

THE VALIDITY OF FAMA AND FRENCH THREE-FACTOR MODEL IN AN EMERGENT MARKET: EVIDENCE FROM QATAR QTOCK EXCHANGE

-An analytical study in the short run-

صحة نموذج فاما وفرانش ثلاثي العوامل في سوق مالي ناشئ: حالة بورصة قطر للأوراق المالية
-دراسة تحليلية في الأجل القصير-

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Abstract:

The study aimed to explain the variations in stock returns in the short term by testing the validity of the Fama and French three-factor model and the three risk factors (**Rm-Rf**; **logMVE**; **B/M**) were used as explanatory variables in the Qatar Stock Exchange. A sample of 13 banks listed in the Qatar Stock Exchange (QSE) was conducted with weekly data, using the Panel data regression models during the period from 10/01/2019 to 31/12/2019.

It was concluded in the empirical results that the market risk premium (**Rm-Rf**) has a positive significant impact on the dependent variable (**Ri-Rf**) of the study, while both the size risk factor (**logMVE**) and value risk factor (**B/M**) are not explanatory factors for stock returns.

Keywords: Fama and French Three-Factor Model, CAPM, Stock Returns, QSE.

Jel Classification Codes: G11, G12, G14, G40.

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ملخص:

هدفت الدراسة إلى تفسير التغيرات الحاصلة في عوائد الأسهم في المدى القصير من خلال اختبار صحة نموذج فاما وفرانش ثلاثي العوامل باستخدام عوامل المخاطرة الثلاث كمتغيرات مفسرة في بورصة قطر للأوراق المالية، وتم الاعتماد على عينة مكونة من 13 بنك قطري مدرجة في البورصة بواسطة بيانات أسبوعية، وتم استخدام طريقة نماذج بانل لتقدير نموذج الدراسة خلال الفترة الممتدة من 2019/01/10 إلى 2019/12/31.

وتم التوصل إلى أن متغير علاوة مخاطرة السوق لديه أثر معنوي موجب على المتغير المستقل للدراسة، في حين أن كل من متغير الحجم ومتغير القيمة لا يعتبران كعوامل مفسرة لتغيرات عوائد الأسهم. **كلمات مفتاحية:** نموذج فاما وفرانش ثلاثي العوامل، نموذج تسعير الأصول الرأسمالية، عوائد الأسهم، بورصة قطر للأوراق المالية.

تصنيف JEL : G40, G14, G12, G11.

1. INTRODUCTION:

Stocks are the most important and the most traded instruments in financial markets, this fact makes the process of returns valuation extremely important when making investment decisions based on its risk analysis. Many studies and theories that studied the relationship between return and risk emerged. From Markowitz's theory to the CAPM model to the Fama and French three-factor model, these studies are considered to be the basis for subsequent financial theory.

This study aims to test the relationship between the return and the three risk factors present in the Fama and French three-factor model as well as their interpretation, by applying the model to all banks listed on the Qatar Stock Exchange as being the most important emerging stock market in the Arab world.

The first section of the study represents the introduction, structure, and covering the area, aims, objectives and the problematic of the study, As well as the literature review and previous studies, while the second section provides research Methodology and Data. The third section addressed the Empirical results, finally the fourth section include discussion of the results and conclusion.

1.1. Research problem and hypotheses:

The process of Analyzing and estimating stock prices and the related returns is one of the most important tools and subjects in financial theory, as it helps investors and financial analysts in pricing process. To achieve the objectives of the study we have addressed the following problematic:

- **Does the application of the Fama French three-factor model help to explain the variations of stocks returns on the Qatar Stock Exchange?**

In order to answer the problematic of the study, Hypotheses to be tested are as follows:

- **H1:** The Market Risk Premium ($R_m - R_f$) has a significant impact on the Returns of the stocks in QSE.
- **H2:** The Size Risk Factor ($\log MVE$) has a significant impact on the Returns of the stocks in QSE.
- **H3:** The Value Risk Factor (BV/MV) has a significant impact on the Returns of the stocks in QSE.

1.2. Research importance:

- The study of stock price behavior is considered one of the most important and oldest topics in finance, beginning with the attempt of Bachelier 1900 to study random prices until the end of the last study of Fama 2014.
- Investors, financial analysts and academics are interested in valuing stocks as well as their returns because the evaluation process is a tool that helps determine the fair value and compare it with the market value in order to maximize returns and reduce risks.
- The continuous evaluation of the various financial models used in capital markets and the Fama-French model is one of these models under the theory of financial markets efficiency (EMH) is very important in order to develop it, and overcome the criticism casted against it by the proponents of behavioral finance theory.

