Literature Review: Fundamental Analysis and Technical Analysis of the Exchange Rate.

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Abstract--This research paper presents a review of the literature on exchange rate forecasting methods for comparing the economic and the psychological approach of the exchange rate, and proposes a theoretical basis for the method of technical analysis.

Index Terms— Fundamental analysis, Technical analysis, exchange rate.

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1. INTRODUCTION

The strong exchange rate fluctuations observed in the 1980s and the 1990s have led some foreign exchange specialists to be skeptical about the relevance of the level of exchange rates to fundamental factors. . Therefore, exchange rates can be detached from any relationship with a so-called fundamental value.

According to André Orléan, financial market anomalies, in particular the crash of 19 October 1987, have reopened a series of questions among economists on the efficiency of markets, more precisely on the relevance of prices. **Do they satisfactorily express the inherent constraints in production and exchange activities, or are they the products of a mass psychology that is partially or totally disconnected from these realities?**

As a result, the prediction of the exchange rate using economic fundamentals no longer makes it possible to have good forecast results on the pretext that exchange rates no longer necessarily reflect the economic reality. Forecasting foreign exchange markets remains a controversial activity for foreign exchange market participants as they ar e constantly seeking a powerful forecasting method to accurately track the movement of exchange rates.

The review of the literature, more exactly J. Frankel and K. Froot, (1986) lists the existence of two distinct forecasting methods commonly used in the anticipation of exchange rates. First, we quote the fundamental analysis that assumes that the exchange rate will return to its long-run equilibrium value. It considers that the determination of the future movement of the exchange rate results from macroeconomic variables. In contrast, technical analysis relies on extrapolating past trends to predict the exchange rate regardless of macroeconomic factors. In addition, technical analysis explains the dominant psychology of market operators.

The contribution of this research work, on one hand, is to present a literature review of exchange rate prediction methods for comparing economic factors and psychological factors, and on the other hand, to propose a foundation theoretical for technical analysis.

2. FUNDAMENTAL ANALYSIS: ECONOMIC APPROACH TO EXCHANGE RATE

2.1 Purchasing Power Parity: Price Approach

Assuming that we have a perfect competition in the international markets, Gustave Cassel (1922) defines the **PPP** as the value of a currency that is determined by the purchasing power of goods and services it generates. It generalizes the law of the single price to all the goods and services of an economy. In fact, the prices of identical goods sold abroad must be the same, regardless of the currency of these prices. The theory of APP is dissected in two versions. First, the absolute **PPP** indicates that the level of the equilibrium exchange rate **Sppp** equals the ratio of domestic **P** prices to foreign **P'** prices in the absence of any form of trade restraint, transportation costs, and information costs. Indeed, the price of a good must be the same regardless of the currency in which it is expressed:

$$Sppp = \frac{P}{P'} \qquad (1)$$

Absolute PPP suffers from some weaknesses, in particular because it considers the price level as the only determinant of the exchange rate. But prices depend on the structure of the market. Thus, the price level does not tend to equalize in absolute terms.

The second version of the PPP, the so-called relative PPP theory, makes it possible to go beyond the latter limit, assuming that the exchange rate between two countries adjusts to reflect changes in the price level over time. It consists in explaining not only the actual level of the exchange rate at a given moment, but also its evolution between two periods:

$$S_{pppr} = \frac{S_t^{PPP}}{S_{t-1}^{ppp}} \qquad (2)$$

This formula makes it possible to highlight that the variation

of the exchange rate depends on the differential of the rates of inflation. Despite the considerable contributions of this theory, she did not escape the criticism of her successors. First, the PPP clearly assumes the assumption of perfect competition between markets, the absence of barriers to trade, and the absence of transport and information costs. This conjecture hardly reflects the commercial reality between countries more exactly in the short term.

Although, The PPP theory proposes a long-term reference for nominal exchange rate variation, it is unable to adjust the real exchange rate which it assumes invariance over time with the economic situation of a country and especially with its external position.

