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Does Financial Crisis Affect the Cost of Equity Estimation? Evidence from the Tunisian Stock Exchange

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Abstract

The aim of this paper is to study the impact of the recent financial crisis on equity cost estimation. We use a data of a 22 firms listed in the Tunisian stock market during the period from July 2006 to June 2011. The choice of this period is motivated by the occurrence of the financial crisis of October 2008, which divides the period into two equal sub-periods. In the first stage, we make abstraction to the crisis impact and we run the three specifications of the cost of equity: the CAPM, the Fama -French three factor model and The Carhart four-factor model. Empirical results confirm the explanatory power of the three specifications in the

context of the Tunisian market. We also confirm the existence of a size effect, a book to market effect and a momentum effect. In the second stage, we show that the presence of financial crisis does not affect the cost of equity. However, we note a decrease in the coefficients of the explanatory variable after introducing the dummy crisis variable.

Keywords: Cost of the capital, Financial crisis, CAPM, momentum, Market portfolio

1. Introduction

The last decade was affected by one of the most severe economic and financial crisis that perturbed the international financial scene. Such an event, which broke out in October 2008, has affected most components of economic and financial spheres. That in turn has an impact on the investor attitude toward risk and required rate of return. Hence, it is expected that this world shocks will affect the firms' values and thereby their cost of capital.

Indeed, the study of the relationship between firm value and the cost of capital is considered as fundamental preoccupation of corporate finance, since the publication of the paper *Modigliani and Miller (1958).* Despite their restrictive hypothesis based on market perfection, this model were certainly important to deeply explore this research field. However, the reality of financial market seems to be extremely different from the irrelevant hypothesis of the cost of capital. In fact, markets are often imperfect, transaction costs are important, information asymmetry characterizes the relationship between market participants and arbitrage opportunities are frequent.

Stiglitz and Weiss (1981) and *Myers and Majluf (1984)* have demonstrated that in an imperfect capital market, internal and external financings are not substitutable. Thus several studies have focused on this purpose and have concluded that in opposition to *Modigliani and Miller (1958),* the reality of financial market makes capital structure more relevant to market value of the firm and the cost of capital (*Frank and Goyal (2005) Baker, Ruback and Wurgler (2004), Myers (2001), Jensen (1985), Huang and Ritter (2004)* and *Welch (2003)*). Moreover, *Myers and Majluf (1984)* have developed the pecking order theory in the context of information asymmetry. *Baker and Wurgler (2002)* proposed the market timing theory showing the persisting influence of market timing on the cost of equity. *Luigi and Sorin (2009)* investigate the financial structure cost by the trade-off between tax advantage and agency cost and bankruptcy risk.

The concept cost of capital is important because it not only gives indication of the risk level perceived by the market about firm's assets, but also helps firms to calculate their requested earning needed to make investment decision. It represents also the main indicator of economic portfolio performance and firm's financial management. Despite its importance, the cost of capital is subject to controversy about its estimation and particularly its components.

In practice, we use the Capital Asset Pricing Model (CAPM) in order to estimate the cost of capital because of the simplicity of its derivation as presented by *Lintner (1965) and Mossin (1966).* However, this estimation is often criticized by many researchers, which led *Ross (1970)* to propose an alternative estimation through the Arbitrage Pricing Model. *Fama and French (1992)* developed Three-factors Model followed by the Four-factors Model of *Carhart (1997).*

In this context, the level of the cost of capital as explained by *Ross et al (2005)* is related to the investor's required of return on an equity investment. As expected, this level has to be affected by market stability or instability. Investors tend to upraise their requested earning once market instability increases and vice versa.

The study of the cost of capital in a crisis context has preoccupied many authors especially during the last financial crisis. *Mickinsey et al (2008)* have found that financial markets performance has decreased for about 46% compared to the previous year leading to a net decrease of market capitalization. However, Dobbs (2009) has found that the last financial crisis didn't have a significant influence on cost capital. *Mokhova (2011)* has studied the impact of the financial crisis on internal and external costs of the capital. She found that that the last crisis had a great influence on international economy and that many firms were risking bankruptcy due to a decrease of financial performance. Moreover, the financial crisis has led to a great decrease in investment returns, a severe lending crisis conjugated with a severe inflation pressure.

