



Impact of Financial Risks on the Value of Moroccan Companies

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ABSTRACT

This paper presents a study on the relationship between the value of the firm and the financial risks based on a sample of Moroccan companies listed on the Casablanca Stock Exchange. The financial risks are mainly; market risk, exchange rate risk, rate risk, and commodity risk. The empirical results show that 35% of Moroccan companies are sensitive to changes of financial instruments for the period between May 2013 to April 2014. The results also show that the sensitivity of firms depends on the nature of the activity and the degree of their openness on the international market. A cross-sectional analysis by activity sector of the sensitivity determinants to the variations of the financial risks is also considered to answer the question, and the results suggest that the most sensitive areas are the telecommunication sector, followed by the building and public works sector, then the transport sector.

Keywords: Financial agency theory, financial risk, firm value, panel data

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1.0 INTRODUCTION

The economic crises in the world emanate mainly from the sensitivity of the financial system, which presents increasingly threatening risks, including credit risk, counterparty risk, liquidity risk and market risk. This latter has become one of the major causes of the volatility of the company's results.

Indeed, the evolution of financial systems results from the openness of economies. International institutions including the IMF (International Monetary Fund) and the WTO (World Trade Organization), define this openness as the most effective development policy, allowing countries to achieve high growth rates. This policy constitute a political and economic system that results in the

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internationalization of companies and thus by opening on the international market, through trade and customs agreements, free trade agreements and also by the linkups of partnership between countries.

The fact remains that this openness can also be a source of risk. Indeed, some authors as [P. Jorion \(1990\)](#), [W. Smithson and al. \(1995\)](#) point out that any company operating on the international market is facing financial risks that have an impact on its value. These risks are manifested in the volatility of prices of financial instruments including currency risk, which results from the price change of a currency relative to the others, the rate risk, resulting from changes in interest rates on the market, and the risk of commodity, which results from unfavorable changes in the raw material prices.

These three types of risks may lead to a deterioration of financial results of companies, and thus impair their value on the market. Hedging financial risks is very important to ensure the business growth efficiency of the companies constituting the economy. Thus the companies are expected to understand their risk profiles. This concept was initiated in 2002 by the Coso 2 "Enterprise Risk Management Framework" which defines it as the maximum level of risk that a company is willing to take in order to increase its value. The risk profile is therefore an appropriate measure to identify and estimate the risk exposure of financial prices, and then put in place some risk management strategies that streamline their choice of financial instruments to protect the financial strength of the firm. Therefore, every company must adopt a fiscal policy that is oriented towards the proper management of these risks.

Like the developing countries, the openness of Moroccan companies on the outside is not often accompanied by hedging mechanisms to protect against the financial risks. Indeed, the financial management of national companies operating in the international market is penalized by additional financial burdens and constrained by their external competitiveness, hence the coverage issue is confined to the second plan.

Although recent reforms sought by the government, which aims at placing the company at the heart of the development strategy, through the 2014-2020 plan to acceleration of the industry, the new vision to a commercial market performance of Africa, and the draft financial center CFCs (Casablanca Finance City), which is an ecosystem for financial companies operating at national and international level. In this sense, the Moroccan case claims a particular attention. The issue of corporate sensitivity to financial risks begins to materialize following these developments, which attracts more and more debates in the national economy. So what is the degree of sensitivity of the Moroccan company's value to financial risks? Companies operating in different industries are impacted by the same intensity, or this differs depending on the nature of their activities? Finally, what conclusions can we deduce about the impact of financial risks on the company's value?

This article is organized as follows. The first part reviews the major works that highlight the measurement and management of financial risks, in addition to exposing divergent results for the different empirical and exploratory studies. The second part, meanwhile, is interested in empirical estimates in panel data to assess the relationship between firm value and financial risks. Descriptions of models, empirical data and results are shown in the same part. Finally, the third part concludes the article.

2.0 LITERATURE OVERVIEW

The evaluation of the impact of financial risks on the value of the firm is of great importance for both economists and company managers. In this sense, models to quantify these risks have been developed, such as the CAPM (Capital Asset Evaluation of Model), the MEA (Evaluation Model for Arbitration), and the model on the Q theory Tobin. The objective of these models is to highlight the link between the value of a firm and financial risks. This led to a series of econometric studies to address this issue.

In fact, many theoretical and empirical studies including [P. Jorion \(1990\)](#) and [Y. Amihud \(1993\)](#), [G. Bodnar and W. Gentry \(1993\)](#), and [J. Caby and G. Hirigoyen \(2001\)](#) are interested in financial risk

management, also called the coverage of financial risks, which is one of the important components of the financial policy of companies. This strategy is in place to partially mitigate the impact of the uncertainty about the evolution of financial prices. These studies on the subject suggest three reasons why the leaders decide to manage their financial risks by using hedging instruments. First, this is due to the degree of risk aversion, because investors have different patterns of behavior vis-à-vis the risk of making decisions. Second, the leaders seek to maximize the value of the company taking a conservative strategy towards risk. And third, to establish the agency problems that exist between shareholders and the managers who are based on information asymmetry and conflicts of interest that may exist between the main partners of the company.

