International journal of applied management and economics
Vol : 02 , N° 10 , October 2024
ISSN : 2509-0720

Econometric analysis of the impact of exchange rate variations on the market value of Morocco's non-financial firms

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Conflict of interest: The author reports no conflict of interest.

To quote this article: STI .N, NABIL .S, ROUGGANI Kh & BENJOUID .Z (2024) « Econometric analysis of the impact of exchange rate variations on the market value of Morocco's non-financial firms»,

IJAME : Volume 02, N° 10 | Pp: 134 – 155.

Submission date : September 2024
Publication date : October 2024

DOI : 10.5281/zenodo.13842546

ABSTRACT

Morocco has begun the process of loosening its exchange rate regime in an international setting characterized by macroeconomic instability. This move could raise exchange rate volatility and expose businesses to more currency rate risk. This study examines the impact of these oscillations on the listed non-financial companies' value and pinpoints the primary causes of this exposure. We processed data from 49 non-financial companies listed on the CSE for the period from January 2018 to December 2021 in order to evaluate this impact. Exchange rates, stock prices, and other financial indicators are included in the data. According to the findings, 14.28% of businesses have a sizable foreign exchange risk exposure. The size of the organization, its export rate, and its debt load are the primary elements that explain this exposure. The significance of foreign exchange risk management techniques tailored to the contemporary foreign exchange market dynamics is shown by these findings.

KEYWORDS : Exchange rates ; Exchange rate regime ; Firm value ; Exchange rate exposure.

1 Introduction

Many studies have looked at the relationship between exchange rates and the market value of enterprises as a result of globalization, the internationalization of trade, and the flexibility of exchange rate regimes. Discussions concerning methodological limits and the distinctions between theory and empirical evidence have resulted from these investigations.

The effect of exchange rate fluctuations on the value of firms has been examined in a number of empirical studies, and the results often indicate that only a small number of enterprises are considerably vulnerable to these variations (Bodnar and Wong, 2003; He and Ng, 1998; Bartov et al., 1996; Bartov and Bodnar, 1994). Nonetheless, a greater proportion of businesses should be susceptible to changes in the exchange rate, according to financial theory (Dufey, 1972; Shapiro, 1974; Adler and Dumas, 1984). The "exposure puzzle" is the name given to this discrepancy. By examining the susceptibility of listed Moroccan companies to shifts in the exchange rate within the framework of the Moroccan exchange rate regime's overhaul, this study attempts to provide some light on this puzzle.

In fact, Morocco has begun to loosen its currency rate regulations as of January 2018. The Dirham's fluctuation band was widened by +/- 2.5% on January 15, 2018, marking the start of this change. In March 2020, there will be another revision, bringing the total to +/- 5%.

Increased exchange rate volatility could result from this legislation, which would impact cash flows and ultimately impact the profitability and value of businesses.

Furthermore, the majority of research on currency rate risk exposure has been carried out in industrialized nations, with relatively less research being done in emerging nations. Therefore, it makes sense to look into this matter in a developing nation like Morocco. Furthermore, in light of exchange rate reforms and a financial sector with few options for hedging exchange rate risks, the study's findings may increase Moroccan businesses' awareness of the dangers related to currency rate volatility.

Moreover, Moroccan research, like those by Hutson et al. (2014), Mrhari and Daoui (2017), STI et al. (2022), and Ibnrhissoul et al. (2015), have mostly measured exposure to exchange rate risk without analyzing the explanatory components. In order to gain a deeper understanding of the financial and economic characteristics of organizations that impact their exposure, this research attempts to objectively evaluate these elements.

This study is unique in that it addresses the limitations of earlier research, updates the findings, and considers the COVID-19 pandemic and Morocco's exchange rate reforms in the present. It will contribute in the areas of theory, research, and management.

Our research issue is : in light of the dirham's flexibilization, how much does the value of companies listed on Casablanca Stock Exchange fluctuate due to exchange rate fluctuations ? The paper is organized as follows to address this question: we start with a literature evaluation and the formulation of research hypotheses. The study approach that was used is then presented, and the analysis's findings come next. In conclusion, we explore the consequences of our discoveries and propose directions for further investigation.

2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Exchange rate exposure is the term used in the literature to describe how changes in exchange rates affect a firm's economic value (Hekman, 1983; Adler and Dumas, 1984). Most empirical research is grounded in the theoretical work of Adler and Dumas (1984), who suggest measuring this exposure using a linear regression model, where the explained variable is the company value as determined by return on shares, and the explanatory variable is exchange rate variation.

