International Journal of Strategic Management and Economic Studies (IJSMES)
ISSN: 2791-299X

Efficiency Trends and Challenges in MENA Financial Markets

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Abstract: A cornerstone of modern financial theory, with many theoretical and practical implications, the theory of the informational efficiency of financial markets plays an important role in the day-to-day practice of market finance.

Developed by Eugene Fama in 1965, this theory has been the subject of several empirical tests in different financial markets. Many studies have attempted to verify the truth or falsity of this hypothesis in different types of markets, often developed; however, few studies have focused on developing markets, especially those in the MENA region.

The aim of our study is to verify this hypothesis in this region, by analyzing the time series of daily logarithmic returns of the main stock market indices in a sample of 7 countries with different characteristics, using a range of econometric tests including normality and serial autocorrelation tests. We then attempt to explore the factors likely to explain the efficiency or inefficiency of these markets, using probit modeling.

Keywords: Financial markets efficiency; Autocorrelation test; MENA Region ; Probit model.

Digital Object Identifier (DOI): https://doi.org/10.5281/zenodo.13623053

Published in: Volume 3 Issue 4

1. Introduction :

Financial markets play a predominant role in the development of economies. In addition to enabling the allocation of public savings, these markets provide a direct link between capital demand and supply at the lowest possible cost; In fact, the equilibrium prices resulting from an increased and continuous confrontation between supply and demand play the role of gauges and indicators of economic health, insofar as the valuation agreed is supposed to be as realistic as possible, and must incorporate all available information in its formation.

This is precisely what the theory of the informational efficiency of markets assumes; in the sense provided by (Fama, 1965) that asset prices in markets reflect all available information and that investors cannot systematically achieve superior returns.

This idea has been widely studied in the context of developed markets, but remains relatively unexplored in emerging and developing economies, notably in the MENA region.

The MENA region comprises a group of countries located in the Middle East and North Africa, whose economies are growing rapidly and becoming increasingly integrated into the global economy. These countries have diversified financial markets, ranging from established stock exchanges to developing emerging markets. Despite significant economic progress in the economies of its countries, the MENA region faces specific challenges, such as shortcomings in corporate governance, financial transparency and access to information.

In this complex context, it is crucial to understand the degree of informational efficiency of MENA's financial markets. Such an understanding can help inform investment decisions, improve financial regulation and promote economic stability in the region.

This work therefore aims to verify the efficiency of the region's markets and to explore the factors likely to explain the results of our work. It therefore makes a significant contribution to the financial literature in order to understand the dynamics of these markets and to shed light on the decisions of the investors who operate in them.

2-Litterature review

The main objective of this literature review is to provide a synthesis of the existing literature on the subject of financial market efficiency, by identifying the key concepts, theories and methodologies most relevant to the field. It then assesses the current state of knowledge on the subject, and identifies gaps and opportunities for future research.

2-1 Définitions and key concepts about efficiency :

The concept of the informational efficiency of financial markets dates back to 1900 with the work of (BACHELIER, 1900), who analyzed stock price movements through their time series, comparing them to a random walk. His conclusions show that financial asset prices are unpredictable, and he summarized his findings as follows: at any given moment, the probability of stock prices going up or down is equal, because the market considers the current price to be the most current and probable, and if it judged otherwise, it would have matched the asset to another price.

Far ahead of their time, Bachelier's work was the first to test a series of stock market returns, and it wasn't until the early 1960s that other authors, including Samuelson (1965), turned their attention to the same subject.

The main question in these studies was whether or not successive price changes follow a random walk, given that if this is the case, knowledge of historical price and profitability series cannot be used to predict prices and thus develop abnormally profitable strategies, and it was at this point that the theory was born.

The main references on the efficiency of financial markets are the research carried out by Eugene FAMA (1965.1970.1991). He was able to mark the beginning of the modern literature on this subject, firstly by providing a definition of an efficient market as one in which prices fully incorporate the information available, and then by subsequently distinguishing between three hierarchical forms of efficiency corresponding to three progressive levels: the weak form, the semi-strong form and the strong form of informational efficiency. It should be noted that this is not the only definition provided by modern literature; several other definitions have followed, including that of (Jensen, 1978) and (BAEVER ,1981).