The work of J. Caby and G. Hirigoyen (2001) fall in line with this idea, and demonstrate that conflicts of interest between shareholders and managers can result in the implementation of the part of the management team, strategies that deviate significantly from the objectives of shareholders. To solve the antagonism shareholder-managers, with a view to maximizing the creation of the total value of the firm, the agency theory involved two types of incentives, including financial incentives and control mechanisms that can be considered as alternatives. The issue of risk management was not limited to the theoretical side, many researchers, including P. Jorion (1990) and Y. Amihud (1993), G. Bodnar and W. Gentry (1993) were interested in assessing the potential impact of changes in financial instruments on the value of the firm through financial models, empirical analyses, and surveys.

The first empirical studies were performed by P. Jorion (1990) and Y. Amihud (1993) on the evaluation of the sensitivity of the values of firms to changes of financial instruments, namely the exchange rate, the rate of interest and commodity prices. These results revealed paradoxical results: relations tested between the value of the firm and the financial instruments are not significant. This aroused the curiosity of many actors to seek the explanation of these results. Other studies by (G. Bodnar and W. Gentry, 1993), which have focused on the evaluation of companies, not at the individual level but rather by business firms in developed countries (Canada, Japan and the USA), possibly suggest a low sensitivity of financial instruments. Thus one finds a discrepancy between the theoretical rationale and empirical results.

Several authors have used surveys and exploratory analyses that were the subject of several recent studies, including, G. Bodnar and al. (1995, 1996, 1998) and A. Phillips (1995) on US companies, A. Berkman and al. (1997) on the New Zealand firms, D. Ceuster and al. (2000) on the Belgian market and E. Mallin and al. (2001) on British companies. The objective of these studies is to analyze the behavior of firms to financial risks through a description of the use of derivatives by the companies so as to counteract the risk exposures. The results suggest that firms are more focused on the use of derivatives to hedge against financial risks, and the bigger the size of the company is, the more important the use of hedging instruments becomes.

It is easy to conclude, following this theoretical debate, that the relationship between the firm value and the financial risk is mainly correlated. The research presented here focuses on analyzing the case of listed Moroccan companies. Thus, our study identifies the link between the fluctuations of financial instruments including the performance of the market, the exchange rate, the interest rate, the price of raw materials and returns of assets. We are going through an empirical approach to panel data to estimate the relationship between firm value and the financial risks, then it seemed appropriate to perform the analysis by business segment. Finally, an individual analysis, company by company was considered to avoid dispersal of information about a particular company.

3.0 ECONOMETRIC MODEL AND RESULTS

3.01 PRESENTATION OF THE ECONOMETRIC MODEL

This section begins by presenting the model used to evaluate the sensitivity to financial risks in listed

Moroccan companies, then explain the economic factors of the exhibition which are the variables of measuring, including the hypotheses to be tested by the model, and finally describe the study sample.

A - THE MEASURE OF SENSITIVITY TO FINANCIAL RISKS

The estimation of the exposure of the firm to risks is based on a regression model that draws on the work of several authors. Mr. Adler and B. Dumas (1984) examined the impact of fluctuations in the exchange rate, they consider that this risk can be measured using a simple regression, where the dependent variable is the value of the company, which is reflected in the price of its shares, and the explanatory variable is the change in the exchange rate. Assuming that the variation of these variables is not anticipated, the extent of the exposure is calculated by estimating the following equation:

$$R_{it} = \alpha_i + \chi_{FXi}(PFX)_t + \varepsilon_{it} \quad t=1\dots T \quad (1)$$

R_{it} is the monthly rate of return on the share of firm i at time t , PFX is the rate of return of the index of the exchange rate, α_i is the minimum return of stock i and χ_{FXi} measures the sensitivity performance of the action to changes in exchange rates.

P. Jorion (1990), W. Smithson and al. (1995) specify a widening of the presented equation, taking into account indicators such as treasury yields, to the vacillation of the various currencies, and the base prices of some commodities, such as independent variables related to performance of the share of the firm. This amounts to adorn the equation (1) by including market fluctuations, interest rates, and prices of commodities. Therefore, the estimation of the exposure to financial risks can be estimated by the model of regression is as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \chi_{ri}(\Delta r/r)_t + \chi_{FXi}(\Delta PFX/PFX)_t + \chi_{ci}(\Delta PC/PC)_t + \varepsilon_{it} \quad t=1\dots T(2)$$

R_{it} : Monthly rate of return of the share of firm i at time t

α_i : The minimum return of stock i

β_i : Market portfolio risk measure of the stock i

R_{mt} : Market Portfolio yield at time t

χ_{ri} : Firm's exposure metering i to interest rate risk

$(\Delta r/r)_t$: Monthly change in the interest rate at time t

χ_{FXi} : Exposure metering firm i to currency risk

$(\Delta PFX/PFX)_t$: Monthly variation of the exchange rate at time t

χ_{ci} : Exposure metering firm i to price risk of commodities

$(\Delta PC/PC)_t$: Monthly change in the price of the commodity at time t

ε_{it} : Error in the regression

The study to be conducted on the model relies on the equation (2), which is to assess the impact of each risk financial prices on stock returns of the assets of Moroccan companies.