1.3. Research aims:

- Test the ability of the Fama French three-factor model to estimate returns on the Qatar Stock Exchange.
- Analyze the efficacy of the risk factors in this model to explain variation in stock returns.
- Evaluating the Fama and French model after testing it in the stock market in Qatar in light of the criticisms casted against it and the EMH theory by behavioral finance.

1.4. Literature review:

Harry Markowitz was the first to associate financial return with risk, and that was in 1952 through his use of the mean and the variance that resulted in a direct correlation between stock returns and their financial risks. This was later called the portfolio theory of Markowitz, which formed the cornerstone of

subsequent financial studies as well as modern financial theory. After what Markowitz presented the cornerstone of the development of modern financial theory by his contribution to discovering the relationship between stocks returns and their risks as well as introducing the concept of diversification to reduce portfolio risks (**Markowitz, 1952, pp. 77-91**), Tobin in 1958 tried to optimize the utility function for investors and the returns of assets, which formed the theoretical framework for the process of maximizing the returns of stocks or assets at a certain level of risk or vice versa (**Tobin, 1958, pp. 68-85**).

After several years, (**Sharpe, 1964, pp. 425-442**), (**Lintner, 1965, pp. 13-37**), (**Mossin, 1968, pp. 215-229**), then (**Hamada, 1972, pp. 435-452**) tried to build and develop a model for pricing assets by incorporating returns and risk into this model. Which was later called the capital asset pricing model **CAPM**, and it is the first of its kind that has been used to evaluate stocks prices and capture returns in financial markets in light of the theory of financial market efficiency (**EMH**) developed and submitted by (Fama, 1965) which assumes the concept of fair pricing of stocks through the proper flow of information, as well as the rationality of Investors.

While, the credibility and reliability of the **CAPM** model were tested by many researchers, led by (**Jensen, Black, & Scholes, 1972, pp. 79-121**) and (Merton, 1973) as well as Ross in 1976, who did not find any evidence to support this model as it is limited to the beta coefficient to measure the risks of stocks or financial assets. After many criticisms of the **CAPM**, (**Ross, 1976, pp. 341-360**) developed a model called the (**APT**) arbitrage pricing theory which is the generalized form of the CAPM model with some modifications which in turn has been criticized by Roll in 1977, Stock pricing problems and financial anomalies experienced by financial markets in light of the succession of crises and shocks led to an increase in criticism of the CAPM model, which can no longer explain the variation in stock prices and returns.

Over the years scientific research continued to develop CAPM, which was unable to fully explain the returns of stocks and financial assets until the study of (**Banz, 1981, pp. 3-18**) came to be the real start in developing stock pricing models by introducing new variables to the old model along the lines of the size effect, then (**Rosenberg, Reid, & Ronald, 1985, pp. 9-17**) and (**Chan, Hamao, & Lakonishok, 1991, pp. 1739-1764**) studied the effect of the book value-to-market ratio (BV/MV) on stock returns.

These efforts prompted **(Fama & French, 1992, pp. 427-465)** to bring about an alternative model to explain the variations in stocks returns by including the beta variable, BV/MV ratio, leverage, and the company's size variable, and they concluded that there was no effect or relationship between each of the two variables Leverage and beta with stock returns. After that in 1993, **(Fama & French, 1993, pp. 3-56)** developed their three-risk model (market risk premium variable, size effect and value effect variable) to later become the current Fama and French model.

The Qatar Stock Exchange is considered one of the most important Arab capital markets, as it witnessed many developments in the level of performance, legislation and regulation. It was raised to the emerging financial market in 2013 by Morgan Stanley (**MSCI**) Index, and by **S&P and Dow Jones** in 2014. Also it was promoted to an emerging financial market by the FTSE Index in 2015, and in 2016 it joined the United Nations for Sustainable Stock Exchanges (SSEI) **(QSE, 2020)**.

The year 2018 witnessed great achievements for the Qatar Stock Exchange, as it was ranked as the best performing emerging stock exchange in the world, and also listed the investment funds traded for the first time, which are considered the largest in the Gulf countries with the launch of the **(ESG)** Sustainability Reporting Platform as a leading stock exchange in the world in achieving the standards of environmental and social governance and corporate governance **(QSE, 2018, p. 31)**.