Moreover, the Balassa-Samuelson effect, introduced by Balassa (1964) and Samuelson (1964), made it possible to explain why the PPP is not valid between the emerging countries and the advanced countries. Indeed, the distortion of the PPP is due to the differences in relative productivities between the exposed goods and the sheltered goods. Countries with relatively lower productivity in exposed goods than in sheltered goods have lower price levels than other countries. Also, productivity tends to increase more rapidly in the exposed goods sector than in the sheltered goods sector.

2.2 Interest rates parity:

The interest rate parity theory stipulates that the interest rate differential must equalize the forecast appreciation / depreciation rate of the foreign currency against the domestic currency. This theory is based on the assumption that domestic and foreign securities are similar in terms of risk and maturity. And in the market, there is no control of capital nor transaction costs. IRP can be unveiled in two forms. First, the covered interest rate parity is to protect against currency risk by using forward markets. CIRP assures the relationship between the spot exchange rate (S_{IRP}) and the forward exchange rate (F) and the national (i) and foreign (i') interest rates, expressed according to the following formula:

$$S_{IRP} = F \frac{(1+i')}{(1+i)} \qquad (3)$$

Secondly, the uncovered interest rate parity suggests that there is a link between the nominal interest rates of domestic and foreign currency investments and the difference between the current spot exchange rate and the future anticipated spot exchange rate. This version assumes that if the futures market is efficient, the forward exchange rate should reflect all information on the future spot exchange rate. So, we will have the following formula:

$$F_t = E_t(S_{t+1}) \qquad (4)$$

With $E_t(S_{t+1})$ the expected future spot exchange rate at the date t in t + 1. Therefore, we can deduce the formula of the NCIRP:

$$S_t^{NCIRP} = E(S_{t+1}) \frac{(1+i')}{(1+i)} \qquad (5)$$

Despite the considerable contribution of the PTI, this theory has evolved in an inadequate framework with the economic reality, since it supposes a perfect competition of the markets, a free and uncontrolled mobility of capital, identical assets in term of risk and liquidity. , and investors without risk aversion. Several empirical studies have verified this equilibrium relationship of the PTI. The culmination was the rejection of the exchange rates of developed countries precisely in the short-term forecast horizons.

2.3 Monetary approach of the exchange rate

Monetary-based approaches highlight the predominant role of money in explaining exchange rate developments. They assume that the PPP is stable at all times, and the IRP is verified to the extent that there is perfect substitutability and capital mobility. In addition, the demand for money is stable and the monetary authorities control the money supply. The monetary approach admits a depreciation of the exchange rate during a rise in the money supply, a decline in the real national income, or a fall in the interest rate.

Indeed, this monetarist thought favors the floating exchange rate regime because it considers that the flexible system makes it possible to better protect itself from external conjunctures. Assuming that one of the trading partners is developing an expansive policy that has resulted in a trade deficit. In a fixed exchange rate regime, the central bank of the country in question must maintain its exchange rate by buying currencies and selling its currency. Subsequently, this behavior created an inflationary movement. On the other hand, in a flexible regime, the central bank does not have any interest in intervening in the foreign exchange market and allows a certain isolation of conjunctures. The floating exchange rate implies a more autonomous economic policy at the expense of a foreign exchange target.

The flexible price monetarist approach assumes that prices adjust instantly to imbalances in the goods market, which ensures the law of the single price in the two countries concerned. In the money market, money demand is stable in both countries, and real household cash is a growing function of real income, and decreasing for the interest rate. And on the other hand, the supply of money is assumed to be exogenous. Thus the exchange rate can be expressed according to the following formula:

$$S_t^l = (m - m') - \alpha(y_t - y_t') + \beta(i_t - i_t') - v_t - (\varepsilon_t - \varepsilon_t') \quad (6)$$

S_t^l: The logarithm of the exchange rate; m and m': The money offers of the domestic and foreign monetary authorities; y_t and y_t': The logarithms of domestic and foreign real incomes; i_t and i_t': Domestic and foreign interest rates; α and β: positive constants; v_t: a disturbance accounting for transitory exchange rate deviations from the PPP; ε_t and ε_t': other associated disturbances.