B -THE ECONOMIC FACTORS OF THE EXHIBITION: THE EXPLANATORY VARIABLES IN THE REGRESSION:

To assess the impact of financial risks on the value of the firm, four economic factors are used. The first factor is the risk of the national market, represented by the MASI (Morrocan All Shares Index), which is the main stock index of the Casablanca Stock Exchange. The second factor is the risk of the interest rate, which is the reference interest rate of Bank Al Maghrib (BAM). The third factor is the foreign exchange risk, represented by the current Euro / MAD. This choice is the fact that the European Union is considered the number one partner of Morocco in terms of trade. The fourth factor is the risk of commodity price fluctuations, represented by the prices of inputs specific to each firm.

The data used in this study are taken from multiple data sources:

- The dividend yield calculated from the courses provided on the Casablanca Stock Exchange website by the formula $R_{ij} = \ln(P_j/P_{j-1})$ with P_j and P_{j-1} are respectively the course months (j) and month (j-1).
- The interest rate used is that applied by Bank Al Maghreb provided on the website of BAM and the formula for calculating the change $dR/dt = (R_t - R_{t-1})/R_{t-1}$ with R_t and R_{t-1} are the closing prices respectively in month t and t-1.
- The exchange rate used is the rate Euro / Mad. Data is extracted from the LOOBIZ finance site and the formula for calculating the change $dPFX/dt = (PFX_t - PFX_{t-1})/PFX_{t-1}$ with PFX_t and PFX_{t-1} are respectively the closing price in month t and t-1.
- Prices of raw materials are extracted from the international website of finance: finance and .net formula for calculating the variation $dPC/dt = (PC_t - PC_{t-1})/PC_{t-1}$ with PC_t and PC_{t-1} are the closing prices respectively in month t and t-1.

C -HYPOTHESES TO BE TESTED:

The study aims at measuring the impact of fluctuations in the financial risks on the value of the firm. These risks are currency risk, market risk, the rate and risk of basic products, which are the explanatory variables used in the model. The dependent variable is the value of the company which is represented by the monthly dividend yield of the company. Thus, using a sample of Moroccan companies listed on the stock exchange, four hypotheses will be tested on the significance of the relationship between, on the one side the monthly returns of corporate actions of companies, and on the other side the monthly fluctuations in market performance, the monthly index fluctuations in the exchange rate, the monthly changes in interest rates, and the monthly fluctuations in commodity prices.

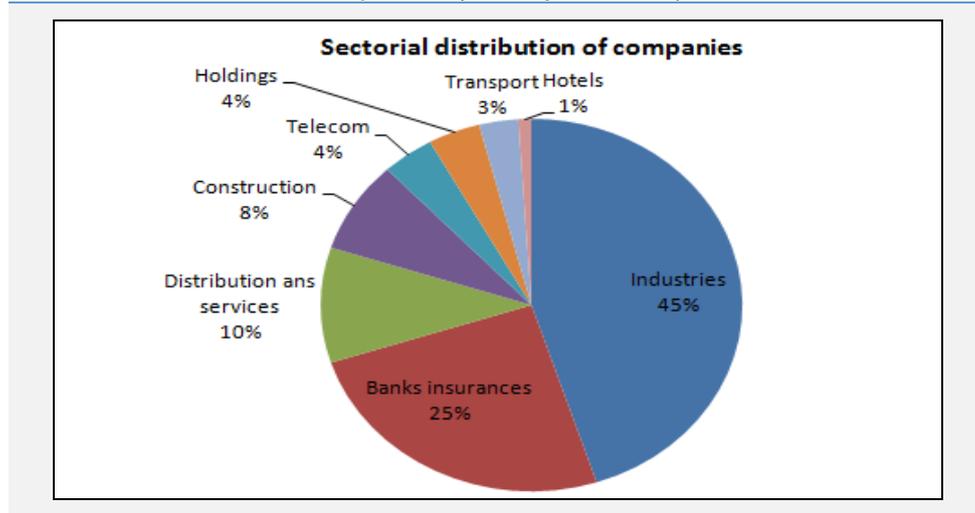
D -SAMPLE OF THE STUDY:

The sensitivity to fluctuations of financial instruments depends mainly on the degree of the company's involvement in the international market. The more the company operates abroad, the more the financial risks increase. Thus, the companies' exposure is different and depends on its risk management strategy.