From the perspective of financial theory, efficiency is a concept that can take on several dimensions, and there are generally three types of financial market efficiency: allocative efficiency, operational efficiency (also known as functional efficiency) and informational efficiency (Bauer, 2004).

2-2 Types of efficiency :

Operational efficiency: Operational efficiency focuses on the market's ability to facilitate transactions smoothly and at minimal cost. An operationally efficient market has the following characteristics:

- Low transaction costs
- High liquidity
- Fast transaction execution
- Robust infrastructure .

Informational efficiency : Informational efficiency assesses the extent to which securities prices reflect all relevant available information. An informationally efficient market is characterized by rapid integration of information, enabling accurate reflection of the intrinsic value of assets, and also by the absence of market anomalies.

Allocative efficiency: Allocative efficiency examines the effectiveness of the market in allocating financial resources to the most productive investments. An efficient market in this sense allows for optimal Investments insofar as Financial resources are channeled towards projects and companies that offer the highest risk-adjusted returns, thus contributing to overall economic growth and also through adequate diversification and Absence of waste -.

It's important to note that these three forms of efficiency are interconnected. Operational efficiency facilitates the smooth flow of information, which in turn contributes to informational efficiency. Similarly, effective information enables investors to make better decisions, which in turn promotes a more efficient allocation of capital.

2-3 Efficiency studies in Mena market:

The region's financial markets have grown significantly in recent decades, with increases in market capitalization and liquidity. However, they remain relatively underdeveloped compared with the developed financial markets of the West.

Financial market efficiency tests in the MENA region are therefore important to assess the ability of the region's financial markets to effectively integrate available information.

This enables investors and analysts to better understand the region's investment risks and opportunities. There are different types of financial market efficiency tests, such as the unit root test (URT), the cointegration test and the regression test, which are generally based on historical data on the prices and volumes of financial assets in the region.

The results of these tests can help investors and analysts to assess the liquidity and volatility of MENA financial markets, and to make more informed investment decisions.

To this end, (Al-Khazali et al., 2007)studied the behavior of stock market indices in eight MENA countries, including Bahrain, Kuwait, Jordan, Morocco, Oman, Saudi Arabia, Tunisia and Egypt, over the period 1994-2004, and concluded that none of these markets were random, due to their youth and the low number of transactions.

(Chow & Denning, 1993) in addition to unit root tests, their results assume that MENA market returns are stationary, with the presence of structural pauses, and concluded that these markets were close to the state of low efficiency, which would be a good prospect for them.

(Ahmed, n.d.) used the same battery of tests to verify the hypothesis of low efficiency in MENA markets, concluding that they were inefficient in the weak sense.

(Harrison & Moore, 2012) also analyzed the efficiency of MENA markets using the (State space) model and autocorrelation tests, demonstrating that, with the exception of the Jordan and Dubai stock exchanges, the time series of returns on the various MENA markets were autocorrelated.

(Lahmiri, 2013)in almost , the same work showed, firstly, that stock market returns in Kuwait, Tunisia and Morocco are predictable. In other words, investors can use past prices to predict future returns and make profits on these markets. Secondly, the null hypothesis of a random walk is rejected in Jordan and Saudi Arabia. This result indicates that stock markets in Jordan and Saudi Arabia are efficient in weak form.

(Elhami & Hefnaoui, 2018)conducted an empirical study on the efficiency hypothesis of financial markets in the MENA region covering the period from May 2005 to April 2012 on the stock market indices of Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Tunisia, United Arab Emirates, then the GCC group of markets and the group of all Arab markets using variance ratio tests developed by

A study by (Derbali, 2019)examined market efficiency in MENA emerging and frontier markets through a set of tests, autocorrelation, runs, unit root and multiple variance ratios, over a 7-year period, the results show mixed results for different indices. However, the emerging and frontier market series and returns indicate market inefficiencies. The study also finds that the daily and weekly returns of market indices do not follow random markets, and concludes that investors can obtain the flow of arbitrage profits due to the inefficiency of markets belonging to these countries.