According to this formula, the exchange rate decreases with the real income gap, and increases with the gap of money growth and the gap of interest rates. Indeed, the widening of the interest rate gap generates, through the demand for mon-

ey, an increase in inflation rates, and subsequently an increase in the exchange rate is a depreciation of the domestic currency. But in reality, the widening of the interest rate differential generates an increase in the purchase of domestic securities at the expense of foreign securities, which will lead to an appreciation of the domestic currency, and not a depreciation according to the monetarist model at flexible price.

Frenkel (1976) tested the validity of monetary variables to explain the evolution of the Mark / Dollar exchange rate between February 1920 and November 1923, when he concluded in a period of hyperinflation that monetary variables can determine the variation of the exchange rate. Subsequently, Frankel (1984) argues that the demand for money is an unstable phenomenon. Moreover, Anthony J. Makin (2004) argues that existing monetary models provide an incomplete picture of the monetary transmission mechanism in open economies as they fail to explicitly trace the exchange rate and the balance of payments adjustment according to macroeconomic fundamentals.

2. 4 Mundell and Fleming model:

The work of Mundell and Fleming (1962) has extended the Keynesian model "IS-LM" into an open economy. This model consists in establishing an optimal economic policy according to the exchange rate regime and the degree of substitutability of capital (Drunat Jérôme, Dufrenot Gilles, Mathieu Laurent 1994). In other words, this approach deals with the simultaneous balance in the goods and services market, the money market and the foreign exchange market. Indeed, the model assumes, in addition to assumptions of the Keynesian IS-LM model of price rigidity, a perfect mobility of capital and a static anticipation of the future exchange rate by the investors.
The equilibrium in the Goods and Services market is given by the following formula:

$$Y + M + C = I + G + X \qquad (7)$$

Y: national income, M: imports, C: consumption, I: investment, G: public spending, X: exports.
The balance of the foreign exchange market is inferred from the balance of payments of a country according to the following equality:

$$BP = BT + BK \qquad (8)$$

With $BT = X - M$, and $BK = \beta(r - r^{'})$

BP: the balance of payment, BT: the balance of transaction, BK: the capital balance. r : the rate of domestic interest, the rate of foreign interest.

The equilibrium of the money market is obtained by comparing the supply of money (M_o) and the demand for money (M_d) .The money supply is considered exogenous because it is fixed by the monetary authorities:

$$M_o = M_d = L_1(Y) + L_2(r) \qquad (9)$$

By mathematically developing each equilibrium of the three markets, we will be able to write the income (Y) according to the interest rate (r) in each market. This will allow us to draw the IS, LM and BP curves.
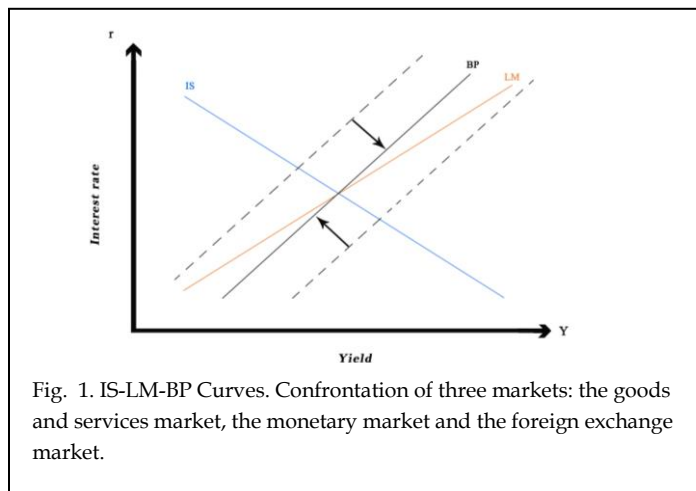

Fig. 1. IS-LM-BP Curves. Confrontation of three markets: the goods and services market, the monetary market and the foreign exchange market.

In fixed exchange, the increase in public spending stimulates both demand and income. The latter will increase the demand for money and the interest rate to the extent that the country in question will see an inflow of capital that weighs positively on the exchange rate. A decline in exports will automatically be noted. In this case, the central bank, to maintain its parity and the supply of national currency, must increase its money supply to readjust its interest rate.