To assess the sensitivity to changes in financial instruments, this study will focus on analyzing a sample of companies listed on stock exchanges covering a perimeter of 72 companies over a period of one year from the month May 2013 to April 2014. A descriptive analysis of this sample by industry brought out the following distribution:

- 45% of listed companies are industries.
- 25% of listed companies are banks, insurance and micro-credit companies.
- 10% of listed companies are distribution and service companies.
- 8% of listed companies operate in the construction sector.
- 4% of listed companies operate in the telecommunications sector.
- 4% of listed companies are holdings.
- 3% of listed companies operate in the transport sector.
- 1% of listed companies are hotels.

The table below provides a breakdown of companies by industry:

Table 1: Distribution of firms by sector (CDG capital source)

In the case of the Moroccan economy, the use of raw materials is not general for all businesses, this depends on the nature of the firm business. In the sample we have only 20% of companies which cover against this risk, and these operate mainly in the industrial sector which includes the food, chemical, mining and metallurgical.

It is in this perspective that the study will be performed on two different samples:

- The first study focuses on our entire sample with 72 companies and takes into consideration the following financial risks: market performance, the change in the exchange rate and the change in interest rates. The study will be performed using the following model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \chi_{ri} (\Delta r/r)_t + \chi_{FXi} (\Delta PFX/PFX)_t + \varepsilon_{it} \quad t=1 \dots T(3)$$

- The second study focuses on the 20% of companies with 14 firms being exposed to the risk of fluctuations in commodity prices, and takes into consideration the following financial risks: market performance, the change in the exchange rate, the change in rates interest and changes in commodity prices. The study will be carried out using the model of equation (2):

$$R_{it} = \alpha_i + \beta_i R_{mt} + \chi_{ri} (\Delta r/r)_t + \chi_{FXi} (\Delta PFX/PFX)_t + \chi_{ci} (\Delta PC/PC)_t + \varepsilon_{it} \quad t=1 \dots T(2)$$

3.02 RESULTS OF THE EMPIRICAL STUDY:

This section begins by describing the methodology of modeling, the followed approaches and the initiated analysis axes, then by presenting the results of different studies proposed.

A- DESCRIPTION OF THE METHODOLOGY OF MODELING:

The regression model subject of the study is estimated using as dependent variable monthly returns of the sample stocks, formed by companies listed on the Moroccan stock market over the period from the month of May 2013 until April 2014. The explanatory variables are the monthly price performance of the market, interest rates and commodity prices over the same period.

Three lines of analysis will be presented to explore the effects of financial risks on the value of the firm. The first analysis is to estimate the model on the entire sample of the study. However, this analysis shows only a partial picture of the effects of exposure risks. Financial mechanisms vary with the nature and the area of business activity. So a second analysis that aims to distinguish companies by industry

will be initiated. Finally, a third analysis evaluating company by company, in order to avoid the loss of information on the sensitivity of a given firm.

The econometric approach to achieve the first and second test involves applying a regression on panel data. In, the third analysis, the proposed model is estimated by the ordinary least square method. Then, the analysis of autocorrelation, heteroscedasticity and the normality of the distribution of residues are made to confirm the robustness of the estimated models.

We recall that in view of the differentiation of financial policies adopted by companies, two studies will be performed on two different samples; the first study focuses on the entire sample of 72 companies and will be the three axes of analysis, the second study focuses on a small sample, only 20% of companies representing 14 firms are exposed to risks of fluctuation prices of raw materials, and will be the first and third lines of analysis, since the sample size is small, and does not establish a sector study.

B -THE RESULTS OF THE STUDY 1:

This study focuses on the estimation of equation (3) and is organized as follows: First an evaluation of the model on the entire sample with 72 companies, then the estimation will be made by industry and finally, an individual analysis by estimating the model on each organization's data.

The first analysis showed that all publicly traded Moroccan companies are sensitive only to changes in the performance of the market. So at the 5% significance level, only the Hypothesis 1 holds.

Table 2: Results of the modeling of the entire sample (72 companies)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003924	0.003730	1.051977	0.2931
$R_{m,t}$ (market performance)	0.705861	0.087945	8.026145	0.0000
$\Delta r/r$ (Monthly variation of the interest rate)	-0.093823	0.122865	-0.763628	0.4453
$\Delta PFX/PFX$ (Monthly variation of the exchange rate)	0.385821	0.259008	1.489610	0.1367
R-squared	0.190428			

The second analysis shows that the fluctuations of the financial instruments do not affect the same way the different sectors. This result seems logical since exposure management policies adopted by the activity sectors differ.

