

**How to analyze exchange rates?  
The case of foreign exchange dealers in Moroccan trading rooms**

**Comment analyser les taux de change ?  
Cas des opérateurs de change des Salles de marchés marocaines**

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**Abstract :**

This paper explores the Moroccan Dirham (MAD) analysis practice of foreign exchange dealers belonging to the nine banks with market maker status granted by The Moroccan central bank (Bank Al-Maghrib ) in a context of transition to a more flexible regime. The ultimate goal is to investigate and interpret the underlying process related to the behavior of exchange operators within their environment. The methodology of interview surveys was employed to gather verbatims for a purely qualitative content analysis. Our sample comprises six Moroccan exchange operators selected using the convenience non-probabilistic sampling method. The main results revealed that the analysis of the Moroccan Dirham value is a problem with two degrees of mobility: the EUR/USD exchange rate analysis and the liquidity analysis.

**Keywords: MAD; Analysis Methods; Technical Analysis; Fundamental Analysis; Liquidity Analysis.**

**Résumé :**

Ce travail de recherche porte sur l'exploration de la pratique d'analyse du Dirham Marocain des opérateurs de change appartenant aux neuf banques ayant le statut de teneur de marché accordé par la banque centrale marocaine (Bank Al-Maghrib) dans un contexte de transition vers un régime plus flexible. L'objectif ultime est d'explorer et interpréter le processus sous-jacent lié au comportement des opérateurs de change, et ce dans leur environnement. La méthodologie des enquêtes par entretien a été mise en oeuvre pour recueillir les verbatims qui seront soumis à une analyse de contenu purement qualitative. Notre échantillon est composé de six opérateurs de change marocains sélectionnés selon la méthode d'échantillonnage non probabiliste de convenance. Les principaux résultats obtenus ont dévoilé que l'analyse de la valeur du MAD est une problématique à deux degrés de mobilité à savoir : l'analyse de la parité EUR/USD et l'analyse de la liquidité.

**Mots clés : MAD ; Méthodes d'Analyse ; Analyse Technique ; Analyse Fondamentale ; Analyse de la liquidité.**

## Introduction

In the context of the transition to a more flexible exchange rate regime, launched by the Moroccan Central Bank on January 15, 2018<sup>1</sup>, the analysis of the Moroccan Dirham has aroused keen interest not only among practitioners but even more so among academics. Before this reform, the Moroccan Dirham (MAD) was a currency pegged to a currency basket composed mainly of the Euro and the Dollar at 60% and 40% respectively, with a maneuvering band of 0.06%.

Foreign exchange dealers on Moroccan trading floors confined themselves to analyzing the EUR/USD exchange rate, to deduce its repercussions on the EUR/MAD and USD/MAD exchange rates. To do this, Moroccan foreign exchange dealers used two types of exchange rate analysis methods: Fundamental Analysis and Technical Analysis (Boussedra, 2017). Firstly, fundamental analysis is based on the study of the fundamental determinants, i.e. the economic, financial, and political figures and policy decisions affecting a currency exchange rate. Technical analysis, on the other hand, is based exclusively on the examination of exchange rate charts and technical indicators (Frankel et Froot, 1986; Laurent, 1996; Vigfusson, 1996; Bessec et Robineau, 2003; Boussedra 2017).

However, the reform of the exchange rate by Bank Al-Maghrib introduced a new price formation process. Indeed, the MAD flexibilization process was launched on January 15, 2018, in which Bank Al-Maghrib carried out a widening of the fluctuation band from 0.06% to 5%<sup>2</sup>. This reform enabled nine Moroccan banks to acquire market maker status, giving them the authority to quote the MAD freely daily while respecting the fluctuation band limits. Given this very specific context, the problem of analyzing MAD arouses a real interest in taking a closer look at this phenomenon, given that the literature review relating to the Moroccan context remains very limited. For example, the studies of Boussedra (2016), Sylviane Guillaumont Jeanneney (2019), and Mezene & Echkoundi (2020) have addressed the problem of the transition to a flexible exchange rate regime. Boussedra (2017) also examined the efficiency of the Moroccan foreign exchange market. In addition, the papers by El Bouhadi, A. and Elkhider, Abdelkader and Kchirid, El Mustapha and Idriss (2008) attempted to study the dynamics of the MAD using the BEER model (Clark & MacDonald, 1998) over the period from 1975 to 2006 without taking into account the main determinants

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<sup>1</sup> D.N°1/W/18 :The Governor's decision on the application of the foreign exchange regime.

<sup>2</sup> It is to be noted that on March 09, 2020, the Moroccan central bank announced the second phase, which consists of widening the fluctuation band by a maneuvering range of up to 10% once again. Our study runs from 2018 to June 2019.

emanating directly from the analysis practices of foreign exchange dealers, and consequently, the results obtained do not reflect the context of transition to a more flexible exchange rate regime.

Thus, based on this observation, a question arises: How do foreign exchange operators analyze the MAD in the context of the transition to a more flexible exchange rate regime? To address this issue, we will focus directly on the behaviors of foreign exchange operators in their environment to explore and understand their practice of analyzing the MAD. Indeed, to our knowledge, no scientific research with an exploratory aim has focused on the practices of foreign exchange operators in trading rooms regarding methods of MAD analysis in the current context of the new exchange rate reform.

The methodology of interview surveys will be employed to directly collect verbatim responses that will be subject to qualitative content analysis. The objective is to explicitly explore the underlying process related to the behavior of foreign exchange operators to better understand their motivations, perceptions, attitudes, and interpretations.

In the following sections of this article, we will present the literature review to delineate the scope of this research. Subsequently, we will unveil the methodological frameworks while highlighting the approach of interview surveys and content analysis. Finally, we will proceed to the analysis and discussion of the results in a final section.

### **1. Literature review:**

In the 1980s, when exchange rates were highly volatile following the adoption of flexible exchange rates, macroeconomic models (Cassel, 1918; Branson et al, 1977; Dornbusch, 1976; Fleming, 1962; Frenkel, 1976; Mundell, 1962; Mussa, 1976; Tobin, 1969) tirelessly struggled to explain exchange rate dynamics (Meese and Rogoff, 1983), several researchers tried to investigate other paths of research likely to provide an alternative explanatory conception of exchange rate evolution.