Contradictory findings, meanwhile, are presented in the empirical literature on the connection between firm value and exchange rates. Indeed, a number of studies (Jorion, 1990; Hsin et al., 2007; Bartov and Bodnar, 1994) demonstrate that changes in exchange rates have little to no impact on stock returns in industrialized and closed countries. Conversely, exchange rate fluctuations have a greater impact on small developing economies and open economies. In this regard, Hutson and Stevenson (2010) found that open economies are more vulnerable to exchange rate risk than closed economies after studying a sample of 3788 enterprises across 23 developed nations. Conversely, Ye, Hutson, and Muckley (2014) investigated, over a ten-year span from 1999 to 2010, the effects of exchange rate variations on the stock returns of 1523 companies in 20 emerging nations, including Morocco. They discovered that the value of half of the chosen enterprises was significantly impacted by changes in exchange rates. The authors discovered that 8 out of 28 enterprises in Morocco, or 29%, had a considerable exposure to changes in exchange rates.

The literature on emerging markets as a whole has found a significant relationship between exchange rate fluctuations and stock returns (Parsley and Popper, 2006; Dominguez and Tesar, 2006; Aysun and Guldi, 2011; Ye, Hutson and Muckley, 2014). Given that Morocco is among the main emerging countries in Africa with an open economy, exchange rate variations would have a significant impact on the value of listed Moroccan companies. We therefore formulate the following hypothesis:

H1 : Variations in exchange rates have the potential to significantly impact on the stock returns of companies listed on the CSE.

Firm size is an explanatory factor for risk exposure in the majority of prior research that has looked at the relationship between exchange rate swings and stock returns (He and Ng, 1998; Bartram, 2007; Dominguez and Tesar, 2006; Aggarwal and Harper, 2011; Hutson and Stevenson, 2010). It is unclear, therefore, how a company's size and its exposure to foreign exchange risk are related. The degree of risk exposure and the size of the company have been found to be positively correlated by some writers (He and Ng, 1998; Bartram, 2007), negatively correlated by others (Dominguez and Tesar, 2006; Aggarwal and Harper, 2011; Hutson and Stevenson, 2010). The adoption of hedging tools by large corporations has justified this adverse link.

Large businesses typically have access to a variety of technological and human resources for hedging strategies. Therefore, the motivation to hedge increases with company size. Furthermore, the cost of hedging is significantly decreased by the economies of scale that big businesses enjoy. Given the foregoing, it would appear pertinent to formulate the following theory:

H2 : The company's susceptibility to exchange rate changes may be significantly and negatively impacted by its size

According to several studies (Jorion, 1990; Choi and Prasad, 1995; Bartram, 2007; Huffman, Makar, and Beyer, 2010; Bodnar and Wong, 2003; Nouajaa and Viviani, 2012), a company's exposure to currency rate risk can be explained by the volume of sales it generates abroad. While some of these studies (Jorion, 1990; Choi and Prasad, 1995; Bartram, 2007; Huffman, Makar, and Beyer, 2010) indicate a positive relationship, others (Bodnar and Wong, 2003; Nouajaa and Viviani, 2012) suggest an inverse relationship between the level of foreign operations and exposure to exchange rate fluctuations. In theory, companies that export significantly are probably more vulnerable to exchange rate risk. Nonetheless, companies that engage in more global business are more likely to employ hedging strategies, which could lower their exposure to currency risk (Dominguez and Tesar, 2006; Judge, 2006). As a result, the following explanation fits the hypothesis associated with the foreign sales variable:

H3 : The company's exposure to swings in exchange rates may be adversely affected by the extent of its foreign sales.

The leverage ratio has been utilized as an indicator of financial hardship in a number of prior empirical studies that have looked at the connection between exposure to exchange rate risk and financial distress. The outcomes appear to be debatable. In fact, some research has indicated that there is a negative correlation between a company's debt load and its sensitivity to swings in exchange rates (He and Ng, 1998; Chue and Cook, 2008). However, some studies (Aggarwal and Harper, 2011; Hutson and Stevenson, 2010) demonstrate a positive correlation between financial leverage and exposure to exchange rate risk.For businesses that are heavily indebted or unable to fulfill their financial obligations, financial distress usually comes at a very high cost. Companies try to lessen exchange rate fluctuations in order to address this issue, which makes them more likely to hedge. Consequently, businesses with large debt loads are more likely to engage in hedging. Their vulnerability to changes in exchange rates is thereby reduced. Thus, we forecast a negative correlation between Moroccan enterprises' vulnerability to exchange rate volatility and their degree of debt. As a result, the following formulation of the debt variable hypothesis is possible:

H4 : The company's vulnerability to exchange rate swings may be significantly and adversely affected by the amount of debt it carries.