Therefore, the Qatar Stock Exchange **(QSE)** is a perfect emerging financial market to test the validity of the Fama and French Three-Factor model.

1.5. Previous studies

Many studies have been conducted to test the ability and the validation of the Fama and French three-factor model to explain and predict the variations in the stock returns, while other studies investigate whether Fama and French three-factor model performs better than the traditional capital assets pricing model (CAPM).

Through this study, we will present a summary of the most important and prominent previous studies related to the subject.

An empirical study by **(Fama & French, 1992, pp. 427-465)** shows that covariance of portfolio return and market return does not explain variation in

portfolio excess returns. They find that covariance has little or no power in terms of explaining cross-sectional variations in equity returns.

The study of **(Fama & French, 1993, pp. 3-56)** presents a different perspective on asset pricing models. They aim to explain excess portfolio returns with three risk factors. These factors are excess market portfolio return, the difference between the excess return on a portfolio of small stocks and excess return on a portfolio of big stocks, and the difference between the excess return on a portfolio of high-book-to-market stocks and the excess return on a portfolio of low-book-to-market stocks. They find that portfolios constructed to mimic risk factors related to market, size, and book-to-market-equity (BE/ME) have important effects on stock returns. They claim that the model is successful in capturing the cross-section of average returns on U.S. stocks.

(Fama, French, Booth, & Sinquefeld, 1993, pp. 37-41) explain the differences between the returns on the New York Stock Exchange (NYSE) and the National Association of Security Dealers (NASD). Stocks on the NYSE have higher average returns than stocks of similar size on the NASD during the test period. They use the Fama and French three-factor model to explain the difference. Their analysis demonstrates that the reason for this variation is the difference between the risk of the stocks, which is captured by the Fama and French three-risk factor model, Fama and French argue that stocks with high sensitivity tend to be firms with persistently poor earnings, which lead to low stock price and high book-to-market equity ratios. Stocks with low sensitivity to the book-to-market risk factor tend to have persistently high earnings which lead to low BE/ME. They conclude that the book-to-market ratio is the most important risk factor that explains the difference in returns between NYSE stocks and NASD stocks.

On the other hand, there are alternative explanations other than the risk-based view. **(Lakonishok, Shleifer, & Vishny, 1994, pp. 1541-1578)** argue that the abnormal returns than common stocks generate is due to the investors misinterpretation based on the past earnings figures. According to this point of view, investor's overreact to a firm's performance. Investors perceive firms with higher BE/ME as being weak and perceive firms with lower BE/ME as being strong firms. Dependent on this perception, investors misinterpret the future expected earnings figures of these firms.

(Fama & French, 1995, pp. 131-155) test whether variations on stock prices, in relation to size and BE/ME reflect the variations on earnings. Fama and French show that consistent with rational pricing, high BE/ME signals persistent poor earnings, and low BE/ME signals strong earnings. They test their model on NYSE, AMEX, and NASDAQ stock markets. They find that market and size factors in earnings explain the factors in returns but they did not find any relation between BE/ME factors in earnings and returns.

(Kent & Titman, 1997, pp. 1-33) test the Fama and French model on NYSE, AMEX, and NASDAQ for the period 1963-1993. Their findings do not support Fama and French models. They conclude that there is no relation between expected return and Fama- French risk factors.

(Heston, Rouwenhorst, & Wessels, 1999, pp. 9-27) tested whether the Three-Factor Model could capture the variation in common stock returns, by employing data of the firms quoted to twelve European countries. They made an adjustment in the Model, replacing BE/ME factor with a one-period lagged market factor. The results of the study suggested that the Model could not capture the variation in common stock returns.

(Davis, Fama, & French, 2000, pp. 389-406) test the model by extending **Daniel and Titman's** (1997) study from 1929 through 1997. They find a contradicting result with Daniel and Titman. Their study supports the validity of the Fama and French model.

(Connor & Seghal, 2001, p. 379) empirically examine the Fama and French model for India. Their results support the model. They accept that there are many questions unanswered in their study. One of the questions is if the size and value factors pervasive in explaining the risk of a wider range of portfolios.