Frankel and Froot (1986) developed a heterogeneous-agent model to explain the dynamics of the US dollar between 1980 and 1985, in which the authors showed that exchange rate movements result from the interaction between two types of agents: chartists, who base their decisions exclusively on a graph of the exchange rate, and fundamentalists, who assume that the exchange rate is in line with economic fundamentals only if chartists are not involved in the market. Frankel and Froot's (1986) Chartist and Fundamentalist model attempted to explain the deviation of the exchange rate from its fundamental value while emphasizing the

hypothesis of agent heterogeneity, which stipulates that foreign exchange agents use two types of exchange rate analysis: Technical Analysis and Fundamental Analysis. To test the specification of Frankel and Froot's model, Laurent (1995), Vigfusson (1996) and Bessec and Robineau (2003) came up with the idea that exchange rate determination also emanates from the interaction between chartist and fundamentalist agents.

In the same line of reasoning, the '90s saw real enthusiasm on the part of researchers (Bhanumurthy, 2006; Cheung et al., 2004; Cheung & Chinn, 2001; Lui & Mole, 1998; Menkhoff, 1997; Taylor & Allen, 1992) for questionnaire surveys of trading room dealers to directly explore their exchange rate analysis behavior. The ultimate aim of this questionnaire survey methodology is to investigate and pinpoint the analysis methods employed by trading room practitioners.

Indeed, the study by Taylor and Allen (1992), considered to be the first research paper to adopt the methodology of questionnaire surveys, showed that foreign exchange dealers on London trading floors, when forming their currency buying or selling decisions, analyze the exchange rate both technically and fundamentally. The authors pointed out that the influence of the technical analysis method is greatest when dealers are making short-term forecasts. On the other hand, the use of fundamental analysis is more important for long-term horizons. Taylor and Allen also concluded that the two methods are highly complementary, given that the point of technical analysis is not to contradict the results of fundamental analysis but rather to affirm them.

For their side, Lui and Mole (1998) revealed that Hong Kong forex traders exploit both technical and fundamental analysis in their decision-making formation and that the two methods of analysis are complementary. For fundamentalists, the authors revealed that the fundamental figures and announcements most frequently analyzed to anticipate the exchange rate are: the interest rate, the balance of payments, and inflation. In addition, technical indicators and chartist figures are the technical tools most used by Hong Kong chartists.

Furthermore, in 1992, Menkhoff (1997) surveyed German foreign exchange dealers using a questionnaire to explore their behavior about exchange rate analysis methods. The results revealed that, in addition to technical and fundamental analysis, German forex traders use another analysis method based on order flow. Order flow analysis is used to determine the volume of trades arranged according to the direction of the transaction. In other words, an accumulation of positive (negative) flows can generate buying (selling) pressure, which can be seen as a source of information for obtaining an opinion on the level of liquidity in the

market. The author's results also demonstrate that psychological market phenomena are as important as economic fundamentals. In addition, German forex dealers made it clear that technical analysis is the key to understanding market psychology.

In another study, Cheung and Chin (2001) examined the behavior of American foreign exchange dealers between 1996 and 1997. The results showed that foreign exchange traders not only used technical analysis, fundamental analysis, and order flow analysis, but also another analysis method called « Jobbing<sup>3</sup> », based on speculative trading practices. Essentially, the authors concluded that technical analysis is the most important analysis, followed by fundamental analysis, order flow analysis, and jobbing. As far as fundamental determinants are concerned, unemployment and interest rates have the greatest impact on exchange rate movements.

In his survey, Oberlechner (2001) attempted to broaden the scope of his research, firstly by including central bank dealers<sup>4</sup> alongside commercial and investment bank dealers, and secondly by examining several European foreign exchange markets in a joint study. The aim was to sound out the opinions of various foreign exchange dealers operating on different exchanges, to determine their behavior concerning exchange rate analysis. Oberlechner's (2001) findings supported the idea that dealers mainly apply technical and fundamental analysis in forming their decisions. The majority of European dealers, i.e. those operating in the Frankfurt, Vienna, Zurich, and London financial centers, demonstrated a high degree of sensitivity to the joint use of technical and fundamental analysis in determining the exchange rate. Only a minority of dealers showed an interest in an exclusively fundamental or chartist analysis.

It should be pointed out that the importance of analyzing non-fundamental determinants (Lamzouri & Daoui, 2020), according to European traders, lies in the fact that exchange rate movements are affected by behavioral and psychological factors. Consequently, the use of technical analysis makes it possible to detect these psychological factors in the foreign exchange market by technically examining the chart (Oberlechner, 2001).

In the same spirit of questionnaire surveys, Gehring and Menkhoff (2003) surveyed foreign exchange traders and fund managers operating in the German and Austrian foreign exchange

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<sup>3</sup> Jobbing is the practice of constantly buying (selling) in order to make a profit. According to the authors, the Jobbing method could be interpreted as very high-frequency speculation. Today, this method is known as scalping.

<sup>4</sup> The author also included journalists working for economic and financial press agencies in his study population. We will restrict ourselves to the responses of foreign exchange dealers, since our field of research deals with the determinants of exchange rates used by foreign exchange dealers.

markets between June and July 2001. Regarding exchange rate analysis methods, the results showed that German and Austrian foreign exchange dealers also employed technical analysis, fundamental analysis, and order flow analysis. The authors also pointed out that the use of technical analysis is strongly linked to the idea that market psychology is important in determining the exchange rate and that it is plausible to capture this through the chart.

Cheung, Chinn, and Marsh (2004) also conducted a survey of forex dealers based in the UK between March and April 1998. Their research is in line with the previous surveys. The results obtained from this survey also revealed that foreign exchange dealers employed different analytical methods in their decision-making, including technical analysis, fundamental analysis, order flow analysis, and jobbing.

Lastly, Bhanumurthy (2006) attempted to examine methods of exchange rate analysis, focusing on those employed by Indian foreign exchange traders between 1997 and 2002. The results indicate once again that foreign exchange market practitioners have employed different methods of analysis to determine the movement of the exchange rate. Indian traders tend to apply technical analysis, fundamental analysis, and order flow analysis. As far as fundamental figures and announcements are concerned, the interest rate is the most important fundamental determinant (Lui and Mole, 1998; Cheung and Chinn, 2001), followed by the trade deficit, money supply, GDP, and the inflation rate.