Certainly, a financial crisis has to affect financial market. However, this impact varies according to the degree of international integration of the local market. In the case of Tunisia, the financial market is not sufficiently integrated with international markets. This represents a high opportunity cost when everything goes well, but it becomes an interesting strategy in a crisis context.

The purpose of our study is to examine the relationship between market instability and the cost of capital level. Particularly, we study the impact of the last financial crisis of 2008 on the cost of capital as required by Tunisian investors. To address this concern, we use a panel of 22 Tunisian firms listed in the Tunisian stock market during the period from July 2006 to June 2011. The paper is organized as follows: Section 2 will provide a review of literature about the cost of capital. Section 3 presents the empirical methodology and the model specification. Section four exposes the main results and section five will conclude.

2. Literature Review

The concept cost of capital is always a central topic in financial theory. It still makes controversy since the monumental propositions of *Modigliani and Miller* (1958, 1963). *Myers (1984), Harris and Raviv (1991) and Ranjan and Zingales (1995)* sustain the classical approach considering the relevance of the cost of capital. According to the irrelevance proposition theorem, speaking about optimal financial structure is not possible in perfect market. Hence, one way to increase firm's value is to reduce the cost of capital by contracting new debt and running new investments. This practice leads to determine the return rate required by shareholders and investors in financial market practice. The one price law made many researchers believe that firms belonging to the same risk class cannot have different market values. The CAPM is one of the most used models to asset pricing. It supposes that investors eliminate all specific risks and measure only systematic risk by the coefficient beta of the market model. However, empirical tests of CAPM present a certain number of anomalies. Generally, anomalies can be due to market inefficiency or a bad specification of the CAPM. *Reinganum (1981)* and *Ball (1978)* found that model specifications errors are the main causes

of anomalies and not market inefficiency. These irregularities factors are size effect, PER effect, book to market effect, momentum effect, herding and seasonality.

2.1 Size Effect

The size effect has been a concern for researchers for many years. This irregularity refers to the situation observed over long horizons that smaller firms show higher return than larger firms. *Banz (1981)* and *Reinganum (1981)* have studied the impact of the size on expected return. They found a negative and significant relationship between firm size and expected return. The hypothesis of Banz (1981) is that the size effect occurs by the lack of available information about small firms. Reinganum (1981) has tested the relationship between earnings-price ratio and firm return. He confirmed the existence of a size effect. In the Canadian market, *Mayrand (2002)* shows that size effect is more confirmed in the case of portfolios with low capitalized assets. Matters (2004), in the context of British market found that small firms returns exceeded by 11.23% those of large firms during the period 1970-2003. Fama and French (2006) indicate that firms with low return have a more interesting mean return than firms with high return.

2.2 Book-to-market Effect

Stattman (1980) and *Rosenberg, Reid and Lanstein (1985)* found that the book to market is positively linked to expected return. They maintain that the book to market provides interesting information to investors seeking for higher returns. *Fama and French (1992)* recognize size and book to market as two fundamental factors of stock market return. *Fama and French (1995)* have demonstrated that firms with high book to market ratio are often those experiencing problems. They concluded that in a rational market and in a long term, return change has an impact on stock price. However, in 2005, they found that expected return of firm with high book to market ratio is higher than market return. *Ferguson and Shockley (2003)* affirm that both size and book to market effects are the main features to estimate expected equilibrium return. *Wang and Dilorio (2007)* found that book to market effect is significant in return change explanation.

2.3 Momentum Effect

Momentum occurs when assets with good performance (bad) in the past are going to record a bad performance (good) in the future. *Jegadeesh and Titman (1993)* show that stocks with high earnings momentum outperform stocks with low earning momentum. They suggest that momentum profits are due to systematic risk and delayed price reactions to firm-specific information. *Barberis et al (1998)* suppose that psychological and behavior bias, conservatism and representativity are the main causes of momentum effects. Using the *fama-french model*, *Schwert (2003)* found the momentum effect is strong and evident during the period 1926-2001. He concludes that this anomaly seems to be the only factor that is playing a crucial role in explaining abnormal returns. *Johnson (2002)* provide additional insights on this results and shows that momentum effect reaches its maximum when the period of portfolio construction is equal to 12 months and the period of its possession is equal to 6 months.