(Guzeldere & Sarioglu, 2012, pp. 1-19) test the validity of the model on the ISE-100 (Istanbul Stock Exchange) index throughout the years from 1999 to 2011. Monthly returns are analyzed by using the panel data analysis method. The findings of the study support the validity of the Fama and French three-factor model during the study period. It is concluded that this model is a good and powerful alternative to the CAPM.

(Athar & AliPeter, 2017, pp. 1-8) the study empirically examines the Fama and French model for Pakistan Stock Exchange covering forty listed companies using annual data from 1984 to 2012; authors used panel least square

method. Their results support the model. and shows that all independent variables are significant.

2. METHODOLOGY AND MATERIELS

2.1. The data and the sample of the study:

The study population is represented by all 47 companies listed on the Qatar Stock Exchange (QSE). The study sample covers 13 banks that formed the banking sector in Qatar during the period from 01/01/2019 to 31/12/2019 based on a weekly data and the number of observations was 767 (Appendix No1).

The study sample was chosen given:

- Continuous listing and pricing of Qatar banks stocks during the study period.
- The vitality of the Qatar banking sector, as well as the good financial performance and results of these companies.

The data consisting of the study sources were collected by the following sources:

- **Sources of the theoretical part:** scientific articles references pertaining the subject as well as some theses and books.
- **Sources of the practical part:**
 - Reports and financial statements of the Qatar stock Exchange from its official website (<https://www.qe.comqa>).

2.2. Study approach and tools:

In order to explain the variations in stock returns through the three-factor Fama French model, an analytical descriptive approach was used in the theoretical part of the study, in addition to using the statistical analysis approach in the applied part in the study to estimate and analyze the empirical model.

The study tools used were represented in both the Excel software program that was used to calculate and arrange study variables, as well as Eviews 9.0 in order to estimate, test, and evaluate the Econometric model.

2.3. Study methods and model:

In order to achieve the objectives of the study, two types of methods were used.

2.3.1. The Fama and French three-factor model:

The methodology of the study is based on estimating the three asset pricing model of Fama and French to test its ability to explain variation in stock returns through the following three risk factors with some modification about the Size and Value Premiums (SMB replaced by MVE and HML replaced by BV/MV) as follows :

Where:

$$R_i - R_f = a + b_1(R_m - R_f) + b_2(MVE) + b_3(BV/MV) + \epsilon$$

- **R_i** : Return of stock “i”.
- **R_f** : Risk free rate (Government Bond Yield for 2019 is 2.25%).
- **R_i-R_f** : Stock Risk Premium
- **R_m** : Market return which is represented by QSE Index return.
- **R_m – R_f** : Market Risk Premium
- **MVE** : Size Risk factor (Size effect factor) which is represented by the Log Market Value Equity (**Kewei, Chen, & Zhang, 2014, pp. 1-5**).
- **BV/MV**: Value Risk factor (Value effect factor) which is represented by the ratio of Book Value to Market (**Brigham & Ehrhardt, 2011**).
- **a** : Constant.
- **b₁** : Regression coefficient of market risk.
- **b₂** : Regression coefficient of stock “i” for MVE.
- **b₃** : Regression coefficient of stock “i” for BV/MV.
- **ε** : error term.

2.3.2. The OLS Panel data regression model:

Through this study, we will try to measure the effect of each variable of market risk premium **R_m-R_f**, the effect of **log MVE**, and the effect of value B/M on expected financial returns (stock risk premium) **R_i-R_f** to the banking sector on the Qatar Stock Exchange during the period from 10/01/2019 to 12 /31/2019, while the Econometric model is as follows:

$$(R_i - R_f)_{it} = \hat{\beta}_0 + \hat{\beta}_1(R_m - R_f)_{it} + \hat{\beta}_2 \log MVE_{it} + \hat{\beta}_3 B/M_{it} + \epsilon_{it}$$

(i = 1 ... n)(t = 1 ... k)

Represents:

- The dependent variable is: **(R_i – R_f)_{it}**.
- The independent variables were: **(R_m – R_f)_{it}** , **log_MVE_{it}** , and **B/M_{it}** .
- Random error : **ε_{it}** .
- The parameter **β̂₀**, represents the constant.
- They are the estimated parameters of the independent variables respectively **β̂₁**, **β̂₂** , **β̂₃**.
- **(i)** represents banks and **(t)** represents years.