Table 3: Results of the modeling industry (base 72 companies)

Sectors	Statistics	Variables				R-squared	significancy
		C	Market Performance	Change in interest rate	Change in the exchange rate		
Telecom	Coefficient	-0.010819	1.651824	-0.611326	-0.387921	0.281364	Market Performance
	Std. Error	0.020521	0.481661	0.670749	1.398594		
	t-Statistic	-0.527215	3.429435	-0.911408	-0.277365		
	Prob.	0.6017	0.0017	0.3689	0.7833		
Construction	Coefficient	0.013572	1.298999	0.281221	0.929937	0.347409	Market Performance
	Std. Error	0.011380	0.268503	0.374430	0.791536		
	t-Statistic	1.192691	4.837931	0.751064	1.174851		
	Prob.	0.2371	0.0000	0.4552	0.2442		
Distributions and services	Coefficient	0.002609	0.444647	-0.305804	1.928547	0.142926	Change in the exchange rate
	Std. Error	0.011501	0.271366	0.378424	0.799977		
	t-Statistic	0.226865	1.638550	-0.808099	2.410752		
	Prob.	0.8211	0.1052	0.4214	0.0182		
Holding	Coefficient	-0.009639	0.264142	-0.036807	0.540611	0.090175	***
	Std. Error	0.015211	0.353746	0.484737	0.960517		
	t-Statistic	-0.633713	0.746699	-0.075931	0.562833		
	Prob.	0.5311	0.4611	0.9400	0.5777		
Hotel	Coefficient	0.007694	0.158720	-0.947763	1.307292	0.067816	***
	Std. Error	0.049893	1.160335	1.590001	3.150624		
	t-Statistic	0.154209	0.136788	-0.596077	0.414931		
	Prob.	0.8813	0.8946	0.5676	0.6891		
Industries	Coefficient	0.003835	0.919617	-0.201404	0.220390	0.113901	Market Performance
	Std. Error	0.006119	0.144526	0.202358	0.427325		
	t-Statistic	0.626812	6.362979	-0.995284	0.515744		
	Prob.	0.5312	0.0000	0.3202	0.6063		
Transport	Coefficient	-0.030896	0.283327	-1.556617	1.284530	0.234990	Change in interest rate
	Std. Error	0.022149	0.522617	0.728795	1.540653		
	t-Statistic	-1.394881	0.542132	-2.135878	0.833757		
	Prob.	0.1791	0.5940	0.0459	0.4148		
Banks and insurances	Coefficient	0.010502	0.247742	0.365439	-0.189587	0.082609	***
	Std. Error	0.005897	0.139135	0.194026	0.410165		
	t-Statistic	1.781043	1.780587	1.883459	-0.462222		
	Prob.	0.0765	0.0765	0.0611	0.6444		

In considering these results, it appears that:

- Telecommunication sectors, buildings and public works and industry, are sensitive to market fluctuations performance, and that the areas of telecommunication and construction are riskier than the market, since the marginal contribution is superior to one.
- The transportation sector is sensitive to fluctuations in interest rates. The marginal contribution is negative, this means that if the performance of an action increases of one basis point therefore the monthly change in the interest rate will fall by 1.55 basis point.
- The area of distribution of goods and services is affected by changes in the exchange rate. The marginal contribution is positive; this means that if the performance of an action increases of one basis point therefore the monthly change in the interest rate will increase by 1.92 basis point.
- Banks and insurance, hotels and holding are sensitive to no financial instrument.

The second analysis concludes that a 5% significance level, the hypothesis 1 is true for industries: Telecom, Building and industry. Hypotheses2 is checked for the retail and service sector, the hypothesis3 holds for the transport sector.

The third analysis is based on an individual assessment of companies. This analysis allows to present the number of companies sensitive to fluctuations of financial instruments in terms of number and percentage industry.

Table 4: Numbers of companies sensitive to financial instruments by sector (base 72 companies)

Sectors	significancy								
	Market Performance		Change in interest rate		Change in the exchange rate		Total		
	Size	Percentage	Size	Percentage	Size	Percentage	Number of the sensitive companies	Total number of companies	Percentage
Telecom	2	67%	0	0%	1	33%	3	3	100%
Construction	4	67%	0	0%	0	0%	4	6	67%
Transport	0	0%	1	50%	0	0%	1	2	50%
Holding	1	33%	0	0%	0	0%	1	3	33%
Distribution	1	14%	0	0%	1	14%	2	7	29%
Industries	6	19%	1	3%	2	6%	9	32	28%
Banks and insurances	3	17%	0	0%	2	11%	5	18	28%
Hotel	0	0%	0	0%	0	0%	0	1	0%
Total	17	24%	2	3%	6	8%	25	72	35%

The main results of this analysis are concerned by the degree of corporate sensitivity to changes in financial instruments and emerge the following observations:

- 24% of companies are sensitive to market performance.
- 8% of companies are sensitive to changes in the exchange rate.
- 3% of companies are sensitive to changes in interest rates.
- Moderately 35% of Moroccan companies are sensitive to changes in financial instruments.
- The most sensitive sectors are telecommunication sector (100%) followed by the construction sector (67%) and then the transport sector (50%).

C -THE RESULTS OF THE STUDY 2

This study focuses on the estimation of equation (2) on a corporate sample using raw materials in 14 firms, then the estimation will be made on company by company to dilute the effect of diversification.