3. Data and Methodology

3.1 Data

Our sample is based on 22 listed companies in the Tunisian stock market covering six different industries (finance, goods, telecommunication, petrol and gas, industry). The data was set according to information availability. Fama and French (1992) exclude financial companies because they have a high return level considered as abnormal. However, such high lending level characterizes distress firms. We consider monthly data frequency for closing priced. Risk free is based on monetary market level with monthly frequency. To calculate market return (Rm), we use the market index Tunindex which gives a hole image about market global tendency the period of study lies between July 2006 and June 2011, with monthly data providing 60 observations for each asset. The choice of this period of study was not made randomly. In fact, this period is centered around the recent crisis of October 2008.

3.2 Research Methodology

In order to study the influence of the last financial crisis on capital cost, we adopt the methodology of Fama and French (1993). We study the case of firms listed in the Tunisian Stock Market. The first model is The CAPM as proposed by Sharpe (1964) and Lintner (1965) which can be written as follows:

$$R_{it} - Rf_t = \alpha_i + \beta_{im}(R_{mt} - Rf_t) + \varepsilon_{it} \quad (1)$$

The second model is the Fama et French (1993)'s model which can be presented as follows:

$$R_{it} - Rf_t = \alpha_i + \beta_{im}(R_{mt} - Rf_t) + \beta_{is}SMB_t + \beta_{ih}HML_t + \varepsilon_{it} \quad (2)$$

Fama and French (1993) have found that three factors pricing model captures a great number of market anomalies except the momentum effect. Thus this model in not able to show short term continuous earning tendency as sustained by Jegadeesh and Titman (1993). So, we have to use Carhart (1997) specification which adds a fourth variable WML «momentum effect» to Fama and French (1993) model. We consider the four factors pricing model derivated as follows:

$$R_{it} - Rf_t = \alpha_i + \beta_{im}(R_{mt} - Rf_t) + \beta_{is}SMB_t + \beta_{ih}HML_t + \beta_{iw}WML_t + \varepsilon_{it} \quad (3)$$

Where: Ri is the return on asset I, Rf is the risk free rate, Rm is the market return, SMB is the difference between the return on diversified portfolio of small stocks and big stocks, HML is the difference between the return on diversified portfolio of high book to market stocks and low book to market stocks, WML the momentum return is the difference between the return on diversified portfolio of the Winners and losers.

The variables of the model are measured as follows:

- **The expected return Ri** can be expressed as follows:

$$R_{it} = \frac{(P_t - P_{t-1}) + D_t}{P_{t-1}} \quad (4)$$

Where: Pt, stock price at time , Pt-1, stock price at time t-1, Dt= dividend per share at time t, In our study, the stock price is here the closing price at the end of each month.

The market return Rm is measured by the difference between market index value at time t and t-1

$$Rm_t = \frac{I_t - I_{t-1}}{I_{t-1}} \quad (5)$$

Portfolios construction: We define (Rm-Rf) as the risk premium or the excessive market monthly return compared to risk free rate. To measure SMB, HML and WML, we adopt the Fama and French (1993) methodology. First, we have to divide our sample into two groups: S for Small and B for Big in terms of market capitalization. Independently on previews ranking, we divide our sample into three groups on the base of the ratio VC/VM for the month of December 2005. The first group corresponds to the three first deciles 30% that we note L (Low). Second group is the four median deciles 40% that we call M (Medium). The third group that correspond to the three last deciles 30% and we call them H (High). We build six portfolios by combining the two criteria of Big-Small of Fama and French (1993) and the book to market portfolios S/L, S/M, S/H, B/L, B/M, B/H. For each month, the spread SMB (Small minus Big) is defined as the difference in terms of return between big and small market capitalization.

