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The Effect of the COVID-19 Pandemic on Corporate Dividend Policy of Moroccan Listed Firms

Zouhair Boumlik [1,2,*], Badia Oulhadj [1] and Olivier Colot [2]

[1] Research Laboratory in Strategy and Management of Organizations, National School of Business and Management, Hassan First University in Settat, Settat 26000, Morocco
[2] Department of Accounting, Auditing, Risk Management and Entrepreneurship, Warocqué School of Business and Economics, University of Mons, 7000 Mons, Belgium
* Correspondence: z.boumlik@uhp.ac.ma

Abstract: The recent literature provides conflicting findings and remains inconclusive regarding the impact of the COVID-19 crisis on firms' dividend policies. In this paper, we examine the dividend policy of Moroccan firms listed in the Casablanca Stock Exchange during the COVID-19 shock. Using panel data from 2015 to 2021 of non-financial listed firms, we observe that the proportion of dividend cuts during the last seven years (2015–2021) achieved its highest level on the onset of the crisis. Furthermore, results of the ordinary least square (OLS) regressions demonstrate that the COVID-19 shock has negatively affected the dividend payout of Moroccan listed firms. This study implies that, in times of economic crisis, Moroccan firms exhibit risk-averse behavior by prioritizing the retention of earnings over distributing dividends, scarifying, therefore, the transmission of positive signals to investors and external stakeholders. Furthermore, our results reveal that profitability, growth opportunities, leverage, and size are relevant determinants of corporate dividend policy.

Keywords: dividend policy; signaling theory; COVID-19 crisis; Casablanca Stock Exchange

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1. Introduction

The COVID-19 pandemic has had a severe economic impact worldwide. The recent literature on the economic effects of the COVID-19 pandemic arrived at the consensus that the pandemic has had a negative impact on capital markets and the global economy. Indeed, the high level of uncertainty and fear related to the COVID-19 crisis led to increase in the global stock market volatility while stock prices dropped considerably in different contexts (H. Ali 2022; Ashraf 2021; Baker et al. 2020). Furthermore, the literature documented the adverse effect of the COVID-19 on firms' performance and operations (Almustafa et al. 2023; Shen et al. 2020).

In such an uncertain environment, businesses encounter difficulties in forecasting the impact of the crisis on earnings which lead them to adjust their dividend policies (Pettenuzzo et al. 2023). During crisis circumstances, firms may omit or reduce dividend payments in order to maintain liquidity to face future needs (Ali et al. 2022) while signaling theory presumes that, even in times of crisis, firms might maintain regular dividend payments in order to send positive signals to investors and external stakeholders (Booth and Chang 2011). Therefore, the debate on dividend policies remains of much interest, since no consensus has been achieved on the dividend payout decisions, as Black (1976) wrote, "*the harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just do not fit together*".

The existing literature remains inconclusive about the dividend payout behavior during crises and studies provide contradictory results. For instance, Ali et al. (2022) found out that dividend payouts dropped during the COVID-19 crisis comparing to previous years. Similar results were reported by Cejnek et al. (2021). On the contrary, the study of Tinungki et al. (2022) shows that the COVID-19 crisis had led firms to increase their

dividend payouts. Indeed, debate on corporate dividend decisions is of much interest in both developed and developing countries. Nevertheless, we have little knowledge on the corporate dividend policy in developing countries. Furthermore, the literature demonstrates that corporate finance models and assumptions are originally conceived for developed markets and often fail when tested in developing and emerging markets (Bekaert and Harvey 2002). Moreover, empirical research on dividend policy in North African markets remain very limited (H. K. Baker and Jabbouri 2016). To the best of our knowledge, no study on the impact of the COVID-19 crisis on corporate dividend policy of Moroccan firms has been carried out yet. Therefore, the limited knowledge we have regarding the changes in dividend policy of Moroccan firms during the COVID-19 shock legitimates our interest in analyzing the potential effect of the crisis related to the COVID-19 pandemic on the corporate dividend policy of Moroccan firms. In this respect, the research questions of our paper are as follows: *(1) How has the COVID-19 pandemic affected the corporate dividend policy of Moroccan listed firms? (2) What are the determinants of dividend payout of Moroccan listed firms?*