In flexible exchange, also the increase in public spending increases the income which will in turn positively impact the interest rate. This rise in the interest rate will undoubtedly attract foreign capital which will ultimately translate into an appreciation of the exchange rate. Subsequently, the exchange rate appreciation will slow down the volume of exports and consequently income. In the money market, this fall in income will be accompanied by a decrease in the demand for money. Thus, this will have the effect of driving the interest rate to its value and even income. In sum, we can see that there is an eviction effect through the rise of the exchange rate in a flexible exchange rate regime.

Assuming a monetary policy: in fixed exchange rate, an increase in the money supply reduces the interest rate in order to rebalance the money market. This decline boosts investment and income. In this type of system, the fall in the interest rate is not corrected by a fall in the exchange rate but rather by the intervention of the central bank by buying the national currency and selling the foreign currencies. Thus, the money supply will be maintained at its equilibrium level, which will enable the interest rate and income to be brought back to their levels.

In flexible exchange, the excess of money supply induces a fall in the interest rate on the money market which will in turn increase investment and income. In the foreign exchange market, this implies capital outflows that will subsequently have a negative effect on the exchange rate. Thus, this drop in the exchange rate will boost exports and subsequently income. This increase in income increases the interest rate and leads to its equilibrium value, which also reduces the investment. Also, we can see that there is an eviction effect through the fall in the exchange rate in a flexible exchange rate regime.

The contribution of this model is to understand in case of exogenous shocks how can we once again reach a situation of equilibrium and which economic policy to choose. Despite the fallout from this model in terms of economic policy, it was

rarely used as a tool for determining the exchange rate. The important criticism of this model is that it assumes price rigidity. In reality, prices are neither fixed nor perfectly flexible, but they adjust late.

2.5 Overreaction model:

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In the extension of the Mundell-Fleming model, Dornbush (1976) proposes a model based on exchange rate dynamics by incorporating the rational expectations hypothesis. In addition, it introduces the assumption that prices in the goods and services market adjust more slowly than those in the market for financial assets that remain in equilibrium as in the case of the monetarist model. This approach explains that a monetary shock can lead to a phenomenon of over-adjustment of the exchange rate relative to its long-term value.

Dornbusch assumes that financial markets are perfectly flexible under the pretext that the exchange rate and the interest rate adjust rapidly following a change in the economic environment. On the other hand, the adjustment in the markets for goods and services is very slow.

Indeed, an increase in the long-term money supply generates an increase in prices and a fall in the exchange rate. At the same time, other economic variables remain constant according to the assumption of currency neutrality. In the short term, an increase in the money supply is accompanied by a considerable fall in the interest rate to adjust the money market. The domestic and foreign interest rate differential is negative; therefore, it implies a decline in foreign capital, which must be followed by a depreciation of the balancing capital market exchange rate. In contrast, economic agents predict that in the long term the interest rate will again tend to its foreign equilibrium value. As a result, they anticipate an appreciation of the currency, that is to say a fall in the exchange rate. This means that the exchange rate depreciates in the short term and varies below its long-term value. However, economic agents know that the exchange rate must depreciate in the long run. According to the rational expectations approach, they can not anticipate a gradual appreciation towards this long-term value unless there is initially an excessive depreciation. Thus, the exchange rate over-adjust relatively to its long-term value.

Fig. 2. Overshooting of the exchange rate following a relaxation of monetary policy

As can be seen from the graph, the increase in the money supply produces a sharp fall in the exchange rate (from r to r ") before rising towards its equilibrium value (r " to r '). The exchange rate follows the movement of the interest rate by depreciating strongly in the first place, and then appreciating gradually to tend to its equilibrium value.

In other words, the loosening of monetary policy gives rise to a preference for holding foreign currency among investors. Thus, if they want to hold the national currency, it is necessary to anticipate an appreciation of the exchange rate. In order for the foreign exchange market to anticipate an appreciation, it is essential first of all that the exchange rate depreciates more than necessary, hence the over-adjustment reaction.