The first analysis showed that the Moroccan companies using raw materials are sensitive only to market performance fluctuations at a significance level of 5% and the monthly change in the interest rate it adds a level of significance 10%.

Table 5: Results of the modeling of the sample companies resorting to raw materials (base 14 companies)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002021	0.009914	-0.203846	0.8387
(R_{mt}) Market Performance	0.937356	0.199190	4.705847	0.0000
$(\Delta r/r)$ Monthly variation of the interest rate	-0.482817	0.280572	-1.720831	0.0872
$(\Delta PFX/PFX)$ Monthly variation of the exchange rate	0.322309	0.589487	0.546761	0.5853
$(\Delta PFC/PFC)$ Monthly variation of the price of raw materials	-0.030562	0.132487	-0.230679	0.8179
R-squared	0.161024			

The second analysis represents the results of the models applied for every company to assess the individual impact of each financial instrument on a given firm.

Table 6: Enrollment sensitive business fluctuations of financial instruments (base 14 companies)

significancy 10%										
Market Performance		Monthly variation Of the interest rate		Monthly variation Of the exchange rate		Monthly variation of the price of raw materials		Total		
Size	Percentage	Size	Percentage	Size	Percentage	Size	Percentage	Number of the sensitive companies	Total number of companies	Percentage of the sensitive companies
3	21,43%	3	21,43%	0	0%	3	21,43%	9	14	64,29%

The main results of this analysis focus on the degree of corporate sensitivity to changes in financial instruments and stand moderately 64% of companies are sensitive to changes in financial instruments, where 21% of companies are sensitive to market fluctuations yield, 21% companies are sensitive to monthly changes in interest rates, and 21% of companies are sensitive to changes in commodity prices.

4.0 CONCLUSION

This research focuses on the assessment of the impact of financial risks on the value of Moroccan company. The main findings argue that the sensitivity begins to take shape with the openness of the economy through the import and export activities

From a sample of 72 companies, the study shows that changes in financial instruments do not have the same impact on all the companies. The results suggest that 24% of companies are sensitive to market performance, 8% of companies are sensitive to changes in the exchange rate, 4% of companies are sensitive to changes in commodity prices and 3% of companies are sensitive to changes the interest rate. The second conclusion is that averagely 35% of Moroccan companies are sensitive to changes of financial instruments for the period of May 2013 to April 2014. The third conclusion is drawn that the most sensitive sectors are the telecommunication sector, followed by industry public building and works, and then the transport sector. Finally, companies that use raw materials are the most exposed to financial risks.

The low correlation rate between stock returns and changes in financial instruments can be explained by two arguments: first, the level of openness of the Moroccan economy which knows a number of obstacles, including considerable deindustrialization of the economy to which it is faced by highlighting its domestic products, investing in the creation of value in terms of human capital and encouraging companies to export .The second argument is the effect of delay, i.e. a lag between the time of change of the financial instrument and the impact suffered by the company.

Ultimately, this article has helped to highlight an important risk typology which is not considered by the majority of managers and shareholders. The exogenous character of financial risks complicates their anticipation and quantification. Thus, following the rapid development of partnerships with developed economies, and the speed of the relocation of projects to Africa, the government policy must begin to involve companies in hedging process against those risks that may cause negative impacts.

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APPENDIX

Tests of conformity of the robustness of the estimated models:

1/Test of correlation of residues: the test «test Breusch-Godfrey LM»

The hypotheses of the test: H₀: The residuals are not correlated

H₁: The residuals are correlated

If P-value > 5 %, the hypothesis H₀ is accepted

2/Test of homoscedasticity of the residues: the test " Breusch-Pagan-Godfrey "

The hypotheses of the test: H₀: The residuals are not heteroscedastics, and thus are homoscedastics.

H₁: The residuals are heteroscedastics

If P-value > 5 %, the hypothesis H₀ is accepted

3/Test of normality of residues: the test «Jarque-Bera»

The hypotheses of the test: H₀: The residuals have a normal distribution(casting)

H₁: The residuals are not normally distributed

If P-value > 5%, H₀ is accepted

Summary table of the tests of correlation, of homoscedasticity and of normality of the residues of the models considered of the companies of sectors transport, telecommunication, hotel, holding company, distributions and services, and the construction