According to this literature review, which we have outlined above, foreign exchange practitioners, operating within the framework of a trading room, have employed various analytical methods when taking positions. These include technical analysis, fundamental analysis, order flow analysis, and jobbing. Indeed, all empirical studies have shown that forex traders' analysis of the exchange rate is mainly based on technical and fundamental analysis. This empirical finding is supported by the theoretical contribution of heterogeneous agent models (J. A. Frankel & Froot, 1986; Laurent, 1995; Vigfusson, 1996; Bessec & Robineau, 2003), according to which exchange rate dynamics emanate from the interaction between different agents whose behavior is assumed to be heterogeneous.

The results of questionnaire surveys of trading room practitioners (Bhanumurthy, 2006; Cheung et al., 2004; Cheung & Chinn, 2001; Lui & Mole, 1998; Menkhoff, 1997; Taylor & Allen, 1992), converge toward the exchange rate determination specification proposed by Frankel and Froot (1986) in which chartist and fundamentalist behavior plays an important role in exchange rate evolution. This questionnaire survey methodology, which focuses directly on forex dealers' behavior, has enabled us to compare practical behavior with the

specifications proposed by the theoretical review (Bessec & Robineau, 2003; J. A. Frankel & Froot, 1986; Laurent, 1995; Vigfusson, 1996).

## 2. Methodological guidance:

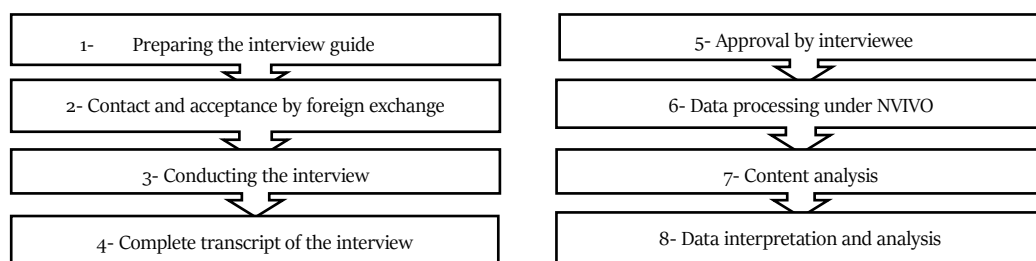
### 2.1 The interview, an investigative tool in financial markets

The objective of this paper is to explore and understand the underlying process related to the exchange rate analysis behavior of Moroccan foreign exchange dealers. The main question of our research is to explore exchange rate analysis methods in the context of the transition to a more flexible exchange rate regime. To achieve this, it is plausible to examine the behavior of foreign exchange practitioners in their environment. To this end, we will opt for the methodology of semi-directive interview surveys<sup>5</sup>.

The issue of MAD analysis by market practitioners, in the context of the transition to a more flexible market, requires prior exploratory investigation to assimilate the practices of foreign exchange operators. In the absence of an understanding of the behavior of Moroccan foreign exchange dealers, the practice of MAD analysis cannot be objectively identified.

In our research, we will adopt Marsat's (2006) semi-directive interview survey methodology, as shown in the figure below:

**Figure 1: Interview survey steps**



Source : Marsat (2006).

The first step was to prepare an interview guide covering all the topics to be discussed during the interview. The second and most arduous stage involved contacting foreign exchange operators in a Moroccan bank's trading room who were open to being interviewed. Once the foreign exchange operator had agreed, an appointment was made for the interview. The entire interview was recorded and transcribed using the “oTranscribe” application<sup>6</sup>. The transcripts were then validated by the interviewees before processing and analyzing the text with NVIVO

<sup>5</sup> Shiller (1990), Tadjeddine (2000, 2006) and Marst (2006) have opted for a survey methodology to understand the behavior of financial market players.

<sup>6</sup> oTranscribe is an online application designed to facilitate the process of transcribing an audio file.



software. To process qualitative data, it is usual to use NVIVO software to carry out the discourse encoding stage and create the matrix of interview crossings and encoded nodes.

## 2.2 Conducting the interview

Before starting the interview, the interviewee was informed that the discussion would be recorded<sup>7</sup>, that their identity would be confidential, and that certain parts of his speech could remain confidential. Furthermore, the research objective was never divulged directly. The interview guide was requested several times. However, the guide was never handed over to elicit spontaneous responses.

The majority of semi-directive interviews were conducted face-to-face. However, only one case was interviewed by telephone due to his unavailability. In 5 cases out of 6, the interviews were carried out at the exchange operator's workplace, and methodically in an isolated area to avoid any disturbance.

Through these different measures, the emphasis was placed on establishing a relationship of trust<sup>8</sup>, enabling the operator to express himself as openly as possible throughout the interview, resulting in the most accurate possible reflection of his perception of the market.

The average duration of the interviews is 65 minutes, as can be seen in the table below:

**Table 1: Duration of interviews**

Interviewees	Duration in minutes
A	70
B	90
C	91
D	44
E	55
F	42
<b>Average length</b>	65

*Source: Self-compiled source.*

## 2.3 Sample surveyed

The sample is made up of 6 foreign exchange dealers operating in the trading rooms of nine banks with the status of market makers granted by Bank Al-Maghrib. The environmental context of this research field is particularly sensitive due to the characteristics of this profession. In particular, foreign exchange dealers are bound by a professional code of confidentiality. In addition, the unavailability of exchange operators and the difficulty of contacting them are undeniable for this type of study.

<sup>7</sup> The recording was made on the dictaphone of two telephones to avoid any unexpected malfunction.

<sup>8</sup> All the interviewees showed great interest in this research, which in turn helped us gain their trust.

As a consequence, we opted to make contact with a foreign exchange dealer who referred us to two dealers, who in turn led us to three other practitioners in a trading room. This empirical non-probabilistic convenience sampling technique called « snowballing<sup>9</sup> » was applied to reach the saturation threshold<sup>10</sup> of 5 interviews. This saturation threshold can be explained by the fact that the Moroccan foreign exchange market is a small one, with 9 trading rooms interacting, offering quotes within the same price range, and executing only hedging operations. As a result, their MAD analysis practices were similar. In other words, during the content analysis, the interview responses showed similar discourses from a single saturation of 5 interviews.