$$SMB= (RS/L+RS/M+RS/H)/3 – (RB/L+RB/M+RB/H)/3. \quad (6)$$

Similarly, HML (High minus Low) is the difference in terms of return between shares with high book to market ratio and those of low one.

$$HML= (RS/H + RB/H)/2 – (RS/L + RB/L)/2 \quad (7)$$

The monthly market return of the portfolio P is the return mean of shares composing this portfolio. L'Her et al (2004) have calculated the factors magnitudes and have added another ranking 30% called W (Winner), 40% N (Neutral) and 30% L (Loser). Then, they proposed the following portfolios S/L, S/N, S/W, B/L, B/N, B/W.

After portfolios construction, we can calculate the different factors WML (Winner Minus Loser) that indicate the difference between weighted mean return of shares composing the Winner portfolios (W) and those of Loser portfolios. So, the momentum effect can be presented as follows:

$$WML = (RS/W +RB/W)/2 – (RS/L + RB/L)/2 \quad (8)$$

Fama and French (1993) maintain that grouping shares into homogenous portfolios with reference to a criterion (size, book to market ratio…) has the merit to highlighting the contribution of these criteria to describe shares' earnings and to deduce other factors specific

impacts. Portfolio construction through monthly returns defines the dependent variables. Shares are ranked firstly according to their market capitalization and the book to market ratio. Then, they are ranked according to the momentum effect. Portfolios are here the intersection between explanatory factors. Monthly, we calculate the excess return towards risk free of portfolios.

4. Empirical Results

4.1 Descriptive Statistics

For the first variable Ri-Rf, we note that it has a minimum value of -0,946450 and a maximum value of 1,873967, with a mean value of -0,038836 and a standard deviation of 0,145526. The study of normality is based on the Kurtosis that equals 53,16044 largely higher than 3 which means that the distribution is relatively peaked. This is confirmed by the positive Skewness value of 2,596082 which indicates a right asymmetry. The second variable Rm-Rf varies between -0,604221 and 0,047703 with a mean value of -0,042282 and a standard deviation of 0,085836. The distribution is not normal due to a value of Kurtosis of 29,60558 and it has a left asymmetry showed by the negative value of the Skewness (-4,469933). The same result can be obtained for the third variable SMB which has a minimum value of -0,166356 and a maximum of 0,130656 with a mean value of 0,007050 and a standard deviation of 0,053409. The fourth variable is HML is varying between -0,280468 and 1,873967 with a mean value of -0,007504 and a standard deviation of 0,08125. The same conclusions can be provided for the normality test for the previous variables. Finally, the variable WML or momentum effect has a value between -0,066722 and 0,249647 with a mean of 0,033466 and a standard deviation of 0,052203.

Table 1. Descriptive statistics

Variables	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis	Jarque-Bera
Ri-Rf	-0,038836	0,145526	-0,946450	1,873967	2,596082	53,16044	139866,5
Rm-Rf	-0,042282	0,085836	-0,604221	0,047703	-4,469933	29,60558	43327,81
SMB	0,007050	0,053409	-0,166356	0,130656	-0,827489	5,044294	380,4950
HML	-0,007504	0,080125	-0,280468	0,160072	-1,222583	5,973038	814,9788
WML	0,033466	0,052203	-0,066722	0,249647	1,393036	6,835057	1235,842

4.2 The Impact of Financial Crisis on the Cost of Capital

In this paragraph, we test the impact of the subprime crisis on the Tunisian stock market using the Pooled Least Squares (PLS) technique. In a first step, we study the impact of the explanatory variables of each model. Model 1 is based on the CAPM, model 2 refers to Fama and French (1993) and model 3 reproduces Carhart (1997) specification. In a second step, we introduce a dummy variable that takes the value of 1 when we have a crisis and zero otherwise.

We expect that the subprime crisis would not have an impact on the Tunisian Stock market. This can be explained by the fact that the hole size of the Tunisian market is insignificant compared to other markets. Moreover, we have not a significant volume of international portfolio investments. However, we anticipate that the subprime crisis will affect investors' behavior and then affect transaction volume and price making.