Morocco, a north African country, registered over 440,000 cases and 7400 deaths related to the COVID-19 pandemic by the end of 2021. The Moroccan central bank reported a significant contraction of 7.2% in the nation's economy during 2020 (Moroccan Central Bank 2021). This was primarily the result of a decline in the services sector, which accounts for more than 50% of the nation's GDP. Additionally, the report underscored the detrimental repercussions of the pandemic on international trade, tourism, and foreign investment. Established in 1929, the Moroccan stock exchange currently comprises 76 firms, out of which 16 are financial firms, and it is characterized by large institutional investors. The Moroccan Capital Market Authority (2023) reported that the global market capitalization reached 561 billion (Moroccan Dirham) at the end of 2022, making of it one of the main stock markets in Africa. Its capitalization structure shows that the market is well diversified and includes the presence of 20 sectors with the large portion of banking companies (34%) followed by telecom firms (21%).

In this paper, we collected data of 55 Moroccan listed firms in the Casablanca stock exchange (CSE) over the period from 2015 to 2021. We selected data starting from 2015 for several reasons. Indeed, both advanced and developing economies experienced lower GDP growth since the global financial crisis of 2008 to 2015 compared to the period of 1997–2006, and the average recovery rate of firms between 2009 and 2014 was relatively low (Jin et al. 2018). Therefore, we decided to start our data analysis from 2015, assuming that the Moroccan stock market had fully recovered from the potential long-term effects of the global financial crisis. Additionally, previous empirical studies support the assumption that data from 2015 onwards would be sufficient to analyze changes in dividend payout (Ali et al. 2022; H. Ali 2022; Krieger et al. 2021). Panel data regressions were performed for data analysis and robustness was ensured through the adoption of two dividend policy proxies.

This paper makes several contributions to the dividend literature. It enriches the existent literature on the corporate dividend changes during COVID-19 shock and represents the first empirical study that analyzes the impact of the COVID-19 crisis on dividend payouts of Moroccan listed firms. Moreover, the study identifies the key determinants of dividend payout decisions, contributing, therefore, to the understanding of dividend policies in developing countries. Overall, this paper provides valuable insights into the financial reactions of Moroccan listed firms when faced with uncertainty and crisis circumstances, which can aid in forecasting the market's response to future economic shocks and to assert the financial behavior of Moroccan firms.

This paper is structured as follows. Firstly, we present the literature review and the research hypothesis section. Secondly, we expose our methodological design and data. Thirdly, we present and discuss our research findings. A general conclusion of the study is presented in the last part.

2. Literature Review and Hypothesis Development

The topic of dividend policy decisions during periods of crisis continues to be a subject of intense debate. Firms find themselves grappling with the dilemma of whether to increase or maintain dividend payouts to signal anticipated high growth and performance or to reduce or cut dividends to preserve cash and liquidity in anticipation of potential financing needs.

Signaling theory constitutes a relevant framework that explains the dividend payout decisions insofar as it considers dividends to be a signal that managers could use in order to inform the "outsiders" about the expected growth and cash flows of the firm, reducing, therefore, the information asymmetry (H. Ali 2022). According to Connelly et al. (2011), signaling theory is essentially developed to explain the behavior of stakeholders when they have access to different information. Indeed, access to information is crucial insofar as it determines the decision-making process (Connelly et al. 2011). In effect, information asymmetry occurs when different parties obtain different information (Stiglitz 2002), which may lead to different behaviors. According to Zahid et al. (2022), the release of business information to the market enables firms to reduce information asymmetry and to optimize the financing costs. Hence, signaling practices could remedy to markets' imperfections by reducing the information asymmetry through sending signals between different parties (Spence 2002). The signaling framework considers dividends as a signal that conveys information about a firm's expected profitability and performance insofar as the decrease or the omission of dividend payout may refer to a deterioration of future cash flows, while an increase indicates a high-performance and a healthy financial situation (H. Ali 2022). While signals could be positive or negative, signaling models focus essentially on the disclosure of information that reflect the positive image of the firm (Connelly et al. 2011). Dividend policy, as a signal, could be interpreted in both negative and positive ways depending on the firm's decision on whether to increase, decrease, maintain or cut the dividend payout, which justifies firm's sensitiveness toward their dividend payout decisions.