Study models were estimated using the three models of Panel Last Squares data regression (**Baltagi, 2013**):

- 1- Pooled regression Model (PRM).
- 2- Fixed effect Model (FEM) or LSDV.
- 3- Random effect Model (REM).

In order to choose the most appropriate PLS model, both **LM Lagrange** and **Hausmann** tests were used.

3. RESULTS AND EMPIRICAL FINDINGS

3.1. The descriptive statistics of the study variables:

Table 1 shows descriptive statistics of the study variables

Date: 04/20/20 Time: 14:48 Sample: 1/10/2019 12/31/2019				
	RI_RF	RM_RF	LOG_MVE	B_M
Mean	-1.965436	-2.204068	9.597319	0.977951
Median	-2.250000	-2.290000	9.739396	0.964000
Maximum	174.6230	1.840000	10.89984	2.161339
Minimum	-54.01471	-7.930000	8.332118	0.355601
Std. Dev.	8.123983	2.536949	0.750887	0.465157
Skewness	13.71904	-0.599851	-0.019797	0.419556
Kurtosis	299.1549	2.993421	1.740193	2.311239
Jarque-Bera	2827052.	45.99853	50.77165	37.66296
Probability	0.000000	0.000000	0.000000	0.000000
Sum	-1507.489	-1690.520	7361.144	750.0887
Sum Sq. Dev.	50555.32	4930.061	431.8949	165.7400
Observations	767	767	767	767

Source : Eviews 9.0 outputs based on study data prepared by researchers.

Table 1 summarizes the descriptive statistics of the study variables, the average value of the variable **B/M** is (0.97), the banks under study have on average more market values than the book values during the study period, and therefore it can be said that investors through this ratio can be optimistic about the future of stocks, meaning that these shares achieve a rate Return on assets **ROA** is greater than the required return **Re** on average, as it achieves good market performance.

The highest value recorded for **B/M** was (2.16) which is for the **National Leasing Bank** this ratio means that the book value represents more than twice the market value of the bank's share, meaning that the stock achieves bad market performance compared to the book value, the lowest value for **B/M** is (0.3585) for the Qatar Islamic Bank, it turns out that the book value constitutes 35% of the market value of the bank's share, which gives an optimistic indication of the future of the stock.

The standard deviation of the variable **B/M** is the lowest value in relation to other variables and represents the value of the sample concentration.

As for the variable of market risk premium (**Rm-Rf**), the average is -2.20% negative, which means that the market return (**Rm**) calculated by the Qatar Stock

Exchange index in the average is less than the risk-free return r_f , meaning that the market return r_m achieves bad performance during the study period.

Regarding the highest and lowest value of the market risk factor **($R_m - R_f$)**, the former has reached 1.84%, which is normal and less than the expected rate And for the second value is -7.93%, which is a very high loss rate.

As for the standard deviation of this variable, it represents neither the centering value nor the sample dispersion value.

As for the third independent variable, **($\log MVE$)** or the effect of volume, the average value has 9.59 which does not differ much from the highest value of 10.89 or from the lowest value of 8.33 which means that the study sample banks are close to size.

As for the descriptive analysis of the dependent variable in the study **($R_i - R_f$)**, the average share risk premium is -1.96-%, which is a negative value, which means that the expected financial returns for the shares of the banks in question are less than the risk-free return, meaning that the returns of the shares of the study sample achieve financial performance And a low market, despite the good indicators of the effect of the value B/M.

The values of the standard deviation Show that the mean differences between the three independent variables are low respectively, and this indicates the consistency of the sample data, Since the skewness values for **B/M** and **$R_i - R_f$** are greater than zero, and the skewness values for each **($\log MVE$)** and **($R_m - R_f$)** are less than zero, the study variables are not completely normal distribution and there is an asymmetry in the normal distribution curve, and the kurtosis values for all study variables are high, this means that the value of the normal distribution curve is low.

3.2. Correlation analysis of the study variables

Table 2 shows The Correlation Matrix

Correlation				
	RI_RF	RM_RF	LOG_MVE	B_M
RI_RF	1.000000	0.115006	0.014682	-0.015146
RM_RF	0.115006	1.000000	0.007503	-0.025475
LOG_MVE	0.014682	0.007503	1.000000	-0.652509
B_M	-0.015146	-0.025475	-0.652509	1.000000

Source : Eviews 9.0 outputs based on study data prepared by researchers.