Estimation results without considering financial crisis

The CAPM specification (regression 1): Table 2 shows that the CAPM specification is globally significant. In fact the fisher test allows to reject the null hypothesis. The constant of the model is negative and statically significant at 1%. This means the existence of other explanatory variables of firm's performance. Rm-Rf has a positive and significant coefficient at 1%, which means that stock return tend to increase when market return increases. Despite the fact that the CAPM provides a significant coefficient for market variable, it seems to have a small power to explain stock's return (adjusted R^2 is low than 6%).

The Fama-French three factor model (regression 3) As for the CAPM specification, the constant of the Fama and French specification is negative and statically significant at 1%. This also means that there are other explanatory variables that are not taken in account by Fama and French model. The variable (Rm-Rf) is positive and statically significant at 1%. This confirms that it is the main explanatory variable of individual firms' performance. Compared to CAPM regression, the Fama and French model provides positive values for both (SMB) and (HML) but the coefficient are not significant. This means that Big size firms' return is higher than small size return. The fisher statistic shows that the model is globally significant at 1%.

The Carhart four factor model (regression 5): In order to run a Carhart specification, we have to take in account the effect of short run past performance in terms of momentum effect. The constant is negative and significant at 1%. The coefficient of SMB is positive but not significant. While, the coefficient related to HML is positive and statistically significant at 5%. This leads us to deduce that firm's with low book to market ratio are generally expected to get more important benefits in the future. The sensibility coefficient related to the momentum strategy, is positive and statically significant at 1%.

Results in a context of crisis

Table 2 shows also that the subprime crisis has a negative but non-significant impact on all three models (regressions 2, 4, 6). This means that the financial crisis affects negatively returns levels. In comparison to the specification without crisis, we note that the coefficients are significant but the value of coefficient have decreased. For the case of the market variable, we note that it maintain its positive and significant coefficient at 1% for the case of the three models. However, we find that only for the CAPM specification there is an increase of about 0,3%, while, for the other models the coefficient has decreased.

For the variable SMB, the introducing of the crisis Dummy variable does not affect the sign or the significance of the variable, but we note an increase of about 1,04% for the Model of Fama and French and a more important increase to 3,48% for the case of Carhart Model. In

contradiction to previous variables, the HML variable had recorded a decrease of 0,48% and 1,06% respectively for Fama and French Model and Carhart Model. Finally, the momentum variable is affected negatively by the crisis dummy variable but still significant at 1%.

Table 2. Excessive return explanatory models from 07/2006 to 06/2011, 60 months

Variables	**CAPM**		**Fama-French model**		**Momentum effect**	
	Without Crisis	*With crisis*	*Without Crisis*	*With crisis*	*Without Crisis*	*With crisis*
Constant	-0,0215***	-0.0207***	-0,0211***	0,0202***	-0,0363***	-0,0339***
	(-4,9690)	(-4,1993)	(-4,5245)	(-3,9383)	(-6,7360)	(-6,0271)
Rm-Rf	0,4090***	0.4093***	0,4198***	0,4195***	0,3889***	0,3863***
	(9,0255)	(9.0273)	(8,6912)	(8,6819)	(8,0830)	(8,0277)
SMB	_	-	0,0434	0,0538	0,0209	0,0557
			(0,4244)	(0,5112)	(0,2061)	(0,5359)
HML	_	-	0,0294	0,0246	0,1451**	0,1345*
			(0,4119)	(0,3409)	(1,9696)	(1,8182)
WML	_	-	_	-	0,4442***	0,4673***
					(5,4771)	(5,6620)
Crisis	-	-0,0027	-	-0,0038	-	-0,0135
		(-0,3102)		(-0,4304)		(-1,4903)
(adj) R^2	0,0574	0,0568	0,0568	0,0563	0,0772	0,0780
Fisher test	81,4606***	40,7505***	27,5250***	20,6772***	28,5984***	23,3442***

**, **, ***Significant at 10%, 5% and 1% respectively.*

Values between brackets represent the T-student statistic

4.3 Estimations Results by Sector

In order to give more explanation on the determinants of cost of capital of Tunisian firm, we divide our sample in two sectors: financial sector and non-financial sector.