We carried out a series of individual semi-directive interviews between November 2018 and June 2019 to collect the primary data and constitute the sample, the main characteristics of which are summarized in the following table:

**Table 2: Characteristics of the selected sample :**

Foreign exchange dealer category	Sales FX	Traders FX	Head of FX desk	Head of Trading Room		
	2	2	1	1		
	33,33%	33,33%	16,67%	16,67%		
Ages	25-35 years old	30-45 years olds	Over 45 years old			
	2	3	1			
	33,33%	50%	16,67%			
Years of experience	0 to 5 years	5 to 10 years	10 to 15 years	Over 15 years old		
	1	1	3	1		
	16,67%	16,67%	50%	16,67%		
Banks	Attijariwafa Bank	Banque Centrale Populaire	Bank Of Africa	CIH Bank	CAM	SGM
	1	1	1	1	1	1
	16,67%	16,67%	16,67%	16,67%	16,67%	16,67%

Source: Self-compiled source.

#### 2.4 Content analysis method :

According to Robert and Bouillaguet (1997), content analysis is a technique that methodically, systematically, objectively, and occasionally quantitatively examines the content of certain texts<sup>11</sup> to classify and interpret the constituent elements that are not comprehensible to the naive reader.

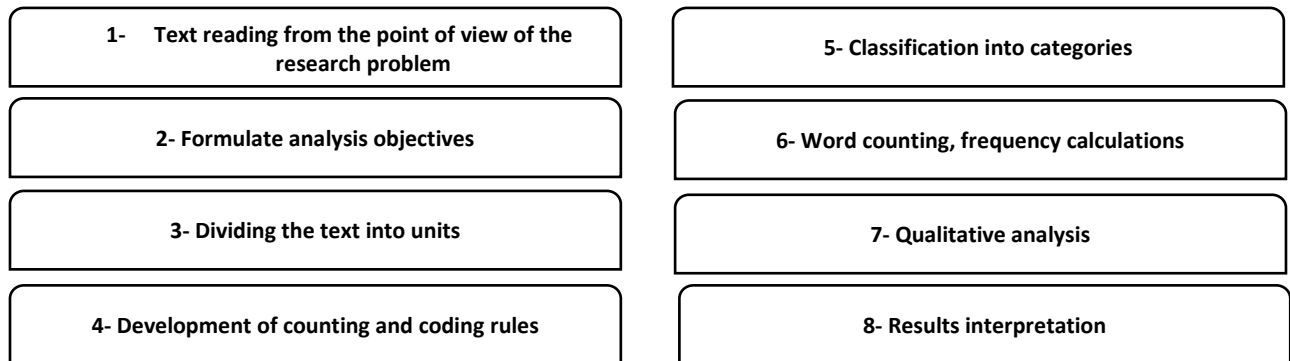
For our content analysis, we will opt for the steps outlined by Bardin (2001):

<sup>9</sup> The snowball technique is a procedure adopted for populations that are difficult to survey. It consists in finding an initial respondent who satisfies the selection criteria defined by the researcher, who then designates other respondents likely to present the required criteria, and so forth (Royer and Zarlowski; 2007).

<sup>10</sup> The saturation threshold corresponds to the point at which responses within a social category no longer vary (Pires, 2007).

<sup>11</sup> This includes all types of verbal production, whether written or oral.

**Figure 2: The main steps in Bardin's content analysis (2001)**



Source: Bardin (2001).

Reading the text is a pre-analysis, facilitating the gathering of specific documents on which the analysis will be based to respond to the given problem. In our case, the documents are in the form of semi-directive interviews. These were broken down into analysis units so that they could be collected and counted. The next step is to categorize and count the units, delimit the content breakdown units, and put into perspective the importance of each category for the sample studied. It is important to note that the NVIVO computer tool enabled us to carry out the speech coding phase and to group all the interviews and the encoded nodes in the form of a matrix, thus facilitating the speech analysis phase<sup>12</sup>.

Subsequently, qualitative content analysis highlights the interpretation of the very essence of the text, i.e., the appreciation of the importance of themes in the discourse, rather than measuring it. However, the computer tool<sup>13</sup> allowed us to facilitate the coding and categorization of the analysis units beforehand. It should be emphasized that the units of analysis were subjected to double coding to minimize subjectivity bias<sup>14</sup>. In addition, all qualitative content analysis was carried out manually, given the qualitative nature of the data. Interpretation of the results is the final step, the purpose of which is to draw conclusions about the corpus studied, based on the elements raised by categorization, to design an objective and original analysis of the text studied.

### 3. Results analysis

The speech coding and categorization phase defined a set of encoded nodes. Each time the exchange operator evoked a discourse attached to this node, it was encoded. The different

<sup>12</sup> This step enables us to identify similarities and dissimilarities in the speeches.

<sup>13</sup> We used the NVIVO 10 qualitative data analysis software package produced by QSR International.

<sup>14</sup> Using the NVIVO 10 software package, which enables us to share collected data and compare results, we compared our construct coding results with those of a university professor, in order to reduce the researcher's interpretation bias.

nodes and sub-nodes we encoded were guided by our research objective, which is to address the MAD analysis methods employed by trading room foreign exchange operators.

**Table 3: Description of nodes**

Principal Nodes	Sub-nodes	Descriptions
Moroccan Dirham analysis	EUR/USD exchange rate analysis	Verbatim on technical and fundamental analysis.
	Analysis of liquidity	Verbatim on liquidity analysis.
Complementarity between TA and FA	-	Verbatim on the complementarity between TA and FA.

*Source: Self-compiled source.*

### 3.1 Moroccan Dirham analysis

The idea that MAD analysis is a two-parameter issue was widely shared by the foreign exchange operators interviewed. Firstly, the MAD fluctuates according to the evolution of the EUR/USD exchange rate, as long as it is pegged to a basket of currencies composed mainly of the Euro and the Dollar (60% and 40% respectively). Following the widening of the fluctuation band, another determinant has been introduced, namely the level of liquidity. The latter is a consequence of supply and demand for the MAD on the local foreign exchange market. As foreign exchange dealers (B), (C), and (F) explicitly mentioned:

“ We observe the EUR/USD cross, i.e. the impact of the Euro and the impact of the Dollar on the MAD. Because the MAD is simply a reflection of the EUR/USD exchange rate, plus a 5% band that can be impacted by supply and demand, that's the real intrinsic value! That's how market makers see the value of the MAD”.

*Forex dealer (B)*

“MAD is a time-varying value. But it has two degrees of mobility. It can vary due to the EUR/USD exchange rate, and just as it can vary due to market liquidity”.