Companies with growth potential are more likely to utilize hedging techniques to lower the costs of underinvestment, according to a number of prior studies that looked at the relationship between exposure to exchange rate risk and growth opportunities (Froot et al., 1993; He and Ng, 1998).

The ratio of the company's market value to its book value is used as an indicator to quantify the investment opportunities available to companies in order to test this relationship. The greater this ratio, the lower the level of exposure to foreign exchange risk and the greater the growth potential. Considering the aforementioned, we presume a negative correlation between the growth opportunity ratio and the degree of exchange rate risk exposure. As a result, the following formulation of the hypothesis can be applied to the growth opportunities variable:

H5 : The company's expansion prospects may have a major negative impact on its exposure to exchange rate changes.

A company's hedging activities may be influenced by its liquidity position. Companies with liquid assets are less likely to use hedging products since they have the capacity to meet their financial obligations and avoid financial difficulties. In this context, Nance et al. (1993) argue that liquidity is a replacement for hedging. As a result, corporations with a high level of liquidity are less likely to engage in hedging activities, increasing their exposure to foreign exchange risk. Furthermore, multiple scholars have confirmed a negative association between a company's liquidity and its use of hedging instruments (Bartram et al., 2009; Lin et al., 2008). Consequently, these companies are considered to be more vulnerable to exchange rate movements. To that aim, we expect a positive link between Moroccan enterprises' liquidity and their exposure to exchange rate swings. Thus, the hypothesis relating to the liquidity variable might be expressed as follows:

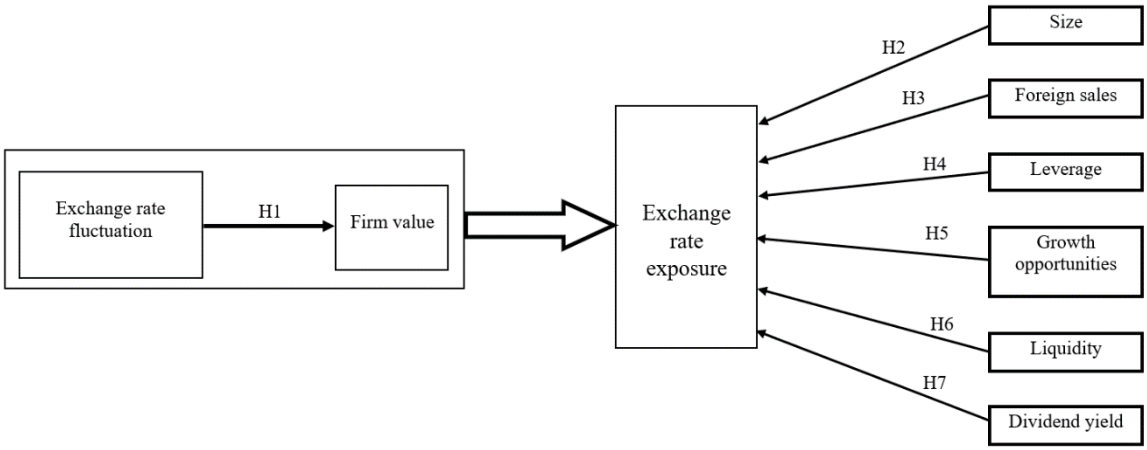
H6 : The company's liquidity levels may have a large and positive impact on its exposure to exchange rate changes.

Finally, various empirical studies have found a link between dividend payout ratio and exposure to currency risk (He and Ng, 1997; Hutson and Odriscol, 2010; Hsin et al., 2007; Nouajaa, 2012). Nance, Smith, and Smithson (1993) explained that corporations that pay out fewer dividends keep more capital, reducing the need for hedging. As a result, the correlation between dividend payout ratio and currency risk is negative. As a result, corporations with modest dividend payouts have less motivation to hedge, increasing their exposure to exchange rate volatility. To this end, we expect a favorable association between the Moroccan firm's dividend payout level and sensitivity to currency rate fluctuations. Thus, the hypothesis concerning the dividend distribution variable might be expressed as follows:

H7 : The company's dividend distribution strategy may have a large and favorable influence on its exposure to exchange rate swings.

Based on the theories generated in our study, the conceptual model is as follows :

Research framework



Source : Authors

3 METHODOLOGY

To assess the validity of our conceptual research model, we conducted two distinct investigations with linear regression-based econometric techniques. These studies are undertaken in two phases. The first phase attempts to objectively analyze the impact of exchange rate variations on the stock returns of non-financial companies listed on the Casablanca Stock Exchange between January 2018 and December 2021. The second phase assesses the explanatory factors influencing these companies' exposure to exchange rate risk over the same time period. This era is particularly significant to our research because it coincides with the introduction of the exchange rate flexibility reform (widening of the Dirham's fluctuation band) and the COVID-19 health crisis.