- *Financial sector*: In our sample, the financial sector is represented by banking, insurance and leasing firms listed at the Tunisian stock market. Results are reproduced in table 3.

Table 3. Excessive return explanatory models for financial sector from July/2006 to June/2011, 60 months

Variables	**Model1**	**Model 2**	**Model 3**
Constante	**-0,0129****	**-0,0115***	**-0.0411*****
	(-2,1026)	**(-1,8053)**	**(-5.7447)**
Rm-Rf	**0,5449*****	**0,4964*****	**0.3519*****
	(8,2371)	**(7,3201)**	**(5.5758)**
SMB	_	**-0,5395 *****	**0.3559*****
		(-3,8529)	**(2.6337)**
HML	_	-0,0538	**0.1891***
		(-0,5535)	**(1.9229)**
WML	_	_	**0.4304*****
			(3.9920)
R2	0,1243	0,1848	0.0794
adjusted R2	0,1224	0,1796	0.0750
DW	1,8954	1,8780	2.0318
F	67,8504***	35,9734***	18.0084**

*, **, ****Significant at 10%, 5% and 1% respectively.*

Values between brackets represent the T-student statistic.

For the case of the financial sector, the CAPM specification is globally significant since the Fischer test is significant at 1%. The constant is negative and statically significant at 5%. The coefficient of the variable (Rm-Rf) is positive and significant at 1%. This means that financial sector return index has a positive impact on stock return of financial firms. Furthermore, the Fama and French specification is globally significant at 1% with and adjusted R-squared of 0,1796. The constant is negative and significant at 10%, while the coefficient of the market variable is positive and significant at 1%. In fact, this variable affects positively stock's return of financial firms. The coefficient of the size variable (SMB) is negative and statistically significant at 1%, while the book to market variable has a negative but non significant coefficient.

For the Carhart four factor model: we note the model is globally significant at 5% (According to Fisher test). The constant is negative and statically significant at 1%.for the other controlling variables, they are all positive and statically significant at 1%, except the book to market coefficient which is significant at only 10%. The value of the Durban-Watson statistic excludes all problems of autocorrelation. Finally the adjusted R-squared is about 7.5%.

Non-financial sector: Non-financial sector is represented in our sample by manufacturing,

telecommunication, industry and oil-gas sectors. The CAPM specification is globally significant at 1%. The constant is negative and statically significant at 1%. The coefficient of the market variable (Rm-Rf) is positive statically significant at 1%. As for the financial sector, the non financial sector index return has a positive impact on shares return of non financial firms.

The Fama -French model is globally significant, with low R-squared of 0.0584. The constant is also negative and significant at 10%. While the market variable is positive and significant at 1%. For the size variable (SMB), it has a positive and significant coefficient at 10%. The rest of explanatory variables are not significant.

The Cahart specification is globally significant with low R-squared of 7,5%. The constant is negative and significant at 1%. Both market, size and momentum variables have a positive and significant coefficients at 1%. While the book to market variable is significant at only 10%. Whatever the industry, the market risk affects stock's returns. In fact, investors tend to keep more attention to market risk than to firm's size, book to market and market value.

Table 4. Excessive return explanatory models for non financial sector from July/2006 to June/2011, 60 months

Variables	Model1	Model 2	Model 3
Constant	**-0,0262*** (-4,5117)**	**-0.0265*** (-4.2729)**	**-0.0411*** (-5.7447)**
Rm-Rf	**0,3378*** (5,6348)**	**0.3798*** (6.0017)**	**0.3519*** (5.5758)**
SMB	_	**0.3778 * (2.7740)**	**0.3559*** (2.6337)**
HML	_	0.0765 (0.8049)	**0.1891* (1.9229)**
WML	_	_	**0.4304*** (3.9920)**
R2	0,0365	0.0618	0.0794
R2 adjusted	0,0353	0.0584	0.0750
DW	2,0118	2.02140	2.0318
F	31,7515***	18.3709***	18.008***

*, **, ***Significant at 10%, 5% and 1% respectively.

