Japan and others. It’s clear with quotes from German Chancellor Angela Merkel that say “We want free, open markets.... We don’t want to build up any barriers” that the tension was high during the meeting with remarks not directly pointed toward Trump but it sure seemed that way [5].



Figure 1: EUR/JPY forecast predictions

The figure seen above is a forecast model for the EUR/JPY pair and it shows a bullish prediction for the EUR. After confirming by looking at chart indicators I longed the pair and made away with over 40 pips. The second figure seen below shows me entering the trade with a profit-triggered active and a trailing stop.

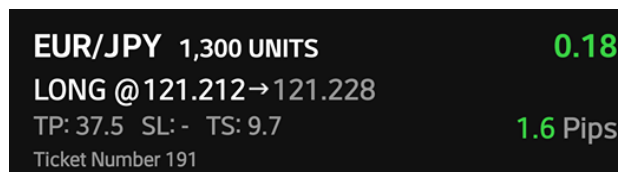


Figure 2: Trade Ticket

Reference

- [1] Adhikari, Shubhankar. "Here Is Why It Is the Perfect Time to Invest in Coca-Cola's Stock." *TheStreet*. TheStreet, 16 Dec. 2016. Web. 21 Mar. 2017.
- [2] Kalogeropoulos, Demitrios. "12 Reasons to Buy Johnson & Johnson and Never Sell." *The Motley Fool*. N.p., 15 July 2016. Web. 21 Mar. 2017.
- [3] Iosebashvili, I. (2017, March 21). Dollar Falls to Four-Month Low. Retrieved March 21, 2017, from <https://www.wsj.com/articles/dollar-falls-to-four-month-low-1490109139>
- [4] Szary, W., & Hannon, P. (2017, March 21). U.K. Inflation Hits Three-Year High, Exceeding BOE's Target. Retrieved March 21, 2017, from <https://www.wsj.com/articles/u-k-inflation-exceeds-central-bank-target-1490091370>
- [5] Ian Talley Tom Fairless Andrea Thomas. "Divisions on Trade Dominate G-20 Global Summit" <https://www.wsj.com/articles/divisions-on-trade-dominate-global-summit-1489967528>