*Forex dealer (C)*

“We use the EUR/USD exchange rate to analyze the value of the MAD against the Dollar, but not only. Now, it's more the case with enlargement because there's a key factor integrated into the price: liquidity!”.

*Forex dealer (F)*

According to currency dealers, EUR/USD exchange rate analysis relies on two types of analysis to deduce the impact on EUR/MAD and USD/MAD: fundamental analysis and technical analysis. As mentioned by forex dealers (F) and (B):

“Currently, when the EUR/USD exchange rate appreciates, the EUR/MAD exchange rate automatically appreciates and the USD/MAD exchange rate depreciates. As long as we have the peg, it's a matter of trying to analyze the evolution of the EUR/USD exchange rate. So, it's mainly a question of using chartism and fundamentalism”.

*Forex dealer (F)*

“There's no analysis called EUR/MAD or USD/MAD because it's a pegged currency. It's not the MAD movement. Its true value is 60% Euro and 40% Dollar”.

*Forex dealer (B)*

As long as the MAD is pegged to its basket of currencies, EUR/USD exchange rate analysis is vital to deduce its repercussions on the EUR/MAD and USD/MAD parities. Moreover, the EUR/USD exchange rate offers enough empirical data to draw cycles and curves, making it easy for traders to put chartist analysis into practice. The EUR/USD exchange rate analysis therefore calls for the application of both technical and fundamental analysis.

### 3.1.1 Technical Analysis :

The practice of technical analysis consists of using technical indicators and chartist figures to try and constrain the movement of the exchange rate. The choice of technical analysis tools is highly subjective, as indicated by the currency trader (A):

“You can use a lot of indicators, and there are a lot of them. Everyone will rely on two, three, or even four tools. For example, I use RSI, moving averages, Fibonacci retracements, resistances, and supports. You can sum them all up to try and delimit the trajectory of the exchange rate”.

The forex dealer (C) mentioned that the choice of technical analysis tools depends very much on the chart movement of the exchange rate, in the sense that there is no typical technical analysis that traders must follow meticulously: “These are the graphs that force you to draw a triangle, a double top, or even a triple top. These are the graphs that guide you to draw a chartist pattern that will indicate, for example, that a movement is about to be triggered in the market”.

As for the performance of technical analysis, forex dealers mentioned that its use is relative to markets that are stable and efficient, i.e. in periods when announcements of economic figures and decisions generate practically no impact on exchange rates. Foreign exchange operators (D) and (C) clearly illustrate this postulate:

“Technical analysis is much more effective when the market is stable and there are no major figures. In other words, there are no decisions that are going to move the market in a particular direction or very quickly. If you're in a stable market, that's the best practice!”.

*Forex dealer (D)*

“You should use the tools of technical analysis in an efficient market where there are enough participants and volumes. You require a minimum of liquidity and a minimum of financial depth to use technical analysis”.

*Forex dealer (C)*

According to forex dealers, technical analysis is, therefore, a subjective practice relative to each practitioner, with technical indicators and chartist figures being the most widely used tools. Technical analysis is also practiced in stable, efficient markets.

On the other hand, forex dealers have indicated that the use of technical analysis on the EUR/USD exchange rate is very much linked to market psychology. Assuming that the majority of traders use the same technical analysis tool, such as the RSI indicator. These traders will automatically adopt the same analysis conclusions. If one trader uses a technical

analysis tool that enables him to anticipate the behavior of the majority of traders, he can identify the average behavior of the market. So, this fact can become market psychology. As such, currency trader (A) explained: "Technical analysis becomes market psychology. In other words, if I have tools that enable me to conclude from each indicator result that all traders will conclude the same, it becomes market psychology. For example, if a technical indicator moves into its oversold zone, everyone will click on buy. This becomes a market psychology. If 70% of traders on the world's markets use the same tools, the market will automatically go up".

The forex dealer (B) also made it clear that the use of supports and resistances in technical analysis is the best way to identify market psychology: "You have supports and resistances that reflect the psychology of financial players on EUR/USD".

### 3.1.2 Fundamental analysis :

The forex operators interviewed indicated that fundamental analysis consists of examining published economic and political data, i.e. economic figures and announcements relating to decisions by the monetary authorities. In order of importance, economic announcements concerning the United States and Europe are the most analyzed, followed by those concerning Japan, as stated by forex trader (A): "Firstly, there are the announcements from the United States, Europe, and Japan. They have an impact on the exchange rate. How can US, European, and Japanese macroeconomic aggregates change monetary policy at any time?".

As an illustration, the forex operator (D) announced that the importance of the key rate lies in the fact that its decrease/increase is a stimulus for the economy: "Just after the subprime crisis, the Fed launched its quantitative easing policy<sup>15</sup>, which consists of lowering the key interest rate. And when the key rate falls, it has an impact on the EUR/USD exchange rate."

The unemployment rate is also a fundamental economic determinant, enabling us to analyze economic health. Indeed, a very low unemployment rate illustrates job creation and implicitly a healthy economy. The forex trader (D) added that the Fed's key rate decisions are based on inflation and the unemployment rate: "Inflation also has a major impact on monetary policy: either it's accommodative, or it's not. Whenever the FED was expected to intervene, their decisions to raise or lower key rates were based on two things: inflation and the unemployment rate. And that's what's going to affect the dollar's value!".

In the same way, forex dealer (B) mentioned that its fundamental analysis also relied on GDP analysis alongside unemployment rates, policy rates, and inflation: "For EUR/USD analysis, I use all the US and European macroeconomic figures. Among the main indicators, I can tell you the unemployment rate in America, the number of times the Fed plans to raise the key interest rate, GDP, and inflation".

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<sup>15</sup> This is a quantitative easing policy launched by the FED to counter the repercussions of the 2008 crisis. The main thrust of the policy was to lower the key interest rate, with the aim of stabilizing financial markets and restoring confidence.

The forex trader (C) also pointed out the importance of the key rate and the unemployment rate. In addition, he mentioned that the decisions of the monetary authorities are very useful in analyzing the EUR/USD exchange rate: "In practice, it's much more a matter of decisions by country presidents and central bank governors".

In addition, forex dealers have pointed out that the announcement of economic and political data is seen as a source of volatility in the market. In practical terms, this means analyzing the market consensus of anticipating future announcements based on previous figures. The forex trader (C) made it clear that economic announcements are a source of volatility: "I'm following in detail the calendar of announcements for the two or three days to come. For me, the announcement is a source of volatility, not a source of trend. I know very well that many investors will position themselves during the announcement period and buy or sell. There will be a battle between buyers and sellers. It's a source of volatility, and therefore a market opportunity".