Through the table 2, it becomes clear to us that the size and nature of the relationship between the variables:

There is a positive correlation relationship between the dependent variable **(R_i-R_f)** and the two independent variables **(R_m-R_f)** and **(logMVE)**, where the correlation rate was accounted for (0.115) (0.014) respectively, and it is this indicates a weak correlation relationship because it is less than 50%, while it is clear to us a weak inverse relationship between the dependent variable and independent variable **(B/M)**.

Table 2 shows the correlation matrix between the study variables. The correlation values show that each common risk factor is independent of the other. Thus, each factor reflects a different aspect of asset pricing. No multicollinearity problem exists (Gujarati, 2004), the largest correlation value is -65% between **(logMVE)** and **(B/M)**.

This indicates the opposite relationship between them and this result is consistent with the results of Fama and French in their three-factor model in 1993.

3.3. Results Estimation

Table 3 Summarize the Results of Panel Models Estimating:

The Estimated Panel Models			Independent variables
Random (REM)	Fixed (FEM)	Pooled(PRM)	
-2.117077 (0.6795)	-940.3011 (0.0000)	-2.117077 (0.7005)	Constant
0.367578 (0.0006)	0.267628 (0.0136)	0.367578 (0.0015)	R _m -R _f
0.110145 (0.8179)	95.40584 (0.0000)	0.110145 (0.8302)	logMVE
-0.097432 (0.8996)	23.81022 (0.0000)	-0.097432 (0.9065)	B/M
0.013435	0.157800	0.013435	R ²
0.009556	0.140979	0.009556	R ² adjusted
3.463527	9.380847	3.463527	F statistic
(0.015980)	(0.000000)	(0.015980)	F Prob
1.000			HAUSMAN TEST prob
2.275577	1.923694	2.275577	D.W
GLS	LSDV	OLS	Estimation Method

Source : Eviews 9.0 outputs based on study data prepared by researchers.

Table 3 summarizes the results of estimating the studied model using the three panel models:

- The value of the Fisher and F-prob test indicates that all three models are significant (because the F -prob values for all models are less than the 5% level of significance).
- The value of Durban Watson (**D-W**) indicates the absence of an auto-correlation of errors, and since the **DW** value of the three models is greater than the **R²** coefficient this means that there is no false slope between the study variables in all models.

3.4. The appropriate model

To choose the appropriate model **LM Lagrange** test and **Hausman** test should be conducted.

3.4.1. First Step : the LM Lagrange Test

To use this test we must follow the following hypotheses:

$\left\{ \begin{array}{l} H_0 : \text{if (P-value} > 0.05) \text{ we choose the PRM as the appropriate one.} \\ H_1 : \text{if (P-value} < 0.05) \text{ and } \mathbf{Brench-Bagan} \text{ value} > \text{Tabular value Tab-value ,} \end{array} \right.$
 then we choose the FEM or the REM as the appropriate model.

Through the table 4, the alternative hypothesis can be accepted, given that the statistical value of the Breusch-Pagan test was (6.20) which is greater than the Tabular value, given that the critical value of this test (0.0128) is less than (0.05),

Therefore it can be said that the Pooled regression model (PRM) is not the appropriate model.

Table 4 The LM Lagranage Test result

Lagrange multiplier (LM) test for panel data
 Date: 05/05/20 Time: 04:05
 Sample: 1/10/2019 12/31/2019
 Total panel observations: 767
 Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	4.220775 (0.0399)	1.979504 (0.1594)	6.200280 (0.0128)
Honda	-2.054453 (0.9800)	1.406949 (0.0797)	-0.457854 (0.6765)
King-Wu	-2.054453 (0.9800)	1.406949 (0.0797)	-1.287552 (0.9010)
GHM	— —	— —	1.979504 (0.1726)

Source : Eviews 9.0 outputs based on study data prepared by researchers.

3.4.2. Second Step : The Hausman Test

Hausman test is a statistical test to select whether the most appropriate Fixed Effect (FEM) or Random Effect model (REM) is used.

To use this test we must follow the following hypotheses:

$\left\{ \begin{array}{l} H_0 : \text{if (P-value of } CHI^2 > 0.05) \text{ we choose the REM as the appropriate one.} \\ H_1 : \text{if (P-value of } CHI^2 < 0.05) \text{ and the statistical value of } CHI^2 > CHI^2 \text{ Tabular value, then we select the FEM as the appropriate model.} \end{array} \right.$

According to the Hausmann test in table 5, the probability value for this test is ($CHI^2 \text{ Prob} = 1.0000 > 0.05$) and Also, the statistical value of CHI^2 is smaller than its tabular value.