In a context where uncertainty is extreme and earnings drop sharply, many firms cut or reduce dividend payouts (Pettenuzzo et al. 2023). Several studies show that businesses omit dividend payouts, scarifying, therefore, the signalization of a positive image to the market (Krieger et al. 2021), which questions the validity of the signaling theory during crisis circumstances. The work of Hauser (2013) shows that a firm's probability to pay dividends decreased during the global financial crisis of 2008–2009. Similarly, Kilincarslan (2021) reported that the financial crisis of 2008 negatively impacted the dividend payments of firms listed in the London Stock Exchange, with these companies promptly adjusting their dividend payouts immediately in response to significant drops in their earnings. In contrast, the study of Al-Malkawi et al. (2014), that was conducted in a developing economy, revealed that the global financial crisis of 2008 did not impact the corporate dividend policy of Jordanian listed firms.

Recently, a few empirical studies investigated the changes in firms' dividend policies during the COVID-19 crisis. For instance, Tinungki et al. (2022) analyzed the effect of the COVID-19 crisis on the dividend policy of Indonesian listed firms and found out that the crisis related to the COVID-19 pandemic led to an increase in dividend payouts, supporting, therefore, signaling theory assumptions. Likewise, H. Ali (2022) used data from 8889 listed firms in the G-12 countries and found that, although the proportion of dividend cuts and omissions was higher during the crisis, the majority of firms maintained a stable dividend payout or even increased it. Contrary, Ntantamis and Zhou (2022) reported that the COVID-19 shock led to a widespread cut of dividends in the G-7 countries. Their study suggests that firms were more likely to decrease dividends during the COVID-19 crisis. Similarly, Ali et al. (2022) employed data on 360 listed firms in the Pakistan Stock Exchange and found out that companies were likely to omit and decrease the dividend payouts during the year 2020 compared to the pre-crisis period. The research of Cejnek et al. (2021) also reveals that dividend payout decreased during the first quarter of 2020 and was not reversed by the end of the year. In the same vein, the research of Krieger et al.

(2021) reveals that the proportion of firms that cut or omitted dividend payout during the first quarter of 2020 was three to five times higher than of any quarter of the pre-COVID-19 period (2015–2019).

Overall, the literature provides contradictory results and it is inconclusive on the effect of the COVID-19 crisis on firms' dividend policies. Based on the above elements, we expect that the COVID-19 crisis had a negative impact on the dividend payouts of Moroccan listed firms. Thus, the following hypothesis was assumed:

H1. *COVID-19 crisis negatively impacted the dividend payouts of Moroccan listed firms.*

In line with previous research, we took into consideration the relevant potential determinants of dividend policies.