Values between brackets represent the T-student statistic.

5. Concluding Remarks

The recent financial crisis was qualified by many academicians as the worst financial crisis since the great depression of the 1930s and market crash of 1986-1987. It caused the bankruptcy of a great number of financial and economic corporations. In this study, we have paid more attention to the impact of the financial crisis on the cost of equity through analyzing the case of the CAPM of Sharpe (1964), Lintner (1965), the three factors models of Fama and French (1993) and the four factors model of Carhart (1997). The CAPM specification provides a simple and comprehensible explanation of investor's requested return. The positive linear relationship attests a significant investor's risk acceptance. However, as sustained by Roll (1977), the CAPM tests reinforce its empirical imperfection and lead to highlight returns anomalies. Those limits lead Fama and French (1993) to provide their three factors model as an interesting CAPM extension by adding to their market variable two other factors expressing size and book to market. This specification allows to capture all kinds of market anomalies except the momentum effect. In this context, Carhart (1997) proposes his four factors model by adding the effect of short term past returns, that he called this factor as momentum effect.

In this context, our empirical tests are conducted in order to explain how financial crisis can give more information on the validity of these models. In a first step, we make abstraction to the crisis impact and we run the three specifications of the CAPM, Fama -French three-factor model and Carhart four-factor model.

Empirical results confirm the explanatory power of the three specifications in the context of the Tunisian market. We also confirm the existence of a size effect, a book to market effect and a momentum effect. We find also that there is no significant affect of the crisis on market performance or cost of equity. However, we note a decrease in the coefficients of the explanatory variables after introducing the dummy crisis variable. This can justify a possible negative impact of the crisis. This seems to be indirectly affected via of investors' psychology and financial behavior. The international crisis did not directly affect the Tunisian stock market. Moreover, Tunisian firms tend to finance their investments relying on bank mortgages. We often qualify the Tunisian economy by an over banked economy. This would be a positive attitude in a context of crisis but otherwise, it has negative impact on firm performance.

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References

Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The Journal of Finance.* https://doi.org/10.1111/1540-6261.00414

Baker, M.P., Ruback, R.S., & J. Wurgler. (2004). Behavioral Corporate Finance: A Survey. *Working paper,* Harvard.

Banz, R.W. (1981). The relationship between return and market value of common stocks. *Journal of Financial Economics, 9,* 3-18. https://doi.org/10.1016/0304-405X(81)90018-0

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics, 49,* 307–343. https://doi.org/10.1016/S0304-405X(98)00027-0

Carhart, M.M. (1997). On persistence on mutual fund performance. *Journal of Finance, 52,* 57-82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

Dobbs, I. M. (2009). How bad can short termism be?—A study of the consequences of high hurdle discount rates and low payback thresholds. *Management Accounting Research, 20*(2), 117-128. https://doi.org/10.1016/j.mar.2008.10.007

Fama, E. F., & K. R. French. (2006). The Value Premium and the CAPM. *Journal of Finance, 61,* 2163-2185. https://doi.org/10.1111/j.1540-6261.2006.01054.x

Fama, E.F., & French, R.F. (1992). The cross-section of expected stock returns. *Journal of Finance, 47,* 427-465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Fama, E.F., & French, R.F. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial Economics, 33,* 3-56. https://doi.org/10.1016/0304-405X(93)90023-5

Ferguson, M.F., & R. L. Shockley. (2003). Equilibrium anomalies. *Journal of Finance, 58,* 2549–2580. https://doi.org/10.1046/j.1540-6261.2003.00615.x

Frank, M. Z., & Goyal, V. K. (2005). Trade-off and Pecking Theories of Debt. In B. Espen Eckbo (Ed.), *Handbook of Corporate Finance.* Elsevier/North-Holland.

Harris, M., & Raviv, A. (1991). The Theory of Capital Structure. *The Journal of Finance, 46*(1), 297-355.

Huang, R., & Ritter, J.R. (2009). Testing Theories of Capital Structure and Estimating the Speed of Adjustment. *Journal of Financial and Quantitative Analysis, 44,* 237–271. https://doi.org/10.1017/S0022109009090152

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: implications for stock market efficiency. *Journal of Finance, 48,* 65-91.