The empirical study carried out on Arab countries by (Ahmed, 2020) to test the efficiency of their stock markets concluded that their markets are inefficient. The KPSS test revealed inefficiency, while the individual variance ratio and multiple variance ratio tests confirmed it. Inefficiency can have several causes: different market sizes, liquidity of securities. Despite the various reforms in these countries, the empirical study carried out on Arab countries in order to improve the attractiveness of their financial markets.

3-Research methodology:

3-1 Constitution of the representative sample:

The study's sample comprises seven MENA countries carefully selected to maximize its representativeness and significance. These countries, namely Morocco, Tunisia, Egypt, Qatar, Bahrain, Jordan, and the United Arab Emirates (UAE), exhibit a rich tapestry of economic and financial characteristics. This diversity ensures that the study's findings encompass a broad spectrum of MENA market dynamics, enhancing the generalizability and applicability of the results.

The chosen countries represent varying stages of economic development, from emerging markets like Morocco and Tunisia to more developed economies like Qatar and the UAE. This inclusion allows for a nuanced understanding of how efficiency patterns evolve alongside economic maturity, providing valuable insights for investors and policymakers.

Furthermore, the selected countries boast stock exchanges with varying levels of liquidity and market infrastructure. This diversity enables the study to explore the interplay between market characteristics and efficiency levels, shedding light on factors that contribute to market transparency, transaction costs, and corporate governance practices.

In essence, the strategic selection of these seven MENA countries transforms the study into a comprehensive examination of stock market efficiency across the region. The rich diversity of the sample ensures that the findings are not only statistically significant but also highly relevant to understanding the unique dynamics and challenges faced by MENA's financial markets.

3-2 Analysis period:

This study examines the efficiency of stock markets in seven MENA countries: Morocco, Tunisia, Egypt, Qatar, Bahrain, Jordan, and the UAE. Employing the Fama-French three-factor model over an extensive period from January 1, 2000, to December 31, 2020, the study reveals varying degrees of efficiency across markets, influenced by factors like market size, liquidity, and global events.

The extended study period allows for a comprehensive analysis of efficiency patterns, long-term trends, and robust findings, offering valuable insights for investors, policymakers, and researchers seeking to understand and enhance MENA's financial landscape.

3-3 Autocorrelation tests:

The main aim of this stage is to assess the low efficiency of the markets concerned.

Serial autocorrelation is a statistical measure that examines the correlation between values in a time series at different time lags. It can be used to detect the presence of dependency between successive observations. In the financial context, this can indicate the existence of persistent patterns or trends in financial asset prices.

To test for weak market efficiency, we are particularly interested in the serial autocorrelation of the indices under study. If these markets are weakly inefficient, we expect to observe significant autocorrelation in the time series of index returns. This would mean that it is possible to predict, to some extent, future price movements from past information.

The autocorrelation function measures the serial correlation between variable k at time t and the same lagged variable at time t-k, where k is the lag, and is expressed as :

$$\rho_k = \frac{cov(R_t, R_{t-k})}{\sigma_{R_t} . \sigma_{R_{t-k}}}$$

$$\rho_k = \frac{\sum_{t=1}^{t=n-k}(R_t - \bar{R})(R_{t-k} - \bar{R})}{\sqrt{\sum_{t=1}^{t=n-k}(R_t - \bar{R})^2} . \sqrt{\sum_{t=1}^{t=n-k}(R_{t-k} - \bar{R})^2}}$$

If the number of observations is large, which is the case in our study, the sampling autocorrelation formula can be used (Régis Bourbonnais, n.d.), which is more handy:

$$\rho_k = \frac{\sum_{t=1}^{n-k}(R_t - \bar{R})(R_{t+k} - \bar{R})}{\sum_{t=1}^{n}(R_t - \bar{R})^2}$$

Where :

N: the number of observations.

$\bar{y}$:the average price.