- Impact of profitability on dividend policy

The literature provides evidence that a firm's profitability has a significant impact on its dividends. For instance, Gunawan and Tobing (2018) found out that the higher the profitability, the more the propensity of the firm to pay dividends increased. Similar results were reported by Denis and Osobov (2008). In the same vein, Jabbouri (2016) demonstrated that return on equity, as a proxy for a firm's profitability, is a key determinant of the corporate dividend policy in emerging markets. Therefore, the following hypothesis was assumed:

H2. *Profitability is positively associated with the dividend payouts of Moroccan listed firms.*

- Impact of growth opportunities on dividend policy

Growth opportunities were considerably discussed as explanatory factors that affect a firm's dividend policy. The basis of this potential relationship emerges from the pecking order theory and the lifecycle theory as they assume that firms with higher growth opportunities would normally distribute less dividends in order to preserve internal funds for financing investments as the internal resources remains the privileged financing option. Several studies have proven this association to be significant (Danila et al. 2020; Jabbouri 2016; Ranajee et al. 2018). Therefore, the following hypothesis was assumed:

H3. *Growth opportunities are negatively associated with the dividend payouts of Moroccan listed firms.*

- Impact of leverage on dividend policy

A firm's leverage constitutes an important determinant of dividend policy. Kaźmierska-Jóźwiak (2015) found out that leverage is negatively correlated with the dividend payout. Those results were supported by the study of Asif et al. (2011) which proved that highly indebted firms pay less dividends. Moreover, the research of H. Ali (2022) reveals that leverage has a significant impact on the dividend payout decision, especially during a crisis. Hence, we formulated the following hypothesis:

H4. *Leverage is negatively associated with the dividend payouts of Moroccan listed firms.*

- Impact of liquidity on dividend policy

A firm's liquidity was also considered as a key determinant of the dividend payout decision in several previous studies. For instance, Jabbouri and Attar (2018) demonstrated that firms listed in the Casablanca Stock Exchange that present higher liquidity levels are more likely to pay high cash dividends. Similar results were reported in the study of I. E. Ahmed (2015). Thus, the following hypothesis was assumed:

H5. *Liquidity is positively associated with the dividend policies of Moroccan listed firms.*

- Impact of firm size on dividend policy

The study of Redding (1997) shows that firm size is a key driver of dividend payout policy. It demonstrates that large firms are more likely to distribute dividends, and that this is positively correlated to the amount of paid dividends. Similar results were supported by Mehta (2012) who found out that the size of the firm positively impacts the dividend payout policy of firms in the United Arabic Emirates. Nevertheless, H. Ahmed and Javid (2008) found out a reverse relationship between size and dividend payout and suggested that firms characterized by small size, measured by natural logarithm of total assets, are more likely to pay less dividends. Overall, various research proved that size is an important determinant to consider while analyzing corporate dividend policy (Al Shabibi and Ramesh 2011; Denis and Osobov 2008; Yusof and Ismail 2016). Therefore, we formulated the following hypothesis:

H6. *Size is positively associated with the dividend policies of Moroccan listed firms.*

- Impact of firm age on dividend policy

The life cycle theory establishes the basis for the relationship between firm age and dividend policy. The theory assumes that a firm's dividend behavior is influenced by its life stage. Indeed, when a company is in its growth phase, it is more likely to pay dividends, but this tendency goes down when the company is in its maturity phase. Several studies have shown that a firm's age is a relevant determinant of its dividend policy (Afza and Mirza 2011; Agyemang Badu 2013; Kuzucu 2015; Nizar Al-Malkawi 2007; Osman and Mohammed 2010). Hence, we formulated the following hypothesis:

H7. *Age is positively associated with the dividend policies of Moroccan listed firms.*

3. Materials and Methods

This section presents the methodological design of our research. Firstly, it introduces the research variables and the econometric model employed in our study. Next, we provide details regarding the data source and sample formulation. Furthermore, we present the estimation methods used in our analysis