Jensen, M.C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review, 76*(2), 323-329. https://doi.org/10.1111/j.1540-6261.1993.tb04702.x

Johnson, Timothy C. (2002). Rational Momentum Effects. *Journal of Finance, 57,* 585-608. https://doi.org/10.1111/1540-6261.00435

L'Her, J.F., Masmoudi, T., & Suret, J.M. (2004). Evidence to support the four-factor pricing model from the canadian stock market. *Journal of International Financial Markets, Institutions and Money, 14,* 313-328. https://doi.org/10.1016/j.intfin.2003.09.001

Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *Revue of Economics and statistics, 47,* 13-37. https://doi.org/10.2307/1924119

Luigi, P., & Sorin, V. (2009). A Review of the Capital Structure Theories. *Annals of Faculty of Economics, 3*(1), 315–320.

McKinsey and Company. (2011). Organizing for M&A: McKinsey Global Survey results. Retrieved from https://www.mckinseyquarterly.com/

Modigliani, F., & Miller, M. (1958). The Cost of Capital, Corporation Finance, and the Theory of Investment. *American Economic Review, 48*(3), 261–297.

Mokhova, N. (2011). The cost of capital in the present-day condition: The impact of the global financial crisis. *Economics and Management, 16*, 1170-1173.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica, 37*, 768-783. https://doi.org/10.2307/1910098

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when companies have information that investors do not have. *Journal of Financial Economics, 13*(2), 187-221. https://doi.org/10.1016/0304-405X(84)90023-0

Myers, S.C. (2001). Capital Structure. *The Journal of Economic Perspectives, 15*(2), 81-102. https://doi.org/10.1257/jep.15.2.81

Rajan, Raghuram G., & Luigi Zingales. (1995). What Do We Know about Capital Structure: Some Evidence from International Data. *J. Finance, 50*, 1421–60. https://doi.org/10.1111/j.1540-6261.1995.tb05184.x

Reinganum, M. R. (1981). Misspecification of capital asset pricing: Empirical anomalies based on earnings yields and market values. *Journal of Financial Economics, 9,* 19-46. https://doi.org/10.1016/0304-405X(81)90019-2

Roll, R. (1977). A critique of the asset pricing theory's tests. Part I: On past and potential testability of the theory. *J Financ Econ., 4*, 129–176 https://doi.org/10.1016/0304-405X(77)90009-5

Rosenberg, B., Reid, K., & Lanstein, R. (1985). Persuasive evidence of market inefficiency. *Journal of Portfolio Management, 11*, 9-17. https://doi.org/10.3905/jpm.1985.409007

Ross, S. (1977). Risk, return and arbitrage. Risk and return in Finance. In Friend, I. and Bicksler, J. (Eds.), Ballinger, Cambridge.

Ross, Stephen A., Westerfiled Randolph W., & Jaffe Jeffrey. (2005). *Corporate Finance* (7th ed.). New York: McGraw-Hill.

Schwert, G.W. (2001). Anomalies and market efficiency. In Constantinides, G., Harris, M., & Stulz, R. (Eds.), *Handbook of the Economic of Finance* (Chapter 17). North-Holland, Amsterdam.

Sharpe, W.F. (1964). Capital asset prices: a theory of market equilibrium under conditions of risk. *Journal of Finance, 19,* 425-442.

Stattman. D. (1980). Book values and stock returns. *The Chicago MBA: A Journal of Selected Papers, 4,* 25–45.

Stiglitz. J.E., & WEISS, A. (1983). Incentive Effects of Terminations: Applications to the Credit and Labor Markets. *American Economic Review, 73,* 912-27.

Wang, Y., & A. Di Iorio. (2007). The cross section of expected stock returns in the Chinese A-share market. *Global Finance Journal, 17,* 335-349. https://doi.org/10.1016/j.gfj.2006.05.007

Welch, I. (2004). Capital structure and stock returns. *Journal of Political Economy, 112*(1), 106-132. https://doi.org/10.1086/379933