Although the explanatory advantage of the Dornbusch model was somewhat successful in the 1970s, several studies subsequently challenged it. Feroldi and Sterdyniak (1984) refuted the idea of Dornbush which highlights the existence of a rapid adjustment of production to competitiveness. Meese and Rogoff (1983) argue that the model's performance is very weak for horizons between 1 to 12 months, and does not exceed that of a simple random walk model. Dornbusch (1980), himself, has highlighted the inability of his model to reflect the reality more accurately more precisely the assumption that financial markets are always in balance by introducing the important role of psychology and agent expectations.

It is clear that economic factors have contributed significantly to tracking the movement of the exchange rate by presenting economic explanations. On the other hand, these economic models could not correctly predict the exchange rate fluctuations, moreover the appreciation of the American exchange rate in the 80s without a valid economic reason clearly illustrates this failure of the fundamentals more exactly in the short term. .

No one can deny the contribution of these economic models of the exchange rate. Despite, a very rich literature review, the performance of these models in terms of forecast remains relative to the long term. Moreover, the work of Meese and Rogoff (1983) clearly states that a simple random walk model predicts better than any short-term economic model. Since then, there has been a skepticism about economic fundamentals, and many economists reject any exploitable relationship between the exchange rate and short-term economic fundamentals, and chart configurations can produce good results.

3 TECHNICAL ANALYSIS: PSYCHOLOGICAL APPROACH TO EXCHANGE RATE

Technical analysis is a very old method whose authorship is attributed to the great Japanese speculator of the 18th century Munehisa Homa. Adviser to the Japanese government on financial affairs, he developed a method of analysis based on Japanese slots that predicted contracts on rice at that time. Also, Charles Dow, founder of the Wall Street Journal, is considered to be the initiator of Western technical analysis. He developed his theory in a series of articles published in his own newspaper between 1900 and 1902, where he argues that the financial markets (foreign exchange market) have the ability to predict, with a certain head start, the economic news, economic growth, and crises ... Thus, the market trend serves as a leading indicator reflecting the state of health of an economy
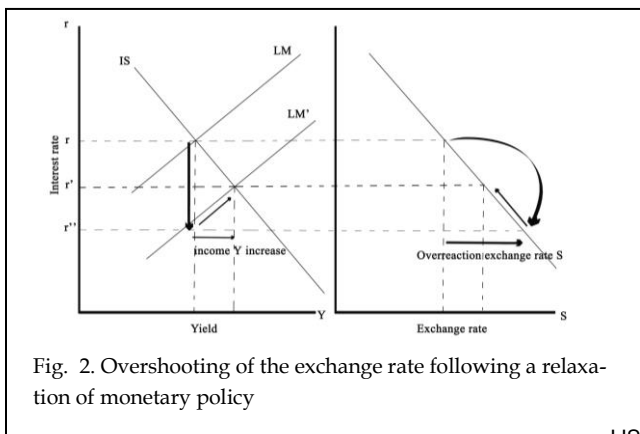
and represents an excellent barometer. According to Dow, through careful study of graphs, we can identify the behavior of insiders who have privileged information on the markets.

Although this method of analysis and forecasting is 100 years old, economists consider it to be a method without solid theoretical foundations. The consideration of psychology by contemporary economic theory has brought many arguments giving credibility to technical analysis.

3.1. Behavioral finance and technical analysis:

Technical analysts consider that the efficiency of graphic configurations is explained by the existence of recurring behaviors among market operators. These behaviors have been analyzed in depth by behavioral finance.

The success of this approach comes back to the work of Daniel Kahnemane and Tversky, who questioned the foundations of the hypothesis of rationality of the agents insofar as they showed the existence of psychological bisais which contradict the hypothesis of rationality of the agents. Of the neoclassical school. Behavioral finance argues that individuals are no longer rational because they are subject to psychological bias. This trait is valid even for the technical analysis where it supports the idea that stipulates the low rationality of the individuals.

For technical analysts, the configurations graphically represent the psychology of the agents. In other words, they reflect the repetitive behaviors of operators that serve to better understand the logic of markets. The contribution of behavioral finance is to introduce the psychological dimension to financial theory, which implies that individuals are subject to psychological biases that influence their decision-making choices. Behavioral finance has allowed a considerable leap in the study of psychological biases, hence the links between this theoretical school and the technical analysis seem very close.