3.1. Variables and Research Models

A review of recent empirical studies enabled us to identify the most relevant variables and proxies adopted in research about the COVID-19 crisis' impact on corporate dividend policies across the world. Hence, 7 independent variables were selected to fit our models. Corporate dividend policies were captured through two proxies, which were the dividend per share (DPS) and the total amount of cash dividend (CASH_DIV), consistent with Driver et al. (2020). The research models are presented as follow:

$$DPS_{i,t} = \beta 0 + \beta 1\ COVID\_Crisis_{i,t} + \beta 2\ Roe_{i,t} + \beta 3\ Pbv_{i,t} + \beta 4\ Liq_{i,t} + \beta 6\ Lev_{i,t} + \beta 5\ Size_{i,t} + \beta 7\ Age_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Cash\text{-}Div_{i,t} = \beta 0 + \beta 1\ COVID\_Crisis_{i,t} + \beta 2\ Roe_{i,t} + \beta 3\ Pbv_{i,t} + \beta 4\ Liq_{i,t} + \beta 6\ Lev_{i,t} + \beta 5\ Size_{i,t} + \beta 7\ Age_{i,t} + \varepsilon_{i,t} \quad (2)$$

The following Table 1 displays the definition and measurement of research variables.

Table 1. Variables definition and measurement.

Variable	Proxy	Abbreviation	Measurement
Dividend policy	Dividend per share	DPS	Total dividend/outstanding shares
	Total amount of paid dividend	Cash_div	Napierian logarithm of total annual dividend
COVID-19 crisis	Crisis related to COVID-19 pandemic	COVID_crisis	A dummy variable which takes the value of 1 when COVID-19 occurs, 0 otherwise
Profitability	Return on equity	ROE	Net income/Shareholder's equity

Table 1. *Cont.*

Variable	Proxy	Abbreviation	Measurement
Growth opportunity	Investment opportunity	PBV	Market price per share/Book value per share
Size	Firm's size	SIZE	Napierian logarithm of total assets
Leverage	Firm's leverage	LEV	Total debt/Total assets
Liquidity	Firm's liquidity	LIQ	Current assets/current liabilities
Age	Firm's age	AGE	Number of years since creation

Table 2 presents descriptive statistics of our research variables.

Table 2. Summary of the variables used in our models.

Variable	Obs	Mean	Std. Dev.	Min	Max
Dps	385	2.679	4.395	0	23.273
Cash_div	344	10.986	7.503	0	20.118
Roe	338	6.486	40.798	−410.547	64.503
Pbv	344	2.558	3.273	−6.705	47.706
Liq	357	1.601	2.241	0.204	28.119
Lev	337	84.856	117.837	0	954.115
Size	357	11.85	1.654	6.937	15.61
Age	385	49.182	26.614	4	102
COVID-19 crisis	385	0.429	0.496	0	1

3.2. Data Source and Sample

Our research used secondary data that was gathered from the Orbis database solution of the Bureau Van DIJK, which is a very reliable source that provides information on 400 million companies worldwide, with a wide variety of financial information for 41 million of them. The database included all 76 listed firms in the Casablanca Exchange Market. Missing data were completed from firms' annual reports published on the official website of the Casablanca Stock Market. We selected data for the period from 2015 to 2021 covering, thus, the pre-COVID-19 period from 2015 to 2018 and the COVID-19 period from 2019 to 2021. Before extracting data, we excluded financial firms from our sample following H. Ali (2022) an Ntantamis and Zhou (2022). Therefore, we extracted data of 60 firms. A total of 5 firms were excluded when preparing our database because they did not report multiple financial information, resulting in a final sample of 55 listed firms that were sorted into 11 corporate sectors based on the NACE rev 2 classification, as shown in Table 3. "Manufacturing" (41.8%) and "Wholesale and retail trade" (20%) sectors had the largest representations in our sample, followed by "mdining and quarrying" sector (9.09%) and other corporate sectors.

Table 3. Firms distribution by activity.