Since the serial autocorrelation coefficient measures the degree of dependence of a variable on its time-lagged historical value, a zero ρ_k indicates that the price change is not autocorrelated, or that price changes are correlated, zero autocorrelation is a sign of the validity of the efficiency hypothesis in the weak sense, as it shows that past profitability does not influence future prices, or in other words, that historical information has already been incorporated into the price (Fama, 1970).

In view of the literature review, to test whether serial autocorrelation is significantly different from zero at a significance level of 5%, we put forward the following null and alternative hypotheses:

$$H_0 : \rho_k = 0 \qquad H_1 : \rho_k \neq 0$$

We can use an autocorrelation coefficient hypothesis test based on the comparison of an empirical Student's t with a theoretical t. Indeed, (Quenouille, 1949) showed that if the number of observations is greater than 30 (n>30) the correlation coefficients follow a normal distribution with zero expectation and standard deviation σ=1/√n ,

$$\rho_k \sim N(0; \frac{1}{\sqrt{n}}).$$

The confidence interval is then $\rho_k = 0 \pm t^{\frac{\alpha}{2}}\left(\frac{1}{\sqrt{n}}\right)$

If ρk is outside the confidence interval, it is considered significantly different from zero at the α threshold. With $t = \frac{\widehat{\rho_k}}{\sigma(\rho_k)}$ and :

$$\sigma(\rho_k) = \frac{1}{\sqrt{N}} \sqrt{1 + 2\sum_{1}^{n-k} {\rho_k}^2}$$

Insignificant autocorrelations for all lags would indicate that markets are efficient, and can follow a random walk, and vice versa, autocorrelation at a certain lag significantly different from zero will lead us to reject the hypothesis of market efficiency in the weak sense.

3-4 Analysis of factors explaining efficiency and inefficiency :

In this step, we try to determine the factors explaining the efficiency and inefficiency of financial markets in the MENA region. To do this, we define the PROBIT model as follows:

$$Y_m = f(X_m)$$

Where 1≤m≤7 represent the market in question ,and Y_m represents a binary variable taking 1 in the case of an efficient market and 0 in the case of inefficiency and Xm being the variables likely to explain efficiency.

$$P(Y = 1) = G(\beta_1 + \beta_2 X_1 + \cdots + \beta_5 X_5)$$

In this sense, the proposed variables are as follows:

The number of companies listed on the market: This variable takes into account the diversity of choice offered to investors in the market.

Market capitalization as % of GDP: The role of this variable is to measure the size of the market in relation to the economy in which it operates.

Market age: This is the difference between the market's creation date and the current year (2022).

Turnover ratio: As an instrument for measuring market liquidity, the introduction of this variable was inspired by the work of (Bouzia, 2020), who demonstrated the link between liquidity and market efficiency.

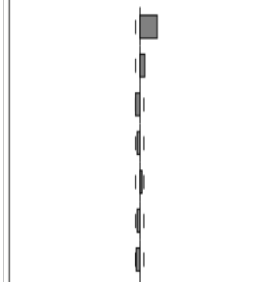
Legal environment variables: developed by (Kaufmann et al; 2011), these ratios describe the legal environment in the countries studied. They can be collected from the website: www.govindicators.org

4-Results :

4-1 Auto-correlation test :

MADEX :

Date: 11/06/21 Time: 11:23
Sample: 1 2490
Included observations: 2490

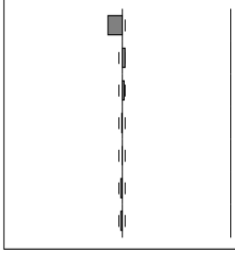


Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.152	0.152	57.928	0.000
		2	0.047	0.024	63.356	0.000
		3	-0.041	-0.052	67.480	0.000
		4	-0.023	-0.011	68.834	0.000
		5	0.023	0.033	70.172	0.000
		6	-0.021	-0.031	71.299	0.000
		7	-0.030	-0.027	73.520	0.000

Figure 1 : Corrélogramme index MADEX

TUNINDEX :