3.1 SAMPLE

Our research focuses on non-financial companies listed on the Casablanca Stock Exchange between January 2018 and December 2021, as they provide the necessary data for our analysis. We omitted financial institutions due to their unique financial statement structure and access to hedging mechanisms. Our research sample includes 49 companies listed on the Casablanca Stock Exchange.

3.2 ECONOMETRIC MODELS

The first model for measuring exchange rate exposure is as follows:

$$\boldsymbol{R_{it} = \beta_0 + \beta_i^{€} Var€_t + \beta_i^{\$} Var\$_t + \beta_i^{v} VI + \varepsilon_{it}}$$

With :

$\boldsymbol{R_{it}}$: The monthly return on the share of company i at time t is given by :

$R_{it} = ln(\frac{P_t}{P_{t-1}})$, where P_t is the share price in month t and P_{t-1} is the share price in month (t-1) ;

$\boldsymbol{Var€_t}$: The monthly variation of the euro share price at time t is denoted by

$Var€ = \frac{price€_t - price€_{t-1}}{price€_{t-1}}$;

$\boldsymbol{\beta_i^{€}}$: The sensitivity parameter of the firm i to fluctuations in the US dollar ;

$\boldsymbol{Var\$_t}$: The monthly variation of the US dollar rate at time t is represented by

$Var\$ = \frac{price\$_t - price\$_{t-1}}{price\ \$_{t-1}}$;

$\boldsymbol{\beta_i^{\$}}$: The sensitivity parameter of the firm i to fluctuations in the euro;

$\boldsymbol{VI}$: Binary instrumental[1] variable coded (0, 1) ;

$\boldsymbol{\beta_i^{v}}$: Marginal contribution ;

$\boldsymbol{\beta_0}$: A constant term ;

$\boldsymbol{\varepsilon_{it}}$: The residual of the regression.

In the second empirical phase, our study approach considers six independent variables: size, financial leverage, liquidity, growth potential, dividend policy, and export rate.

- One dependent variable is the vector of exposure coefficients βi, which represents overall exposure to foreign exchange risk based on the results of our initial study.

As a result, our econometric model will be constructed using quantitative variables requiring computational expressions. The table below summarizes the chosen variables and their associated calculation equations.

[1] 0 : non-crisis period
1: crisis period

Table 1. Summary of independent variables (Empirical phase 2)

Variables	***Abréviations***	***Mesure***
Firm size	***LnSize***	The four-year mean of the logarithm of total assets.
Growth opportunities	***MB***	The four-year mean ratio of market capitalisation to the book value of the company's equity.
Liquidity level	***Liquidity***	The four-year mean ratio of the sum of cash and cash equivalents, short-term investments and accrued income to the book value of total debt
Dividend yield policy	***DY***	Four-year mean of the dividend paid/share price ratio
The level of financial debt	***Leverage***	The four-year mean of the debt-to-equity ratio
foreign sales	***FSales***	Four-year mean of the ratio of foreign sales to total sales

Source: Authors

Because of the variables we chose, we collected secondary data from reliable and credible sources, which confirmed the validity of our findings.

Regarding the dependent variable, the data are extrapolated from the results of our previous study, which marked the coefficients of exposure to exchange rate risk arising from the regression of Model 1.

In terms of independent variables, the majority of the data came from the selected companies' annual financial reports, including the Balance Sheet, the Income Statement, and the B11 statement of the Income Statement details appearing at the Statement of Additional Information level.

The CDG Capital bourse and CSE databases were used to collect stock market information such as market capitalisation, dividends paid, and share price.

The econometric form of the regression models used to evaluate the factors explaining exposure to exchange rate risk is presented as follows:

Model 2 :

$$\beta_i^{€} = \gamma_1 + \gamma_2 Size_i + \gamma_3 Leverage_i + \gamma_4 MB_i + \gamma_5 Liquidity_i + \gamma_6 LSales_i + \gamma_7 DY_i + \varepsilon_{it}$$

With :

$\beta_i^{€}$: The coefficients of exposure to exchange rate risk estimated by the model1 in relation to the fluctuation of the euro for each company i ;

$\gamma_1, \gamma_2, \ldots\ldots, \gamma_k$, : Model parameters ;

ε_{it} : Specification error.