In short, according to Forex dealers, fundamental analysis is the practice of examining economic figures, mainly interest rates, unemployment rates, inflation rates, GDP, and the decisions of political and monetary authorities. The announcement of economic and political data is a source of market volatility.

### 3.1.3 Analysis of liquidity :

After the transition to the flexible exchange rate regime, the analysis of the liquidity level became predominant. As the fluctuation band widens over time, the importance of the liquidity level will have a greater impact on the evolution of the MAD. Forex operator (A) made this point: "After flexibilization, today we can look at large operations like Saham<sup>16</sup>, for example, or Moroccan Residents Abroad. Did MLA bring in more foreign currency this year? Was there more FDI or less? We're going to start looking into that from now on! But before flexibilization, this had no impact whatsoever on the MAD!".

Thus, the value of the MAD is influenced by the level of market liquidity, which results from the volume of currency inflows and outflows from hedging operations by companies, MLA, and FDI. In the same spirit, foreign exchange operators revealed that foreign exchange inflows and outflows generally occur from the beginning of the summer season, which coincides with the arrival of MLA and foreign tourists, as indicated by foreign exchange operator (C): "Right now, we're trying to get ready for the summer season. We're already pricing in an inflow of 40 billion MAD. So we expect the MAD to appreciate it once again. There will be foreign currency inflows from MREs and foreign tourists in the summer. 80% or a little after 75% of banknote inflows in Morocco coincide with the summer. As a result, banks are already trying to prepare for the massive influx of foreign banknotes".

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<sup>16</sup> In 2018, the Saham group carried out a major foreign exchange hedging operation in the form of a forward sale of dollars in order to sell its Insurance division. The majority of banks on the Moroccan foreign exchange market were mobilized to carry out this hedging operation.

Also, the foreign exchange operator (E) revealed that the dividend transfer period generates strong demand for foreign currencies, which consequently weighs on liquidity levels: “Dividends are usually transferred between May, June, and July. There's a lot of demand for the currency. So when the banks start dealing with customers, positions inevitably fall. You sell at a higher price. So the MAD depreciates mechanically”.

Foreign exchange inflows and outflows relating to transactions by MLA, tourists, imports and exports, and dividend transfers, affect the foreign exchange position of banks, which in turn impacts the value of the MAD. Foreign exchange operator (E) explicitly explains this market mechanism about banks' foreign exchange positions: “The value of the MAD is much more affected by the banks' foreign exchange positions. Supposing now, in the summer period, we have quite a few tourists coming, and MLA returning to Morocco. So there's a lot of foreign currency accumulating. So, in general, the market becomes long. If the market becomes long, that is, the market has exchanged MAD for currency. What happens when you go long? Well, it starts to accumulate in foreign exchange positions. We're well aware that, according to regulations, you can't exceed 20% of equity in foreign currencies<sup>17</sup>. So, at a given moment, when you're approaching the maximum allowed by legislation, you try to make an effort on the price to try and liquidate the foreign exchange position. This effort results in an appreciation of the MAD because my bank will make an effort, the other bank will make an effort, and so on. At some point, the market will reach a consensus, and currency prices will inevitably fall. So the MAD will appreciate”.

In addition, the foreign exchange operator (F) pointed out that the foreign exchange position is practically affected by the timing of international foreign exchange settlements, particularly those relating to imported petroleum products and exported phosphate sales, since they have a major impact on the balance of trade situation: “More easily, when you have the schedule of oil importers, at that moment, you have control over the value of the MAD. Because that's the major factor in the trade deficit. The biggest is energy. So, all sectors have to pay at a given date. Simply put, there will be a need for foreign currency on that date. Because, if I sell the Dollar against the MAD, I'm going to sell the Euro against the Dollar. We're also tracking phosphate because we're an exporter, and because there's also an impact on foreign currency inflows. So whoever has this information, the schedule of currency outflows and inflows, and the international settlements of economic operators, will have the true value of the MAD”.

The practice of analyzing market liquidity has revealed a new dimension in the analysis of the MAD, which is mainly made up of foreign currency inflows and outflows, banks' foreign currency assets and liabilities, and the central bank's foreign exchange reserves. Foreign exchange operators who have access to the foreign exchange transaction schedule will have visibility over the value of the MAD, as explained by the foreign exchange operator (F): “Liquidity should be measured by banks' foreign currency assets and commitments, foreign currency inflows and outflows, and foreign exchange reserves. All foreign exchange transactions have a schedule. This will provide visibility”.

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<sup>17</sup> According to Bank Al-Maghrib regulations, see the official website of the Moroccan central bank.



About foreign exchange reserves, the operators stated that they consult the ARA (Assessing Reserve Adequacy) model<sup>18</sup> of Bank Al-Maghrib, which calculates the level of foreign exchange reserves required when the exchange rate crosses its fluctuation band. To illustrate, the foreign exchange operator (C) revealed that “We try to follow the model presented by the central bank. The ARA model represents the central bank's estimate of the level of foreign exchange reserves it needs to hold. For example, the ARA model estimates that a liquidity level of 3 months' imports must be maintained to counter a shock on international markets. If we find that the level of foreign exchange reserves is approaching the minimum threshold, we can anticipate a risk of appreciation of the MAD, which is a risk of pressure on the MAD. As a result, local banks may adopt a more sensitive attitude towards foreign currencies”.

It's fundamental to point out that, to better anticipate the level of liquidity in the foreign exchange market, foreign exchange traders have started to use a fundamental analysis of the figures published by the Exchange Office and Bank Al-Maghrib. For instance, foreign exchange operator (E) clearly illustrates this assumption: ‘So, there are several components that give you an idea of where the MAD should be established. We also check the figures published by the Exchange Office. We look at our foreign trade every month, and see whether the trade deficit has stabilized or widened. So, if we see that there's a trade deficit, we figure that at some point the market will become tighter. We're not going to stray too far from the middle reference”.

### **3.2 Complementarity between technical and fundamental analysis**

In the Moroccan interbank foreign exchange market, foreign exchange dealers use both technical and fundamental analysis to analyze the EUR/USD exchange rate. They have repeatedly stated that these two analyses are highly complementary. As forex trader (D) points out: ‘I believe that technical analysis complements, if I may say so, fundamental analysis”.