Date: 11/23/22 Time: 17:17
Sample: 1 5000
Included observations: 4999

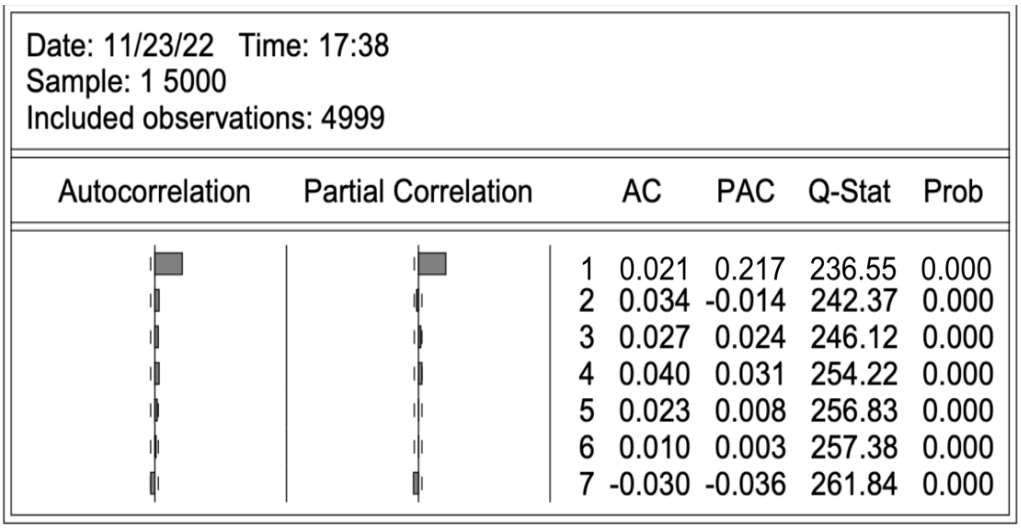


Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.133	-0.133	88.070	0.000
		2	0.028	0.011	92.125	0.000
		3	0.022	0.027	94.494	0.000
		4	-0.007	-0.001	94.721	0.000
		5	0.003	0.001	94.773	0.000
		6	-0.016	-0.016	96.002	0.000
		7	-0.013	-0.017	96.871	0.000

Figure 2: Corrélogramme index TUNINDEX

EGX :

Date: 11/23/22 Time: 17:38
Sample: 1 5000
Included observations: 4999

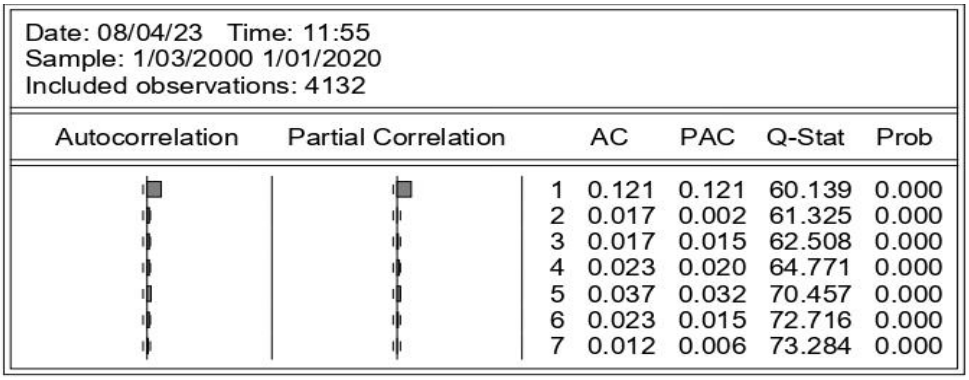


Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.021	0.217	236.55	0.000
		2	0.034	-0.014	242.37	0.000
		3	0.027	0.024	246.12	0.000
		4	0.040	0.031	254.22	0.000
		5	0.023	0.008	256.83	0.000
		6	0.010	0.003	257.38	0.000
		7	-0.030	-0.036	261.84	0.000

Figure 3 : Corrélogramme index EGX

QSI :