Corporate Sector	Firms	
	N	%
Manufacturing	23	41.81%
Wholesale and retail trade	11	20%
Mining and quarrying	5	9.09%
Information and communication	4	7.27%
Real estate activities	4	7.27%
Construction	2	3.63%
Others	6	10.90%
Total	55	100%

Our research sample may appear insufficient; however, the analysis technique used consists in the OLS regression, which gives the advantage of requiring a small sample depending on the estimated parameters number. In our research, we used a sample of 55 firms compared to 7 explanatory variables, resulting in a ratio of number of observation/number of variables of 7:1. Indeed, we have seven observations per variable which satisfies the minimal ratio of 5:1 proposed by Hair et al. (2006). We are aware that the sample size directly affects the statistical power of the model and the generalizability of the results. Nevertheless, we believe that our sample provided us with a minimum level of statistical power, as our regression models demonstrated important explanatory capacity. Indeed, it is worth highlighting that researchers in the field of financial markets in developing countries commonly encounter this limitation of sample size.

3.3. Estimation Methods

In order to select the convenient estimation method, several statistical tests were performed. We started off by providing a description of the minimum and maximum values, as well as the mean and standard deviations of our data set (Table 2). This revealed various details about the businesses in the study. Then, we proceeded with the correlation analysis to investigate any correlation problems between our dependent and independent variables. To do so, Pearson correlation analysis was applied. Indeed, correlation coefficient (r) between independent variable and dependent variables must not be equal to zero, otherwise the concerned independent variable must not be included in the model. Also, a high correlation coefficient ($r > 0.8\%$) between two independent variables means that there is a multicollinearity issue and that one of the two associated variables must be dropped from the model. Multicollinearity problem occurs when two or more regressors are linearly related; this problem results in increased standard errors which, consequently, affects the coefficients of independent variables.

To go further in the multicollinearity analysis, we performed the variance inflation factor test. This test gave us the VIF value for each independent variable, which enabled the researchers to observe directly how much the multicollinearity affected the variances of estimated coefficients (Mansfield and Helms 1982). Belsley et al. (2005) noted that there is no precise value for distinguishing "high" from "low" VIFs value. The widely used cut off values of VIF (5, 10 or 30) should be interpreted with caution and researchers must take into consideration other factors (i.e., sample size) that could affect estimated coefficients before making decisions to deal with collinearity (Murray et al. 2012).

One of the essential assumptions of linear regression modeling is homoskedasticity. It refers to the assumption that the variance of model's errors is constant. The heterogeneity problem violates this assumption and it occurs when the residuals variance is non-constant and the errors are not purely random. However, we note that heteroskedasticity does not bias the estimated coefficient as is remains consistent, it biases the covariance matrix estimator which results in biased errors (Cribari-Neto 2004). Hence, we proceeded with the test of heteroskedasticity in our models using Breusch–Pagan/Cook–Weisberg test, whose null hypothesis of homoskedasticity "errors have constant variance across observations".

Since the presence of serial correlation in linear panel-data models induces biases into the standard errors and makes the obtained results less accurate, it was necessary to investigate whether our panel models present serial correlation or not. In this sense, we performed the "Wooldridge test for autocorrelation in panel data" whose null hypothesis assumes that there is no first-order autocorrelation. This test has the advantage of robustness as well as the requirement of fewer assumptions.

It is widely admitted that endogeneity is the most frequent and important problem facing researchers in the field of corporate finance (Roberts and Whited 2013). It can be defined as the existence of a high correlation between an independent variable and the error term. Indeed, endogeneity violates the OLS assumption of exogeneity consisting in independence between explanatory variables and the error term. Hence, estimates parameters and results of ordinary least square method are biased and inconsistent under the presence of endogeneity. Endogeneity issue could be assessed by multiple methods such as generalized method of moment for panel data analysis or two-stage least-square for survey data, etc. (Ullah et al. 2018). To investigate if we had endogeneity problem, we used the "Durbin–Wu–Hausman" test, whose null hypothesis is that exogenous variables are truly exogenous.