Fundamental analysis is used to identify the underlying movement in the exchange rate, while technical analysis is integrated to identify the threshold that this underlying movement may reach. The forex trader (A) briefly explained this complementarity: “We're going to follow as many macroeconomic indicators as possible to try and anticipate the exchange rate. But just to see whether we're already heading up or down. And once we know whether we're on the way up or down, we'll integrate chartist analysis to see how far we can go. You always need to combine the two, whether you're looking at the long term or the short term”.

Forex trader (B) also explained that fundamental analysis, more specifically economic and political announcements, is the main source of fluctuations that enable exchange rates to outline trends: “Because even if you want to get started with chartism, you have to start with fundamental analysis. Why? Because it's the only way to get a chartist's trend out of a graph”.

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<sup>18</sup> For more details, see the IMF report by Porter and Moriyama (2014).

Furthermore, forex trader (C) pointed out that using technical analysis independently of fundamental analysis can lead to contradictory analysis results: “You have to combine the two analyses to get an accurate picture of the market. The two analyses are complementary. If we're talking about the EUR/USD market, the two approaches are complementary. You can't say that technically the EUR/USD is going to rise or that fundamentally the EUR/USD is going to appreciate because you're always going to have counter-examples”.

Although the majority of forex dealers pointed to the complementarity between technical and fundamental analysis, the weight given to the use of each analysis by forex dealers remains very heterogeneous. Half the operators indicated that they refer more to technical analysis. As expressed by forex dealers (A), (E), and (C):

“I prefer the chartist analysis. Let's just say it's less biased. It's binary, unlike fundamental analysis, where you can get figures that don't reflect reality”.

*Forex dealer (A)*

“Mostly, I use technical analysis. The first thing I do, which is very easy to do, is to determine resistance and support. Secondly, I look at the underlying trend. Is it bearish or bullish? After that, you can do it over 30 minutes or 15 minutes. I use MACD 200-day moving averages a lot. I don't use fundamental analysis very often”.

*Forex dealer (E)*

“Everyone has their strategy. I base my strategy 80% on technical analysis and 20% on fundamental analysis”.

*Forex dealer (C)*

In contrast, forex trader (B) disclosed that he gives more weight to fundamental analysis than to technical analysis. He made it clear that the use of technical analysis is only useful because other traders believe in it. In other words, the practical value of technical analysis depends solely on the fact that the majority of traders use it. Also, the results obtained by technical analysis are only the subjective conclusions of those who use it:

“Technical analysis is only interesting because you believe in it. There's no real intrinsic value. But the real value comes from fundamental analysis, in my personal opinion. It's just a personal opinion of the person doing it. But then, the real added value comes from market operators' anticipations by studying macroeconomic indicators, and by understanding the interest and consequences of macroeconomic data on the EUR/USD exchange rate. After that, I don't believe in technical analysis. How often do you find a support that can't be broken out of? Then, it's cleared. For me, all the interest comes from fundamental analysis and its impact on the evolution of the EUR/USD. Suppose I may say so, with much more emphasis on fundamental analysis. This is my personal opinion”.

Foreign exchange dealers have also pointed out that fundamental analysis no longer carries the same weight in exchange rate analysis as it used to, due to the economic and financial crises the world has been experiencing recently. As a result, forex dealers are relying less and less on published economic and political announcements, as forex operator (E) explained:

“So, with all the crises the world has seen, fundamental analysis doesn't have the same impact as it used to. Indeed, traders are relying less and less on the numbers that are going to come out and their impact. Certain figures can move the market a little. But most of the time, the market anticipates that there is a consensus. And part of the price movement has already been incorporated. When the figure comes out, there's not much impact. Unless that is, the figure comes out far from the consensus. That is, if the unemployment rate is expected to be 4%, and the figure comes out at 4.9%. In this case, the

market doesn't expect the unemployment rate to fall, and you're going to see a very significant movement in the exchange rate. So, the idea is that fundamental analysis no longer has the same impact. We rely less and less on fundamentals".

#### 4. Discussions :

The main contribution of this paper is to provide an insight into the phenomenon of the Moroccan dirham's analysis practice in the context of the transition to a more flexible exchange rate regime. In addition, this research paper aims to make a practical contribution to Moroccan foreign exchange dealers by delineating the various facets of the practice of analyzing the Moroccan dirham. We do not, however, aspire to propose concrete solutions to the problems experienced by foreign exchange dealers, but rather to attempt to clarify the phenomenon explicitly by highlighting the current context of transition to a more flexible exchange rate regime.

Our exploration of MAD analysis practice has led us to conclude that MAD fluctuation, in the context of transition to a more flexible regime, is highly dependent on two parameters: the evolution of the EUR/USD exchange rate and the level of liquidity. Consequently, foreign exchange traders in the trading rooms of the nine banks with market maker status tend to use three types of MAD analysis methods:

- The first two analyses are technical and fundamental, applied to the EUR/USD exchange rate to deduce the impact on the EUR/MAD and USD/MAD exchange rates. The reason for using these two analyses is that the MAD is a currency pegged to a basket of currencies weighted 60% Euro and 40% Dollar. The composition of the basket is itself explained by the volume of international trade that Morocco conducts with its economic partners.
- The analysis of liquidity emanates mainly from the exchange rate reform implemented by the Moroccan authorities, which consists of progressively widening the MAD's fluctuation band. As this fluctuation band widens over time, analysis of the level of liquidity, i.e. the volume of currency inflows and outflows, will become more preponderant.

These results support the postulate that foreign exchange dealers also use the technical and fundamental analysis methods mentioned in the empirical review of questionnaire surveys (Bhanumurthy, 2006; Cheung et al., 2004; Cheung & Chinn, 2001; Lui & Mole, 1998; Menkhoff, 1997; Taylor & Allen, 1992). On the other hand, our interview survey of the Moroccan context revealed a new, obscure facet of the flexibilization process that cannot be

observed through quantitative data. This is the practice of liquidity analysis, which became predominant following the widening of the fluctuation band.