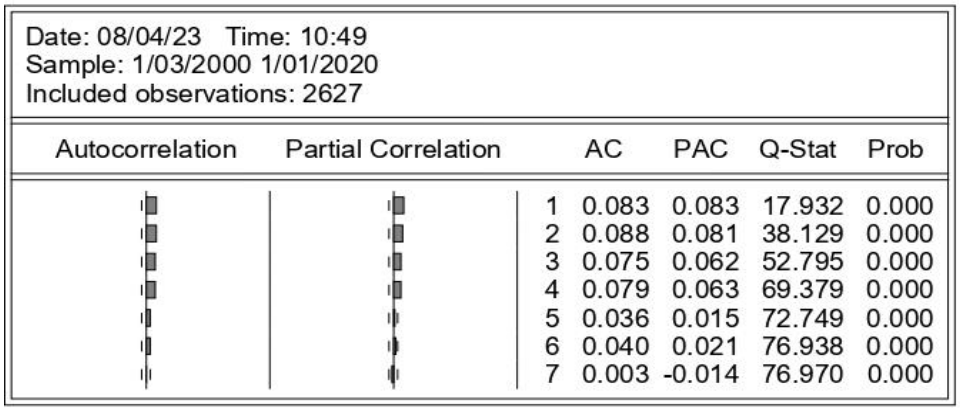
Date: 08/04/23 Time: 11:55
Sample: 1/03/2000 1/01/2020
Included observations: 4132



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.121	0.121	60.139	0.000
		2	0.017	0.002	61.325	0.000
		3	0.017	0.015	62.508	0.000
		4	0.023	0.020	64.771	0.000
		5	0.037	0.032	70.457	0.000
		6	0.023	0.015	72.716	0.000
		7	0.012	0.006	73.284	0.000

Figure 4 : Corrélogramme index QSI

BAX :

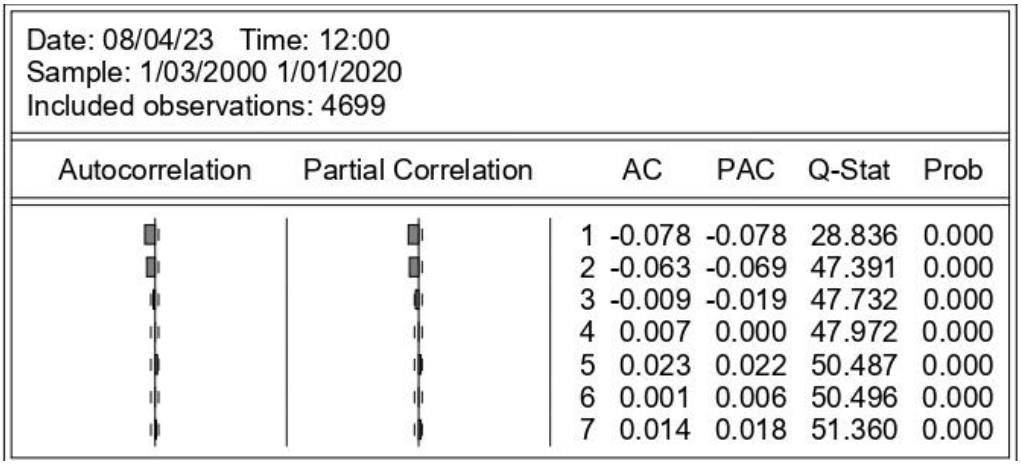


Date: 08/04/23 Time: 10:49
Sample: 1/03/2000 1/01/2020
Included observations: 2627

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.083	0.083	17.932	0.000
		2	0.088	0.081	38.129	0.000
		3	0.075	0.062	52.795	0.000
		4	0.079	0.063	69.379	0.000
		5	0.036	0.015	72.749	0.000
		6	0.040	0.021	76.938	0.000
		7	0.003	-0.014	76.970	0.000

Figure 5: Corrélogramme index BAX

AMMAN ALLSHARES :



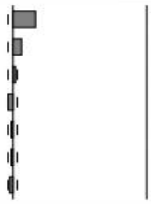
Date: 08/04/23 Time: 12:00
Sample: 1/03/2000 1/01/2020
Included observations: 4699