Model 3 :

$$\beta_i^{\$} = \gamma_1 + \gamma_2 Size_i + \gamma_3 Leverage_i + \gamma_4 MB_i + \gamma_5 Liquidity_i + \gamma_6 LSales_i + \gamma_7 DY_i + \varepsilon_{it}$$

With :

$\beta_i^{\$}$: The coefficients of exposure to exchange rate risk estimated by model 1 in relation to the fluctuation of the USD for each company i ;

$\gamma_1, \gamma_2, \ldots\ldots, \gamma_k$, : Model parameters ;

ε_{it} : Specification error.

4 RESULTS AND DISCUSSION

Descriptive statistics

Table 2 presents a descriptive analysis of monthly variations in the euro (Var€) and the US dollar (Var$) over 48 months.

Table 2. Descriptive analysis of variables (Empirical phase 1)

	Mean	**Standard deviation**	**Min**	**Max**
Var€	-0,0013	0,0083	-0,0247	0,0279
Var$	-0,0003	0,0122	-0,0330	0,0459

Source: Authors

The mean variation for the euro is slightly negative (-0.0013), but the dollar is nearly unchanged (-0.0003). The dollar exhibits greater volatility (standard deviation of 0.0122) than the euro (0.0083), implying greater changes for the dollar.

The correlation analyses reveal intriguing patterns between monthly swings in the euro (Var€) and US dollar (Var$) rates.

Table 3. Correlation analysis of variables (Empirical phase 1)

		Var€	***Var$***
Var€	**Corrélation de Pearson**	1	0,091
	Sig. (bilatérale)		0,540
	N	48	48
Var$	**Corrélation de Pearson**	0,091	1
	Sig. (bilatérale)	0,540	
	N	48	48

Source: Authors

The correlation between Var€ and Var$ dropped to 0.091, showing a nearly non-existent and

insignificant relationship between the two currencies.

The table below provides descriptive information regarding the characteristics of the selected companies from January 2018 to December 2021. These factors include corporate size (*size*), foreign sales (*FSales*), leverage ratio (*Leverage*), Liquidity ratio (*Liquidity*), growth opportunity ratio (*BM*) and dividend policy (*DY*). It displays the mean, standard deviation, minimum, and maximum for each variable

Table 4. Descriptive analysis of explanatory variables (Empirical phase 2)

	Mean	**Standard deviation**	**Min**	**Max**
LnSize	21,46	1,62	17,79	25,46
Leverage	0,31	0,49	0,00	2,68
MB	2,71	2,10	0,31	9,02
Liquidity	0,66	1,47	0,00	8,70
DY	0,02	0,02	0,00	0,08
Fsales	0,15	0,29	0,00	0,98

Source: Authors

The size variable was calculated using the logarithm of the total assets to ensure a more consistent distribution of values. The minimum and maximum values are 17.79 and 25.46, respectively, with a mean of 21.46 and standard deviation of 1.62.

In our study, we employ the Market to Book Ratio to examine the idea of underinvestment. The descriptive statistics show that the maximum, minimum, and mean values of the MB are 9.02, 0.31, and 2.71, respectively, indicating that the companies in our sample have prospects for growth and investment while also creating wealth for their shareholders from 2018 to 2021.

In contrast, the debt variable spans from 0 to 2.68, with an average of 0.31. The minimal value suggests that some organizations in our sample do not incur financing debt. Furthermore, the average of 0.31 indicates that 31% of the equity capital of the enterprises in our sample is long-term debt.

Similarly, the data suggest that the average liquidity ratio (*Liquidity*) is 0.66, with a range of 0.00 to 8.70. This indicates that the companies in our sample have a high level of liquidity.

Furthermore, the minimum and greatest values for the level of dividend distribution among the companies in our sample are 0.00 and 0.08, respectively, with an average of 0.02.

In terms of exports, the companies in our sample had an average export ratio of 0.15, indicating that exports account for 15% of their total sales. The minimum and highest values are 0.00 and 0.98, respectively. The zero value of the minimal value indicates the presence of enterprises that do not conduct international operations.

The following table summarizes the findings of the correlation analysis of the explanatory variables, which utilized Pearson's correlation matrix.

Table 5. Correlation analysis of variables (Empirical phase 2)