Thus we accept the null hypothesis (H_0), meaning that the random effects model is appropriate. This indicates that the sample is randomly taken from the whole population of the study.

Table 5 show The Hausman test result

Correlated Random Effects - Hausman Test Equation: Untitled Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	3	1.0000

Source : Eviews 9.0 outputs based on study data prepared by researchers.

Therefore, the empirical model of the study is as follows:

$$-2.117077 + 0.367578 (Rm - Rf)_{it} + 0.110145 \text{ LOG}_{MVE_{it}} - 0.097432 (Ri - Rf)_{it} = B/M_{it} + \varepsilon_{it}$$

Table 6 shows the PLS appropriate model REM

Dependent Variable: RI_RF				
Method: Panel EGLS (Cross-section random effects)				
Date: 04/20/20 Time: 14:29				
Sample: 1/10/2019 12/31/2019				
Periods included: 59				
Cross-sections included: 13				
Total panel (balanced) observations: 767				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.117077	5.123028	-0.413247	0.6795
RM_RF	0.367578	0.107280	3.426359	0.0006
LOG_MVE	0.110145	0.478156	0.230353	0.8179
B_M	-0.097432	0.772100	-0.126191	0.8996
Effects Specification			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			7.529583	1.0000
Weighted Statistics				
R-squared	0.013435	Mean dependent var	-1.965436	
Adjusted R-squared	0.009556	S.D. dependent var	8.123983	
S.E. of regression	8.085073	Sum squared resid	49876.10	
F-statistic	3.463527	Durbin-Watson stat	2.275577	
Prob(F-statistic)	0.015980			
Unweighted Statistics				
R-squared	0.013435	Mean dependent var	-1.965436	
Sum squared resid	49876.10	Durbin-Watson stat	2.275577	

Significance level at 5%.

Source : Eviews 9.0 outputs based on study data prepared by researchers.

3.5. Empirical results summarize

After choosing REM as the appropriate model of the PLS method, we summarize our statistical results in table 6 as follow :

- The F statistics are significant ($0.01598 < 0.05$) but there is a low possibility of prediction because of the R-square very small.
- The R-square (R^2) shows that independent variables can only explain around 1.3% variations in dependent variable ($R_i - R_f$), (and our results can not support the result of la porta 1996).
- The independent variable ($R_m - R_f$) shows a positive impact on the dependent variable ($R_i - R_f$) with a coefficient of 36.75% increase for every 1% increase in the dependent variable, thus we accept the null hypothesis regarding the first hypothesis of the study.
- Table 6 shows that the independent variables like the Size Risk factor ($\log MVE$) and the Value Risk factor (B/M) are insignificant and have not signed as predicted in the theoretical understanding, Although both ($\log MVE$) and (B/M) independent variables are insignificant the (B/M) has a negative impact on the dependent variable with a coefficient -9.74%, while the ($\log MVE$) shows a positive impact on ($R_i - R_f$) with a coefficient of 11%. thus we reject the null hypothesis for the second and third hypotheses of the study.

From the obtained results we infer that the Fama and French three-factor model can not explain the variations of stock returns on the Qatar Stock Exchange in the short term, and we concluded that as observed by **(Fama French 1996)** that covariance of the stock with the market return alone is not enough to measure risk and return, hence the multifactor model is a better predictor to measure returns, but in our case, only one independent variable was significant the ($R_m - R_f$) and the rest was not significant ($\log MVE$) and (B/M) value variables.

4. DISCUSSION AND CONCLUSION

The aim of this study was to test the validation of the Fama and French Three-factor model in the QSE to explain the variations of stocks returns, for this purpose Market Risk Premium ($R_m - R_f$), size Risk factor ($\log MVE$) and the (B/M) value risk factor were used as the explanatory variables. Estimations results show that the Fama and French Three-factor model has a limited potential to explain the variations, or the ff3fm cannot fully explain the variation in the returns of stocks because the only variable that was significant is the market risk premium ($R_m - R_f$). while the rest of independent variables were not significant and these results can answer the main question of the study.