3.1.1. The anchoring bias:

Behavioral finance suggests that certain anomalies in the foreign exchange market are due to the existence of behavioral errors made by the operators. The latter are strongly influenced by the environment in which they operate. Indeed, the anchoring bias is one of the most important errors observed on the foreign exchange market. The anchoring bias corresponds to the use of past beliefs influencing operators' expectations in the sense that it leads to the overweighting of past data to the detriment of recent information and data. As a result, operators are strongly affected by these anchoring biases and make their decisions in a conservative way. For example, in a trend market, individuals will be encouraged to engage in buy-and-sell transactions at the expense of buy-sells in a bull market because the context pushes them, even if there is nothing rational about this approach. In other words, operators will often rely on irrelevant levels to make a forecast, so it is clear that their estimates will not be a conclusion of a long search because it is based only on information that is immediately available. In technical analysis, the anchoring bias is consid-

ered one of the main reasons for the success of graphical media and resistors, as it is an information that is easy to obtain. Indeed, individuals, visually, will easily spot the levels of support and resistance that will certainly influence their decision. Agents positioned for purchase will be encouraged to take profits around resistance while lower-ranked agents will do the same around a support. Being an observation approach, the technical analysis will help to support the relevance of this anchoring bias.

3.1.2 Momentum bias:

Momentum bias is based on the premise that agents will rely on the recent past to make their forecasts. Indeed, he considers that investors will be optimistic in a bull market, and pessimistic in a bear market. This error occurs most often during a bullish movement. If the exchange rate progresses, operators will follow the uptrend and position themselves to purchase, many operators in turn will position themselves because they believe that the trend will continue its rise and without break. However, it usually follows a period of fragility resulting in the appearance of bearish divergences on the technical indicators. This involves investor panic and the narrowing of the number of potential buyers. These two factors will cause a reversal and constitute a strong theoretical argument in favor of the reliability of the downward divergences between the technical indicators and the trend of the exchange rate.

3.1.3 The law of small numbers

Individuals, to make their decisions, are based on laws of probability. Indeed, the probabilities are relevant when the sample chosen is very important. In reality, individuals often falsely master the laws of probability in the sense that they affect the outcome of probabilities at different events. Thus, they will generalize the result obtained, which is only a special case, and be limited to the law of small numbers to apply a significant probability to a series of irrelevant unrepresentative of a large sample. Then, the law of small numbers influences individuals to limit themselves to a short series to elaborate their decision, thus, the individual suffices him only the realization of an event two or three times to forge a general law. In technical analysis, this bias explains the reaction of individuals that will be drawn often on the market around supports and resistances and even graphic figures like the double hollow, and double top...

3.2 School of Convention and Technical Analysis:

According to the theory of market efficiency, the market movement is progressing in a random manner and the trends observed would be an optical illusion. Yet, it is easy to identify trends in reality. The school of convention, to approve of such movement, is based on the presence of the phenomena of fashion and the mimetic rationality of the individuals. Indeed, the conventionalists explain that the agents often refer to a con-

vention in the form of a dominant belief that can lead to a divergence with the fundamental exchange rate. In such situations, André Orléan argues that the uncertainty of future returns will incite the appearance of a speculative bubble. This approach to the conventions aims to understand the reason why traders position themselves for buying (or selling) in situations where exchange rates are overvalued (or undervalued). It is true that the operators should not be positioned on these levels, but according to the conventionalists, it is reasonable to take a position around these levels when the operator is certain that other operators are ready to position themselves for the purchase. Thus, it is clear that it will rely on the dominant consensus to position itself by ignoring the fundamental value of the exchange rate.

In the same vein, the technical analysis approves the existence of trends in the markets evolving over several time horizons. Indeed, the repetitive existence of configurations on the markets reflects the dominant consensus that describes the behavior of agents. Moreover, human behaviors are often stable over time. Thus, the technical analyst is a method based on recurrences that has become accredited by the new financial theories.