Sectors	Compagnies	Test of the correlation of residues: Breusch-Godfrey LM test			Test of the homoscedasticity of residues: Breusch-Pagan-Godfrey			Test of the normality of residues: Jarque-Bera		
		Obs*R- squared	Prob. Chi- Square(2)	significancy	Obs*R- squared	Prob. Chi- Square(3)	significancy	Jarque-Bera	Probability	significancy
Transport	1	5.170447	0.0754	Accept H ₀	1.091182	0.7792	Accept H ₀	0.519163	0.771372	Accept H ₀
	2	0.000000	1.0000	Accept H ₀	5.360941	0.1472	Accept H ₀	0.957322	0.619613	Accept H ₀
Telecom	1	1.987544	0.3702	Accept H ₀	1.070903	0.7841	Accept H ₀	9.922278	0.0070055	Reject H ₀
	2	2.206229	0.3318	Accept H ₀	0.724692	0.8674	Accept H ₀	0.485547	0.784449	Accept H ₀
	3	0.000000	1.0000	Accept H ₀	3.107674	0.3753	Accept H ₀	5.840638	0.053916	Accept H ₀
Hotel	1	4.405242	0.1105	Accept H ₀	2.262821	0.5197	Accept H ₀	0.872037	0.646606	Accept H ₀
Holding	1	3.877808	0.1439	Accept H ₀	2.729322	0.4353	Accept H ₀	1.38128	0.501255	Accept H ₀
	2	3.774680	0.1515	Accept H ₀	3.793204	0.2847	Accept H ₀	0.035093	0.982607	Accept H ₀
	3	1.332314	0.5137	Accept H ₀	1.817979	0.6110	Accept H ₀	0.671101	0.714944	Accept H ₀
Distribution	1	0.417212	0.8117	Accept H ₀	4.174806	0.2432	Accept H ₀	0.476573	0.787977	Accept H ₀
	2	1.702737	0.4268	Accept H ₀	1.419154	0.7011	Accept H ₀	1.691259	0.429287	Accept H ₀
	3	0.233628	0.8898	Accept H ₀	2.689641	0.4420	Accept H ₀	0.632102	0.729022	Accept H ₀
	4	3.235036	0.1984	Accept H ₀	1.791959	0.6167	Accept H ₀	1.592252	0.451073	Accept H ₀
	5	1.175285	0.5556	Accept H ₀	2.899751	0.4073	Accept H ₀	1.053905	0.590401	Accept H ₀
	6	4.793919	0.0910	Accept H ₀	1.732987	0.6296	Accept H ₀	0.577829	0.749076	Accept H ₀
	7	0.417212	0.8117	Accept H ₀	4.174806	0.2432	Accept H ₀	0.476573	0.787977	Accept H ₀
Construction	1	1.953423	0.3765	Accept H ₀	3.490765	0.3220	Accept H ₀	0.138422	0.93313	Accept H ₀
	2	0.093496	0.9543	Accept H ₀	0.766758	0.8574	Accept H ₀	9.290343	0.009608	Reject H ₀
	3	4.182633	0.1235	Accept H ₀	1.332085	0.7215	Accept H ₀	0.99655	0.607578	Accept H ₀
	4	0.642374	0.7253	Accept H ₀	0.660179	0.8825	Accept H ₀	0.181615	0.913193	Accept H ₀
	5	3.328741	0.1893	Accept H ₀	0.909711	0.8231	Accept H ₀	0.103076	0.949768	Accept H ₀
	6	0.427420	0.8076	Accept H ₀	3.651889	0.3016	Accept H ₀	0.671991	0.714626	Accept H ₀

Summary table of the tests of correlation, homoscedasticity and normality of residues of the models considered of the companies of sectors banking and industrialists.