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.078	-0.078	28.836	0.000
		2	-0.063	-0.069	47.391	0.000
		3	-0.009	-0.019	47.732	0.000
		4	0.007	0.000	47.972	0.000
		5	0.023	0.022	50.487	0.000
		6	0.001	0.006	50.496	0.000
		7	0.014	0.018	51.360	0.000

Figure 6 : Corrélogramme index AMMANALLSHARES

DFMGI :

Date: 08/04/23 Time: 10:42
Sample: 1/03/2000 1/01/2020
Included observations: 3252



	AC	PAC	Q-Stat	Prob
1	0.174	0.174	98.017	0.000
2	0.074	0.045	115.62	0.000
3	0.019	-0.001	116.83	0.000
4	-0.034	-0.042	120.61	0.000
5	-0.012	-0.001	121.11	0.000
6	-0.009	-0.002	121.36	0.000
7	-0.024	-0.021	123.25	0.000

Figure 7 : Corrélogramme index DFMG

The results of the tests for low efficiency for the sample markets selected are shown in the table below; we have calculated the serial autocorrelation coefficients up to the 7th lag; the chosen significance level is 5%, and the results show that 5 markets in the sample are weakly efficient, given the insignificance of their autocorrelation coefficients up to the 7th lag: these are the markets of Egypt, Bahrain, Jordan and the United Arab Emirates. While the Moroccan, Tunisian and Qatari markets are deemed inefficient, given the significance of their particularly first-order autocorrelation coefficients. This means that today's price depends significantly on the previous day's price, which is contrary to the assumption of market efficiency, which considers that prices should follow a random walk process.

The table below summarizes the results obtained for the different markets:

COUNTRY	INDEX	PAC LAG						
		1	2	3	4	5	6	7
MAROC	*MADEX*	0,152**	0,024	-0,052	-0,011	0,033	-0,031	-0,027
TUNISIE	*TUNINDEX*	-0,13**	0,028	0,022	-0,07	0,003	-0,016	-0,013
EGYPTE	*EGX 30*	0,027	0,034	0,027	0,04	0,023	0,01	-0,003
Qatar	*QSI*	*0,121***	*0,0017*	*0,0017*	*0,0023*	*0,0037*	*0,0023*	*0,0012*
BAHRAIN	*BAX*	*0,083*	*0,088*	*0,075*	*0,079*	*0,036*	*0,04*	*-0,014*
Jordanie	*AMGNRLX*	*-0,078*	*-0,063*	*-0,009*	*0,007*	*0,023*	*0,001*	*0,014*
U.A.E.	*DFMGI*	0,066	0,031	0,008	0,038	0,060	0,003	0,027

Table 1 : Recap of the Autocorrelation tests conducted

4-2 Probit modelisation :

The model summary provided shows the measures of fit and overall results of our binary logistic regression model.

Cox-Snell R-two: Cox-Snell R-two is also a measure of overall model fit. It represents the proportion of variation explained in the dependent variable (efficiency) by the model.

The Cox-Snell R-two value of 0.734 indicates that your model explains around 73.4% of the variation in the dependent variable.

Nagelkerke R-two: The Nagelkerke R-two is another measure of overall model fit that is also based on the Cox-Snell R-two. It is generally considered to be a more accurate estimate of the R-two.

In our case, the Nagelkerke R-two is 90.8%, which indicates that your model fits the variation in the dependent variable very well.

		B	E.S	Wald	ddl	Sig.	Exp(B)
Pas 1[a]	AGE	3,798	1519,750	,000	1	,004	,022
	NBVAL	1,513	624,165	,000	1	,998	4,542
	MAKETCAP	2,100	5765,923	,000	1	1,000	8,168
	GOV_EFF	6,481	19124,812	,000	1	,002	,002
	Constante	283,510	905969,638	,000	1	1,000	1,340E+123

a. Introduction des variables au pas 1 : AGE, NBVAL, MAKETCAP, GOV_EFF.

The variables included in the model equation are as follows:

AGE :

The coefficient associated with AGE is 3.798 with a high standard error of 1519.750, meaning that the effect of market age on the informational efficiency of financial markets is positive. However, with a Sig. value of 0.004, which is below the 0.05 threshold, market age is statistically significant. This suggests that older financial markets tend to be more efficient.