The level of liquidity in the Moroccan foreign exchange market results from the confrontation of supply and demand for currencies. Banks' foreign exchange positions, which represent all foreign exchange transactions carried out by trading rooms, provide an overview of the level of liquidity. According to Moroccan foreign exchange dealers, liquidity can be measured directly by banks' foreign exchange positions and foreign exchange reserves. It should be noted that foreign exchange positions comprise all the bank's foreign currency assets and commitments arising from international economic and financial operations, Moroccan Living Abroad (MLA) and tourism operations, and dividend transfers. The level of liquidity can therefore vary either directly through the foreign exchange position or indirectly through its components. In the case of foreign exchange reserves, Moroccan foreign exchange operators consult the estimates of the Assessing Reserve Adequacy model to analyze the repercussions on liquidity levels.

In this perspective of making the MAD more flexible, it will be very useful to analyze the relationship between the level of liquidity and the value of the MAD to study their correlation and develop possible scenarios to identify the impact of the seasonality of currency inflows and outflows on the value of the MAD.

Furthermore, our exploratory results have shown that technical analysis and fundamental analysis are two highly complementary analysis methods, as indicated in the empirical review of analysis methods (Bhanumurthy, 2006; Cheung et al., 2004; Cheung & Chinn, 2001; Lui & Mole, 1998; Menkhoff, 1997; Taylor & Allen, 1992). Fundamental analysis is used to examine the economic and political factors that will create the underlying trend, while technical analysis is used to affirm or reject it. This is in line with Taylor and Allen (1992), who state that the purpose of technical analysis is to consolidate the conclusions of fundamental analysis. Furthermore, half of the foreign exchange dealers interviewed indicated that they are more sensitive to the use of technical analysis, given that forex dealers are relying less and less on the impact of economic announcements. On the other hand, a minority of FX traders gave more importance to fundamental analysis, arguing that technical analysis is only of practical value because other traders believe in it, and that true intrinsic value results from analysis of economic fundamentals.

On the other hand, Moroccan forex dealers have stated that technical analysis is considerably linked to market psychology. Firstly, this is because dealers can use the same technical tool to

generate the same analysis conclusions, and therefore they can form the same expectations. As a result, it is only necessary to anticipate the average behavior of dealers to determine the trajectory of the exchange rate. Secondly, Moroccan forex dealers use support and resistance levels to determine market psychology. This statement was evoked in the studies of Oberlechner (2001), and Gehring and Menkhoff (2003), who concluded that technical analysis tools can be used to detect psychological behavior in the foreign exchange market.

As a result, Moroccan forex traders tend to use a combination of three analytical methods: technical analysis, fundamental analysis of the EUR/USD exchange rate, and liquidity analysis. It was found that Moroccan foreign exchange operators have a heterogeneous behavior and a differentiated analysis process. This heterogeneity stems from the fact that the weight given to either technical or fundamental analysis differs from one operator to another. In terms of liquidity analysis, each bank's foreign exchange operator rates the MAD according to the foreign exchange operators backing the commercial transactions he receives from his customers, the amount of his bank's equity capital authorized by the Bank Al-Maghrib, and his bank's strategic objective. Indeed, the customer portfolio, the percentage of equity capital, and the bank's strategic objective differ from one bank to another and may lead dealers to adopt subjective judgments and heterogeneous behaviors. These findings tend towards the postulate that the principle of agent heterogeneity influences price formation (Akin, 2012), and adhere to the results of Cheung, Chin, and Marsh (2004) and Menkhoff (2010) who raised the issue of actor heterogeneity.

## Conclusion

The ultimate aim of this research work was to explore and interpret the behavior of Moroccan foreign exchange operators regarding their MAD analysis practice. Our findings indicate that MAD analysis practice involves a two-fold mobility issue, namely the analysis of the EUR/USD exchange rate and liquidity analysis. The primary contribution was shedding light on the phenomenon of MAD analysis practiced by foreign exchange operators in Moroccan trading rooms, particularly in the context of a transition towards a more flexible exchange rate regime initiated by Moroccan monetary authorities.

Furthermore, the objective encompassed delivering a practical contribution, primarily targeted at foreign exchange professionals, through the elucidation of diverse facets within the MAD analysis methodology. The challenge we had set ourselves was to provide Moroccan foreign exchange dealers with a clear picture of the knowledge involved in analyzing the MAD.

However, our intention was not to provide concrete solutions to the problems faced by exchange operators, but rather to explicitly elucidate the phenomenon by highlighting the current context of transitioning towards a more flexible exchange rate regime.

In this paper, we have adopted a qualitative methodological approach to the phenomenon of the practice of analyzing the Moroccan dirham. Our research problem could not be approached in any other way, given that we are working in unexplored terrain whose facets are not likely to emerge from a purely quantitative approach. As a result, the subjective character of our research strongly dominated. We had to develop the capacity for empathy to interpret subjective meanings as correctly as possible. Subjectivity bias can emanate from our respondents' answers. Indeed, our respondents' words may be confronted with a rationalization bias using which they try to provide a coherent representation of the phenomenon they reveal, just as they may be selective in their element of answers by evoking only those they remember. We were also often confronted with an interpretation bias that may arise not only in the coding phase of the data collected but even more so in the content analysis phase of the constructs obtained. To reduce the researcher's interpretation bias, we subjected our collected data to double encoding.

The results obtained are purely qualitative in scope, and their interpretation and understanding are highly dependent on the context of the study. However, it would be appropriate to explore other foreign exchange markets, using the same methodological approach, to understand the currency analysis practices of foreign exchange traders in their particular context, and to validate the transferability criterion. In this sense, it is plausible to explore the behavior of foreign exchange dealers, by way of illustration, in the Tunisian and Algerian foreign exchange markets, or countries belonging to the MENA region, given that their foreign exchange regimes have several criteria similar to those of the Moroccan foreign exchange market, namely the tendency to adopt more flexible regimes, and the fluctuation of their currencies is highly sensitive to the EUR/USD exchange rate.

To conclude, it would be relevant and instructive, in the same perspective of research relating to the analysis of the MAD, to also take an interest in the behavior of the treasury managers of leading Moroccan companies and the foreign exchange operators of the trading room of the Office Chérifien des Phosphates, within the framework of quantitative research, while exploiting the results obtained by this modest study. It will also be a natural and essential extension of this research to borrow the heterogeneous agent model, more specifically the chartist-fundamentalist agent model of Frankel and Froot (1986), Laurent (1995), and

Vigfusson (1997), to study the dynamics of the MAD, while integrating the "liquidity level" variable into the fundamentalist forecast specification, thus representing the impact of the exchange rate reform.

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