3.3. The theory of DOW:

The formation of trends is often misunderstood by operators, although this phenomenon is very common in the foreign exchange market. Charles Dow, initiator of Western technical analysis, has developed a theory to explain the formation of trends. It starts from the idea that the exchange rate, at a given moment, reflects all available information. In addition, he has tried to explain that in each major trend, there are three main phases based on the information available on the market.
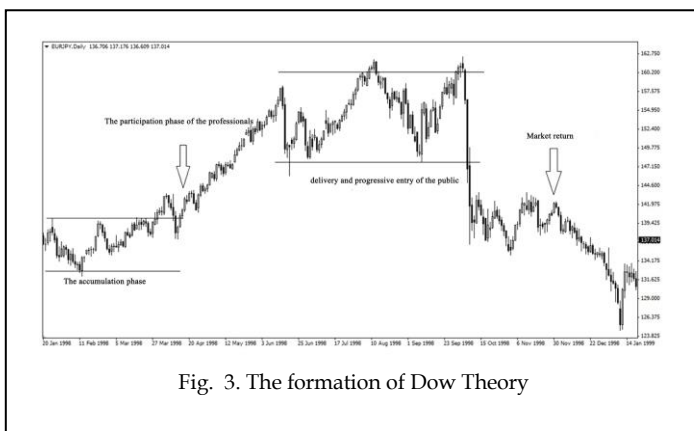
Fig. 3. The formation of Dow Theory

The accumulation phase is the period when insiders have privileged information and begin to position themselves for the purchase. Thus, informed investors predict an economic recovery and the beginning of a long-term uptrend. They will accumulate buying positions of currency parity with novice investors who, lacking experience, are stressed and want to get rid of their currencies in possession.

The participation phase of the professionals and progressive entry of the public is the period, often the most dynamic, where the professionals take in turn buying positions in the market to take advantage also of this probable evolution. In

this phase we are witnessing a sharp acceleration of the exchange rate, which is explained by the publication of economic news pushing professionals to position themselves. Thus, the expectations of insiders are drawn on the market.

The distribution phase and market return is the time for strong hands and professionals to exit the market by positioning themselves for the sale of currency parities. With the continuation of announcements of optimal economic conditions, which will impact the currency of a country in question, novice investors and individuals, believing going to fructify their gain, are positioning themselves to purchase. They are taken by the general euphoria and think that the market will continue its rise. But this entry of individuals allows insiders and professionals to get rid of their positions. Thus, insiders and professionals profit from cash to make profits by positioning themselves for the sale of currency parities.

This approach was the first to spot in the market the presence of insiders and professionals who have privileged information. Thus, their behaviors will be drawn on the graph. The technical analysis makes it possible to identify the impulsive movements at the beginning, as well as certain economic and political decisions. Despite the discretion of insider positions at the beginning, other stakeholders can identify such events using Dow's theory.

In reality, Dow's vision is characterized as follows: the insiders are always market makers of a trading room who have the privileged information, since they know, before the opening of the market, all offers and customer requests. So, they get an advantage over the particular operators allowing to know the behavior at the opening. In addition, professionals will rely on the insiders' reaction to position themselves because they are more experienced than novice traders.

3.4. Elliott's wave theory:

Ralph Nelson Elliot developed, in a series of articles published in 1939 in the Financial World, an approach to explain the movement of markets. By combining the psychological side borrowed from Charles Dow, and the harmony of nature identified by the mathematician Fibonacci, this method interprets the evolution of the movements of the markets insofar as its main contribution is to draw up scenarios, and to fix targets to anticipate future movement.