		Size	***leverage***	***MB***	***Liquidity***	***DY***	***Fsales***
Size	***Corrélation de Pearson***	1	0,033	0,433**	-0,116	0,075	-0,093
	Sig. (bilatérale)		0,822	0,002	0,425	0,609	0,527
	N	49	49	49	49	49	49
Leverage	***Corrélation de Pearson***	0,033	1	0,034	-0,165	-0,281	-0,095
	Sig. (bilatérale)	0,822		0,817	0,258	0,050	0,517
	N	49	49	49	49	49	49
MB	***Corrélation de Pearson***	0,433**	0,034	1	-0,075	0,300*	-0,026
	Sig. (bilatérale)	0,002	0,817		0,610	0,036	0,860
	N	49	49	49	49	49	49
Liquidity	***Corrélation de Pearson***	-0,116	-0,165	-0,075	1	0,086	-0,039
	Sig. (bilatérale)	0,425	0,258	0,610		0,557	0,790
	N	49	49	49	49	49	49
DY	***Corrélation de Pearson***	0,075	-0,281	0,300*	0,086	1	0,006
	Sig. (bilatérale)	0,609	0,050	0,036	0,557		0,968
	N	49	49	49	49	49	49
Fsales	***Corrélation de Pearson***	-0,093	-0,095	-0,026	-0,039	0,006	1
	Sig. (bilatérale)	0,527	0,517	0,860	0,790	0,968	
	N	49	49	49	49	49	49

***/**/* significant at the 1%/5%/10% level respectively

Source: Authors

The independent variables in both regression models show no strong association, as indicated

by the Pearson correlation matrix. The Market-to-Book (*MB*) ratio is correlated with the size variable (0.300) and the Dividend Yield (*DY*) with the MB ratio (0.433), but these values are relatively low, indicating weak relationships between the variables.

Results presentation and analysis

14.28% of businesses are considerably exposed to exchange rate risk, according to the results of the estimation of econometric model 1 (see table 6), with a 5% margin of error.

Table 6. Estimation results for exchange rate exposure

	The proportion of companies with significant exposure to foreign exchange risk		
Analysis period : January 2018 - December 2021	4,08%***	14,28%**	30,61%*

***/**/* significant at the 1%/5%/10% level respectively

Source: Authors

This discovery validates the theoretical hypotheses positing a noteworthy correlation between fluctuations in the exchange rate and the return on equity of publicly traded corporations. Consequently, we confirm our first hypothesis. Comparing actual data to theoretical predictions, the percentage of businesses that are highly exposed to exchange rate risk remains relatively small.

For both USD and EURO fluctuations from January 2018 to December 2021, non-financial companies listed on the Casablanca stock exchange had their exposure to currency rate risk estimated using multiple linear regression, as shown in Table 6

Table 7. Summary of results for factors explaining exposure to foreign exchange risk

	Euro		**USD**	
Variable	**Coefficient d'exposition**	**P-value**	**Coefficient d'exposition**	**P-value**
Size	-0,158	0,272	**-0,237*** **	**0,008**
MB	0,129	0,363	0,025	0,866
Liquidity	0,027	0,853	0,052	0,719
DY	-0,045	0,763	0,131	0,328
Leverage	**-0,882***	**0,057**	-0,006	0,968
FSales	-0,056	0,695	**-1,013** **	**0,040**
Constante	-0,402	0,128	**4,287****	**0,026**
R^2	0,075		0,192	
N	49		49	

***/**/* significant at the 1%/5%/10% level respectively.

Source: Authors

The coefficients of the variables Leverage, Size, and Fsales exhibit strong and statistically significant explanatory power for the foreign currency risk exposure of Casablanca stock exchange listed companies

Discussion

The examination and comparison of our results to the literature reveal a concordance between our findings and those of earlier studies. Indeed, the results of the measurement of exposure to exchange rate risk (Model 1) are consistent with the results of previous studies, both at the national level (STI et al. (2022) ; Mrhari, M and Daoui, D. (2017); Ibenrissoul and Zouigui, (2015); Ye, Hutson and Muckley (2014)) and internationally (Bodnar and Wong, 2003), which found a low percentage of companies significantly exposed to exchange rate risk.

The findings, which demonstrate a minimal number of enterprises considerably exposed to currency risk, lend credence to the exposure puzzle's dispute. Indeed, financial theory predicts that fluctuations in the exchange rate will have a considerable impact on the value of the company. However, the empirical literature demonstrates that this relevance is limited to a small number of organizations (Mefteh, 2006; He and Ng, 1998; Jorion, 1990)

Furthermore, our study's findings indicate that the company size variable is significantly and negatively correlated with USD fluctuations at the 99% level. This suggests that major companies listed on the CSE are less vulnerable to exchange rate swings than smaller companies. **Hypothesis (H2) is thus confirmed.**

This could be because large corporations have greater access to hedging products and are therefore less expose to exchange rate risk. These organizations also have human capital that is more suited to using hedging products, which necessitate a high level of experience as well as specialized resources and valuation processes.