NBVAL (Number of listed stocks):

The coefficient for NBVAL is 1.513 with a standard error of 624.165. However, the associated Sig. value is very high (0.998), indicating that it is not statistically significant. This suggests that the number of stocks listed on the market does not have a significant effect on its informational efficiency.

MAKETCAP (Market Capitalization):

The coefficient for MAKETCAP is 2.100 with a high standard error of 5765.923. The Sig. value is 1.000, indicating that MAKETCAP is not statistically significant in this model. This suggests that market capitalization does not have a significant effect on the informational efficiency of financial markets as measured in this analysis.

GOV_EFF (Government efficiency):

The coefficient for GOV_EFF is 6.481 with a very high standard error of 19124.812. However, the Sig. value is very low (0.002), indicating high statistical significance. This suggests that government efficiency, as measured by this indicator, has a significant effect on the informational efficiency of financial markets. A positive coefficient indicates that effective public policies can promote financial market efficiency.

Constant :

The constant has a coefficient of 283.510 with a very high standard error of 905969.638. Its Sig. value is very low (1.340E+123), indicating high statistical significance. However, interpretation of the constant in this context is limited, as it simply represents the level of informational efficiency when all other variables are zero (which may not make sense in this context).

In summary, in this binary logistic regression model, market age and government efficiency appear to be statistically significant in explaining the informational efficiency of financial markets. This suggests that older financial markets and effective public policies may contribute to better informational efficiency in financial markets. However, the number of listed stocks and market capitalization do not appear to have a significant effect in this model and in our study.

5-Discussion :

The analysis of serial autocorrelations revealed some interesting results. Only five markets in the sample were considered efficient, i.e. they showed a significant absence of serial autocorrelations in returns. The remaining markets showed significant autocorrelations, indicating a dependence of past returns on future returns. This suggests potential inefficiency in these markets.

These results highlight the importance of an in-depth analysis of the specific characteristics of each financial market in the MENA region. Economic, political and institutional differences may have an impact on market efficiency and need to be taken into account in future assessments.

The probit model was used to identify the determinants of financial market efficiency in the MENA region. Variables such as market age, number of listed stocks, market capitalization and government efficiency were included in the model.

The results showed that two variables have a significant impact on market efficiency.

Market age was identified as an important factor, indicating that newer markets tend to be less efficient. This may be explained by the fact that emerging markets need time to develop effective institutions and mechanisms.

Finally, government efficiency has also been identified as a significant determinant of market efficiency. Better government efficiency is associated with a greater likelihood of efficient financial markets. This underscores the importance of a strong and transparent regulatory framework to foster efficient financial markets in the MENA region.

Our research findings have important implications for investors, regulators and policymakers in the MENA region. By understanding the determinants of financial market efficiency, appropriate measures can be taken to promote more efficient markets and a more effective allocation of resources.

6- Conclusions and recommendations :

In light of the results of our research, several recommendations can be formulated to improve the efficiency of financial markets in the MENA region and thus strengthen the international competitiveness of its markets.

- To improve the efficiency of financial markets in the MENA region, it is essential to strengthen financial regulation and promote transparency. Regulatory authorities should implement clear and consistent rules to guarantee the integrity of transactions, protect investor rights, and prevent fraudulent practices.
- In addition, listed companies should be required to disclose their financial information, performance, and risks in a transparent and comprehensive manner.
- A strong regulatory framework and increased transparency would foster investor confidence and contribute to greater efficiency in financial markets.

Strengthening access to financial data:

- To improve research on the efficiency of financial markets in the MENA region, it is crucial to facilitate access to complete and reliable financial data. Financial authorities should work in collaboration with financial institutions and researchers to promote the collection, management, and dissemination of financial data.
- This could include setting up centralized databases, improving data collection protocols, and promoting collaboration between market players and researchers. Easier access to financial data would allow for a more in-depth analysis of the efficiency of financial markets and promote academic research and informed decision-making.

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