Elliott considers that the bottom-line movement of the market consists of eight waves. The first five waves represent an impulsive movement, and the following three waves represent a corrective movement.
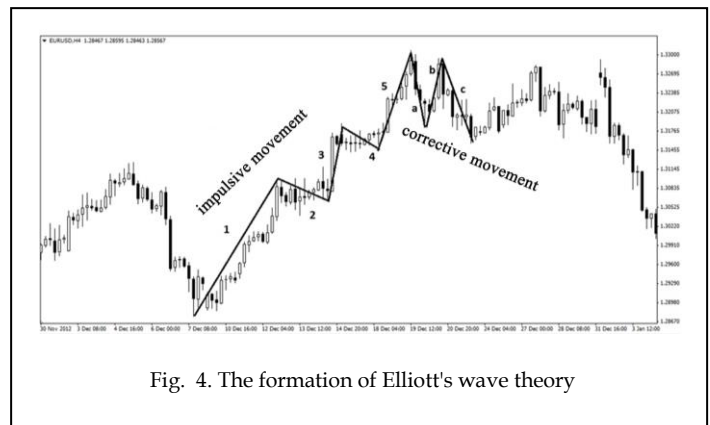
Fig. 4. The formation of Elliott's wave theory

In the diagram, the impulsive movement contains three impulsive waves (1, 3 and 5) and two corrective waves (2 and 4), whereas the corrective movement consists of two corrective waves (a and c) and one impulsive wave (b).

The first impulsive wave describes the entry of precursors that anticipate a reversal of the market followed by an impulsive movement. Their purpose is to position themselves at the beginning of the movement, this is similar to the insiders of Dow's theory.

The second wave reflects the correction of the impulsive movement representing the entrance of the contrarians who assume that the market will continue its course in the direction of correction.

The third wave indicates a phase of followers and professionals influenced by the positive news that supports impulse movement provoking, thus, a sharp acceleration of the exchange rate. This implies that this vaguer is the most important.

Then, the fourth wave is usually the moment when the operators, who took advantage of the rise of the third wave, begin to take profits although the impulsive trend is not questioned.

The fifth wave is the last impulsive wave of the main impulsive movement. It is characterized by the entry of novice agents or lagging followers, who have noticed the rise without positioning themselves. Hoping to take advantage of this impulsive trend, they are on the end of the impulsive movement, therefore, they are victims of the market downturn.

The next three waves, respectively a, b and c, correspond to the corrective movement of the previous impulsive major movement. Thus, the waves a and c have a corrective movement to support the trend reversal, against the wave b are impulsive having a magnitude lower than the fifth wave which means the end of the major impulsive movement.

Ultimately, Elliott's theory of waves allows analysts to imagine different scenarios to deal with different eventualities and identify market turning points.

In sum, trends still exist on the foreign exchange market, as well as the existence of certain graphic configurations. Behavioral finance and conventions have been able to confirm the basic principles of technical analysis. The latter makes it possible to visualize and follow on the graph the recurring behavior of the individuals and to identify the dominant consensus by means of repetitive trends and configurations on the market.

4. CONCLUSION

The economic models of exchange rate forecasting are designed to calculate the intrinsic value of the exchange rate using purely economic variables. The theoretical contribution is considered very beneficial insofar as several models could explain the movement of the exchange rate in the long term, as we presented previously. As a result, economic fundamentals remain the best approach for predicting exchange rates on the grounds that it will return to its long-run equilibrium value.

The day after the work of Meese and Rogoff, the economic approach experienced a feeling of failure with respect to economic variables more exactly in the long term. Indeed, the existence of a difference between the equilibrium exchange rate, calculated by one of the economic models (PPA, PTI ...), and the exchange rate of the market has generated in econo-

mists a doubt to the extent that they have rejected all exploitable relationships between the exchange rate and the short-term economic variables, and that chart patterns are also good tools.

The appearance of behavioral finance has helped to build a theoretical base for technical analysis so long marginalized and challenged by economists. Behavioral finance clearly explains the anomalies of the foreign exchange market by means of psychological biases in that it considers that foreign exchange operators are irrational and their recurring behaviors are a source of dysfunction. Technical analysis can identify these recurring behaviors as repetitive configurations. In addition, the school of conventions asserts that the proper functioning of the market is based on a dominant convention. The latter reflects a consensus that can be identified by a dominant trend on the graph implying that convention theory asserts the use of technical analysis.

Note that we can clearly see that the economic approach and the psychological approach are complementary under the pretext that economic factors are more efficient in the long term and psychological factors are more relevant in the short term. It is preferable for a foreign exchange market operator to consider different approaches to improve its exchange rate forecast.

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