This finding aligns with the theory of the determinants of hedging, which proposes the 'hedging capacity' argument (Smith and Stulz, 1984; Block and Gallagher, 1986), which predicts that large companies have more sophisticated human and financial resources to hedge their financial risks, reducing their exposure to exchange rate risk. Similarly, multinational corporations adopt operational and financial hedging strategies to mitigate foreign exchange risk (Pantzalis et al. 2001). Furthermore, large enterprises benefit from economies of scale, which reduce the cost of hedging and improve access to hedging resources (Nance et al., 1993; Allayannis and Ofek, 2001; Hutson and Laing, 2014). Our findings are consistent with empirical research indicating a considerable negative relationship between firm size and exposure to foreign exchange risk (Pantzalis et al., 2001; Dominguez and Tesar, 2006; Hutson and Stevenson, 2010; Aggarwal and Harper (2010)...).However, it should be emphasized that our findings contradict earlier research indicating a strong and positive association (He and Ng, 1998; Bartram, 2007).

The results demonstrate that the foreign sales ratio (*Fsales*) is negatively and significantly associated to USD movements at a 95% confidence level. In other words, companies listed on the CSE with a high amount of exports are less vulnerable to exchange rate fluctuations.

Hypothesis (H3) is thus confirmed.

There are three primary causes for this outcome: First, exporting companies listed on the Casablanca stock exchange that have greater international activities are more cognizant of foreign exchange concerns. They utilize more effective hedging strategies to limit their exposure. Second, this sort of organization earns a high amount of income in foreign currencies, reducing its exposure to foreign exchange risk. Finally, because these enterprises are directly exposed to foreign exchange risk, they can hedge their risks more easily than companies that are indirectly exposed. When we compare our findings to the results of previous studies on international markets, we can say that our findings are consistent with the work of several

authors (Bodnar and Wong, 2003; Nouajaa and Viviani, 2012; Dominguez and Tesar, 2006; Judge, 2006), who justify this finding by the practice of hedging by firms with more foreign sales. Nonetheless, the findings of Jorion (1990), Choi and Prasad (1995), Bartram (2007), and Huffman, Makar, and Beyer (2010) revealed a positive and significant association between the foreign sales ratio and exposure to currency risk.

Our findings suggest that the long-term leverage ratio has a considerable negative impact on euro fluctuations, with a 10% margin of error. This shows that companies listed on the CSE with a high level of debt are less vulnerable to exchange rate volatility. **Hypothesis (H4) is thus confirmed.**

This result can be explained by the fact that enterprises with greater long-term debt ratios are more vulnerable to financial distress, making them more likely to adopt hedging mechanisms. Similarly, optimum hedging theory demonstrates that the expected costs of financial distress motivate enterprises to hedge their financial risk (Smith and Stulz, 1985), leaving them less vulnerable to exchange rate changes (He and Ng, 1998).

Furthermore, our findings corroborate the empirical findings of He and Ng (1998) and Chue and Cook (2008), who found a negative and substantial link between long-term debt ratio and foreign exchange risk exposure. However, our findings contradict the findings of Aggarwal and Harper (2010) and Hutson and Stevenson (2010), who discovered a positive link between exchange rate exposure and financial leverage.

Our findings do not support the growth opportunities hypothesis (*MB*) because the relationship between firms' investment opportunities and their level of exposure to exchange rate risk (for the two currencies Euro and USD) is insignificant, implying that the investment opportunities of firms listed on the CSE have no significant impact on their exposure to exchange rate risk; thus, **hypothesis H5 is rejected.**

Our findings are similar with prior research (He and Ng, 1998; Hsin et al., 2007; Zubairu and Iddrisu, 2019), which indicated no significant relationship between growth potential and foreign exchange risk exposure.

Firms use liquidity as a hedging proxy (as per optimum hedging theory). Indeed, organizations with higher levels of liquidity reduce their risk of financial difficulty since money are available to repay loans and they have less incentive to use hedging mechanisms. As a result, their susceptibility to exchange rate volatility will increase. This is why we included and tested a variable assessing liquidity levels in our empirical regression model, using the immediate liquidity ratio as a proxy.

However, the empirical findings indicate that the degree of liquidity has little effect on Moroccan enterprises' exposure to exchange rate fluctuations in either the Euro or the USD. As a result, **H6 is rejected**, indicating that there is no meaningful relationship between liquidity levels and exposure to exchange rate risk.

Our hypothesis H8 states that there is a negative and substantial link between dividend distribution and exposure to foreign exchange risk among companies listed on the Casablanca stock exchange. However, our findings do not support this hypothesis because there is no significant association between dividend distribution levels and exposure to currency fluctuations in the Euro (= 0.045, P-value = 0.763) and the USD (= 0.131, P-value = 0.328). **Hypothesis H7 is therefore rejected.** Our findings are consistent with previous studies that revealed no significant association between dividend distribution and currency risk exposure (Zubairu and Iddrisu, 2019; He and Ng, 1998).