After the preliminary tests, it was necessary to determine the most suitable regression method. In this sense, F-test was established to choose in first place between the OLS method and the Fixed Effect method following Baltagi (2008). At this stage, if the F-statistic of OLS method is greater than the F-statistic of the Fixed Effect model, then the OLS method is the convenient method for our analysis. On the contrary, if the F-statistic of the fixed effect model is greater than that of the OLS, Hausman test must be performed in order to choose between Fixed Effect model and Random Effect model. Both of our research models supported the adoption of the OLS estimation method. Therefore, we performed the OLS regression with the Newey–West standard errors and the Pooled OLS regression with the Driscoll–Kraay standard errors in order to deal with autocorrelation issue.

4. Findings

Table 4 reports the evolution of the number of dividend payers and non-payers over the period from 2015 to 2021. We observed that, before the crisis related to the COVID-19 pandemic, the mean percentage of dividend payers in the Casablanca Stock Market was about 71%, this percentage decreased considerably to achieve 57% during the COVID-19 period. Hence, the impact of the crisis on the dividend policy of Moroccan listed firms is quite obvious since an important number of firms cut their dividends, especially in the years 2019 and 2020. The minimal number of dividend payers was 25 firms and this was registered in 2019.

Table 4. Evolution of dividend payers over the last seven years.

Period	Year	Dividend Payers		Mean over Periods	Dividend Non-Payers		Total
		N	%		N	%	
Pre-COVID-19 Period	2015	39	70.90%	71%	16	29.09%	55
	2016	39	70.90%		16	29.09%	55
	2017	41	74.54%		14	25.45%	55
	2018	38	69.09%		17	30.90%	55
COVID-19 Period	2019	25	45.45%	57%	30	54.54%	55
	2020	34	61.81%		21	38.18%	55
	2021	36	65.45%		19	34.54%	55

The Pearson correlation analysis results are reported in Table 5. The data show no collinearity issue since all coefficients are smaller than 0.8. Profitability (Roe) and Growth opportunities (Pbv) show a significant positive association with the dividends per share, while leverage (Lev) shows a significant negative relationship with the DPS at a significance

level of 1%. The Cash dividend variable revealed a significant positive association with profitability (Roe), Growth opportunity (Pbv), and firm size, while it was observed that it has a negative association with leverage (Lev) with the COVID-19 crisis at a significance level of 1% and with liquidity at a significance level of 10%. The great association in our data was negative and related return on equity to leverage (−0.53).

Table 6 reports the results of the variance inflation factor. The VIF of an explanatory variable reflects the degree to which the variable was associated in linear relationships with the other explanatory variables. The highest VIF value among our variable was for Return on equity (Roe) (VIF = 1.599), whereas the lowest VIF value was for the COVID-19 crisis (VIF = 1.027). All of our variables have VIF values that were above 1 and that did not exceed 10%. The general rule of thumb assumes that the VIFs that are greater than 10 must give some cause for concern. Accordingly, no multicollinearity was detected in our data.

Table 5. Pearson correlations.

Variables	DPS	Cash_Div	ROE	PBV	LIQ	LEV	SIZE	AGE	COVID_CRISIS
(1) Dps	1.000								
(2) Cash_div	0.459 ***	1.000							
(3) Roe	0.254 ***	0.384 ***	1.000						
(4) Pbv	0.301 ***	0.262 ***	0.123 **	1.000					
(5) Liq	0.004	−0.090 *	0.003	−0.068	1.000				
(6) Lev	−0.147 ***	−0.297 ***	−0.535 ***	0.018	−0.185 ***	1.000			
(7) Size	0.056	0.346 ***	0.106 *	0.150 ***	−0.362 ***	0.149 ***	1.000		
(8) Age	0.035	−0.004	0.012	0.054	0.036	−0.084	−0.143 ***	1.000	
(9) COVID_crisis	−0.049	−0.185 ***	−0.032	−0.013	−0.035	−0.092 *	−0.001	0.065	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6. Variance inflation factor.