As far as we know our study is the first of its kind to test the validation of Fama and French three factor model on the Qatar stock exchange. It is also the

first of its kind that uses short term data, which means that the Fama and French three factor model would not possibly explain stock returns variations in the short run.

The Fama and French Three-factor model is one of the most successful financial models for pricing and the closest one in explaining the variations in the returns of stock and this is confirmed by the compatibility of this model with the results of many studies , such as the study of **Connor and Sehgal (2001)** in the indian stock exchange, **Drew and Veeraraghavan (2003)** test the validation of the fama and French three-factor model in four Asian emerging markets Hong Kong, Korea, Malaysian, and Philippines, and **Athar Iqbal and Al (2017)** study that empirically examines the Fama and French three factor model for Pakistan Stock Exchange, all these studies and more support the Fama and French three factor model.

While the results of this current study were opposite to the results of studies that support the validity of Fama French three factor model , it was consistent with other studies which also contradicted the results of fama French model 1993 such as the study of **Daniel and Titman (1996)** in NYSE which is the first study whose results conflicted with the fama and French results in 1993.

Serval studies successively followed, which contradicted the results of the fama and French studies (1993), like the study of **Heston et al. (1999)** employing data of the firms quoted to twelve European countries, **Guan, Shaw and Al. (2007)**, the study of **Vaysel Eraslen (2013)** in Istanbul stock exchange.

All of these studies do not support the validation of the fama and French three factor model in explaining the variations of stock returns especially about the value risk factor (B/M), in the end «It's a model ,it's not completely true, no models are completely true » like **Eugene Fama** said.

As possible reasons of these results in the current study:

- It may be due to the poor financial performance of the Qatar Stock Exchange compared to 2018, when the market value of shares of listed companies witnessed a decrease of 1.01% and the stock prices of 46 listed companies out of 47, the total trading value of the market also decreased by 1.16%.
- The Qatar Stock Exchange is considered an emerging financial market and they are characterized by information asymmetry, inefficiencies, ownership concentration, high volatility, thin trading, higher transaction costs, a smaller

number of investors, smaller market capitalizations, and higher sample average returns than developed stock exchanges.

- There may be behavioral factors from investors as well as financial analysts in the Qatar Stock Exchange as it has certain characteristics.

However, although our hypotheses were supported statistically some limitations are worth noting, such as:

- The sample was small including just the banking sector in the QSE and the time frame was in the short term.
- The Panel last squares regression approach may not be the best and the most appropriate method to estimate the empirical model, and this is confirmed by the saying of **Box George and R.Draper** « Essentially all models are wrong, but some are useful ».

At the end of this discussion and conclusion section, we recommend the following:

- 1- According to the results of this study, it is clear that the Fama and French Three Factor model is unable to explain variations in the stock returns of the banks listed in QSE, that is, the application of this model by investors in order to estimate the expected returns in the short term does not take into account the rest of the risk factors except for a factor Market risk premium ($R_m - R_f$).
- 2- Investors should use other capital asset valuation and pricing models such as the four-factor **Carhart** model (1997), or the fama and French five-factor model (2013). in order to identify the financial factors and indicators that explain and affect the stock returns.
- 3- Investors should focus on the relationship between return and various risk factors because they affect investment decisions on the stock exchange.
- 4- The Stock Market Supervision and Regulatory Authority in Qatar should work to increase the informational efficiency of the market and the pricing efficiency.
- 5- Future researchers should replicate the same study at the following levels:
 - At the local level on the the Qatar Stock Exchange, but with a larger sample size and a longer study period in order to compare its results with the results obtained from our study.
 - On the Arab financial markets to test the validation of the Fama and French Three-factor model in these markets and compare the results with the results of the current study.

At the international level, through testing of the Fama and French three-factor model in developed as well as in the emerging financial markets to ensure that it can be applied to all markets, and compare the results with the current study.

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6. Appendices:

Appendix 1 shows the banks list of the study sample

Code	List of banks sample study	Code	List of banks sample study
1	Ahli Bank	8	National Leasing
2	Comm. Bank of Qatar	9	Qatar First Bank (QFC)
3	Dlala	10	Qatar Islamic Bank
4	Doha Bank	11	Intl. Islamic Bank
5	Islamic Holding	12	QNB
6	Al khalij Commercial Bank	13	Qatar Oman
7	Rayan		

Source : prepared by researchers based on the study sample.