5 Conclusion

Given its present relevance, this research's theme is extremely important. What distinguishes it is that it investigates the influence of exchange rate variations on the share performance of Moroccan enterprises within a new framework defined by the Dirham's flexibility reform. Furthermore, this is the first in-depth study to look at the elements that explain how CSE-listed companies are exposed to exchange rate risk.

To test the validity of our research model, we conducted our first empirical study on the influence of exchange rate changes on the stock returns of companies listed on the Casablanca Stock Exchange.

We began by estimating the exposure to exchange rate risk of 49 non-financial companies listed on the CSE from January 2018 to December 2021 using an econometric model. We discovered that the percentage of enterprises considerably exposed to currency risk was 14.28%, with a 5% margin of error.

Additionally, our findings are consistent with with previous research conducted in the Moroccan context (STI et al. (2022), Mrhari, M. and Daoui, D. (2017), Ibenrissoul and Zouigui, (2015), and Ye, Hutson, and Muckley (2014)), while not significantly different from the findings of international studies.

To gain a better understanding of the characteristics of enterprises that are vulnerable to exchange rate swings, we conducted an econometric study on the explanatory determinants of exchange rate risk. To accomplish this, we created two multiple linear regression models, one for the euro (model 2) and the other for the US dollar (model 3):

he coefficients of exchange rate risk exposure, estimated from model 1 based on the first empirical phase results, are used as the dependent variable.

The literature-based explanatory factors for exposure to foreign exchange risk, which combine together the degree of openness of enterprises and the primary determinants of financial risk hedging under the theory of optimal hedging. Consequently, six criteria were selected: company size, foreign sales, leverage, growth potential, liquidity, and dividend policy.

The findings indicate that business size, international sales, and leverage are all significantly associated to the foreign exchange risk exposure of non-financial enterprises listed on the Casablanca Stock Exchange.

The findings of this study will have significant theoretical, empirical, and managerial implications. Our study adds to the current literature by examining the influence of exchange rate variations on the stock market performance of publicly traded Moroccan enterprises in an

environment of exchange rate flexibility and a health crisis caused by the COVID-19 epidemic. To our knowledge, this is the most recent longitudinal study undertaken in the Moroccan context following the end of the fixed exchange rate regime.

Moreover, this is the first in-depth study to investigate the elements that explain the influence of exchange rate variations on the stock market performance of Moroccan-listed companies.

Based on the convincing results of our empirical research, we think that this research provides a substantial contribution to the field of business management, with considerable practical implications for Moroccan enterprises and investors and authoroties.

More particular, our findings indicate that Moroccan companies listed on the Casablanca Stock Exchange should be cautious and aware of overseas transactions using major international currencies such as the USD and the EURO. In this context, management should consider appropriate currency hedging techniques to mitigate the potential impact of exchange rate volatility affecting various currencies.

Furthermore, the findings of our study could help investors make financing and investment decisions by taking into account the influence of exchange rate variations on the stock market returns of companies in which they are interested.

Finally, the findings of our study may encourage Moroccan authorities to establish new foreign exchange risk hedging instruments at the national level in order to protect themselves against potential external shocks caused by erratic exchange rate fluctuations, particularly in the context of exchange rate liberalisation reforms.

As with any scientific study, this research has its limitations. Our research focused on the current impact of exchange rate variations on Moroccan companies' stock market results. However, Bodnar and Gentry (1993) proposed the concept of a lagged influence in the link between exchange rate fluctuations and stock returns.

Furthermore, while many empirical studies have addressed the issue of exposure to exchange rate risk by studying how firms' market values respond to exchange rate changes using the'market-based' method (Bodnar et al., 2002), the latter has certain limitations. Indeed, the results cannot be explained in terms of economic behavior because there is no explanatory model latent in business behavior. Furthermore, the sample expected to be investigated will only include large publicly traded corporations.

Finally, our analysis is limited to only two currencies: the euro and the US dollar. A examination of exposure to other foreign currencies, or the use of the weighted average exchange rate, would be more economically useful.

Financial institutions were excluded from the second part of our investigation due to their varied balance sheet and financial statement structures.

Several research perspectives could be addressed in order to overcome the inherent constraints of this study. To begin, we propose using control variables in the econometric modelling of the measurement of exchange rate risk exposure of publicly traded Moroccan companies in order to provide more meaningful explanations. Furthermore, a non-linear econometric study of the measure of exposure to exchange rate risk may be useful, given that the link between exchange rate volatility and stock returns can be non-linear. Furthermore, it would be useful to investigate the lagged effect of exchange rate variations on stock market returns, which is supported by the literature. Finally, we advocate extending the study's time span

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