Sectors	Compagnies	Test of the correlation of residues: Breusch-Godfrey LM test			Test of the homoscedasticity of residues: Breusch-Pagan-Godfrey			Test of the normality of residues: Jarque-Bera		
		Obs*R- squared	Prob. Chi- Square(2)	significancy	Obs*R- squared	Prob. Chi- Square(3)	significancy	Jarque-Bera	Probability	significancy
Banks and insurances	1	5.697217	0.0579	Accept H0	0.701249	0.8729	Accept H0	0.277181	0.870585	Accept H0
	2	1.658600	0.4364	Accept H0	3.624289	0.3050	Accept H0	2.985983	0.224699	Accept H0
	3	0.000000	1.0000	Accept H0	1.421754	0.7004	Accept H0	0.073843	0.963752	Accept H0
	4	0.000000	1.0000	Accept H0	5.116876	0.1634	Accept H0	3.573968	0.167464	Accept H0
	5	0.745526	0.6888	Accept H0	2.545466	0.4671	Accept H0	3.020286	0.220878	Accept H0
	6	0.000000	1.0000	Accept H0	1.539713	0.6731	Accept H0	0.27537	0.871373	Accept H0
	7	2.056895	0.3576	Accept H0	1.828139	0.6088	Accept H0	2.289785	0.318258	Accept H0
	8	2.547579	0.2798	Accept H0	5.171930	0.1596	Accept H0	0.105364	0.948681	Accept H0
	9	0.000000	1.0000	Accept H0	6.775244	0.0794	Accept H0	0.586964	0.745663	Accept H0
	10	2.536471	0.2813	Accept H0	1.656999	0.6465	Accept H0	0.619903	0.733483	Accept H0
	11	0.000000	1.0000	Accept H0	3.486777	0.3225	Accept H0	1.438696	0.48707	Accept H0
	12	3.232803	0.1986	Accept H0	1.889403	0.5957	Accept H0	0.165001	0.920811	Accept H0
	13	7.113578	0.0285	Reject H0	2.499312	0.4754	Accept H0	0.466428	0.791984	Accept H0
	14	1.239614	0.5380	Accept H0	0.706061	0.8718	Accept H0	3.134593	0.208608	Accept H0
	15	0.821164	0.6633	Accept H0	1.366724	0.7134	Accept H0	1.381017	0.501321	Accept H0
	16	8.432436	0.0148	Reject H0	4.119689	0.2488	Accept H0	0.090154	0.955924	Accept H0
	17	8.432436	0.0148	Reject H0	4.119689	0.2488	Accept H0	0.090154	0.955924	Accept H0
	18	5.060090	0.0797	Accept H0	2.829381	0.4187	Accept H0	0.348886	0.839925	Accept H0
Industries	1	0.000000	1.0000	Accept H0	0.442393	0.9314	Accept H0	12.12811	0.002325	Reject H0
	2	1.482563	0.4765	Accept H0	3.644612	0.3025	Accept H0	0.47063	0.790322	Accept H0
	3	3.996728	0.1356	Accept H0	3.318645	0.3451	Accept H0	0.647434	0.723455	Accept H0
	4	0.000000	1.0000	Accept H0	0.983337	0.8053	Accept H0	3.208459	0.201044	Accept H0
	5	4.576127	0.1015	Accept H0	2.561203	0.4643	Accept H0	0.407039	0.815854	Accept H0
	6	4.526892	0.1040	Accept H0	6.965880	0.0730	Accept H0	0.313173	0.855057	Accept H0
	7	2.362117	0.3070	Accept H0	2.571164	0.4626	Accept H0	0.886285	0.642016	Accept H0
	8	4.627977	0.0989	Accept H0	1.021217	0.7961	Accept H0	0.339413	0.843912	Accept H0
	9	6.264881	0.0436	Reject H0	2.075509	0.5569	Accept H0	1.584256	0.45288	Accept H0
	10	0.304783	0.8587	Accept H0	1.072497	0.7837	Accept H0	5.41633	0.066659	Accept H0
	11	0.000000	1.0000	Accept H0	5.035756	0.1692	Accept H0	2.690526	0.260471	Accept H0
	12	0.868720	0.6477	Accept H0	6.680143	0.0828	Accept H0	0.014282	0.992884	Accept H0
	13	1.729005	0.4213	Accept H0	2.550808	0.4662	Accept H0	1.230221	0.540581	Accept H0
	14	3.426251	0.1803	Accept H0	1.941934	0.5845	Accept H0	0.036331	0.981998	Accept H0
	15	1.340622	0.5115	Accept H0	0.515219	0.9155	Accept H0	1.000783	0.606293	Accept H0
	16	1.330688	0.5141	Accept H0	1.512965	0.6793	Accept H0	9.808488	0.007415	Reject H0
	17	2.369116	0.3059	Accept H0	3.321120	0.3447	Accept H0	8.082833	0.17573	Accept H0
	18	6.175577	0.0456	Reject H0	1.629481	0.6527	Accept H0	1.095234	0.578326	Accept H0
	19	4.847594	0.0886	Accept H0	4.587004	0.2047	Accept H0	0.394767	0.820876	Accept H0
	20	1.494745	0.4736	Accept H0	1.454766	0.6927	Accept H0	0.036572	0.98188	Accept H0
	21	2.598603	0.2727	Accept H0	1.913653	0.5905	Accept H0	4.99803	0.082166	Accept H0
	22	0.304557	0.8587	Accept H0	2.488054	0.4775	Accept H0	0.629989	0.729793	Accept H0
	23	0.326830	0.8492	Accept H0	4.949443	0.1755	Accept H0	0.399778	0.818822	Accept H0
	24	0.000000	1.0000	Accept H0	2.236089	0.5249	Accept H0	1.41269	0.493444	Accept H0
	25	0.000000	1.0000	Accept H0	2.515123	0.4726	Accept H0	0.015342	0.992359	Accept H0
	26	1.666578	0.4346	Accept H0	2.533017	0.4694	Accept H0	0.244609	0.884879	Accept H0
	27	0.000000	1.0000	Accept H0	2.031957	0.5658	Accept H0	0.055724	0.972523	Accept H0
	28	0.615422	0.7351	Accept H0	4.011048	0.2603	Accept H0	1.210411	0.545962	Accept H0
	29	0.215258	0.8980	Accept H0	5,34634	0,1481	Accept H0	0.772716	0.679527	Accept H0
	30	2.053129	0.3582	Accept H0	0.835298	0.8410	Accept H0	2.115125	0.347301	Accept H0
	31	5.509081	0.0636	Accept H0	2.523881	0.4710	Accept H0	0.491745	0.782022	Accept H0
	32	5.449605	0.0656	Accept H0	3.821462	0.2814	Accept H0	0.625535	0.73142	Accept H0