	Roe	Lev	Size	Liq	Pbv	Age	COVID_Crisis	Mean Vif
VIF	1.599	1.591	1.33	1.242	1.157	1.038	1.027	1.283
1/VIF	0.625	0.629	0.752	0.805	0.865	0.963	0.974	

The Breusch–Pagan and Cook–Weisberg tests were carried out to investigate whether we had heteroskedasticity problems among our data or not. The presence of heteroskedasticity results in biased errors term and therefore affects the efficiency of the OLS estimation results. The results show that our data violated the homoskedasticity assumption for the two models since the *p*-value was less than 5%. To deal with the heteroskedasticity problem, we referred to the use of the Robust standards error method. This technique efficiently solves the heteroskedasticity problem and rendered the OLS efficient and unbiased.

The endogeneity issue was investigated through the Durbin–Wu–Hausman test to make sure that our exogenous variables were truly endogenous. The results in Table 7 reveal that both Model (1) and Model (2) presented no endogeneity problems and that all explanatory variables were truly exogenous.

Table 7. Heteroskedasticity, autocorrelation and endogeneity tests.

Tests	DPS	CASH_DIV
Breusch–Pagan and Cook–Weisberg	199.07 *** (0.000)	15.42 *** (0.000)
Wooldridge test	2.67 (0.1085)	5.882 *** (0.0191)
Durbin–Wu–Hausman	10.88 (0.053)	9.816 (0.080)

*** $p < 0.05$.

The Wooldridge test for serial correlation in panel data was performed in order to capture whether our models presented autocorrelation or not. The existence of autocorre-

lation induces biases in the model's standards errors. The test results show that we had autocorrelation issue for the model (2) (Cash_Div). To deal with this issue, multiple options could be chosen. Since we did not have an endogeneity problem, we eliminated the possible option of using the GMM method. Therefore, the Newey–West standards errors option and the Pooled OLS regression with the Driscoll–Kraay standard errors method remain the convenient options to solve the problems of heteroskedasticity and serial correlation in panel data. Therefore, we adopted these two methods for the model (2).

In sum, a rigorous investigation of the validity of our models was carried out through multiple statistical tests. Overall, our models satisfied all the requirements and we addressed the heteroskedasticity and serial correlation problems through the Robust standard errors option for the model (1) and the Newey–West standard errors and the Driscoll–Kraay standard errors methods for the model (2).

The results of the regression analysis are reported in Table 8.

Table 8. Regression results of the first model "DPS".

	Dividend per Share	
Variables	**OLS**	**FEM**
COVID_crisis	−0.972 **	−0.129
	(0.441)	(0.521)
Roe	0.014 **	0.003
	(0.007)	(0.008)
Pbv	1.211 ***	0.502 ***
	(0.172)	(0.160)
Liq	−0.040	0.097
	(0.062)	(0.085)
Lev	−0.004 **	−0.005
	(0.002)	(0.003)
Size	−0.326 **	0.036
	(0.162)	(0.770)
Age	−0.003	−0.177
	(0.007)	(0.136)
Constant	4.615 **	10.318
	(1.860)	(10.482)
Industry dummy		YES
R-squared	0.309	----------
Within	----------	0.069
F-statistic	10.79 ***	2.75 ***
Number of id	----------	55

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$.

The OLS regressions present an R2 squared of 30% and 42% for the DPS model and Cash_div model, respectively, which indicates that our models have an important explanation capacity and that the chosen explanatory variables significantly influenced the firms' dividend policies. Hence, our models explained, respectively, 30% and 42% of the variance in the dividend per share and the total cash dividend. In addition, the Fisher test is significant (F-value < 0.01) for all models, indicating, therefore, that at least one of our independent variables significantly affected our dependent variables. In order to determine the optimal estimation model, we performed the fixed effects models and found out that the F-statistic of the fixed effect models (2.75 for model (1) and 7.02 for model (2)) are significant at a significance level of 1%. However, they are smaller than the F-statistic of the OLS regression models (10.79) for the model (1) and (43.02) for the model (2). Hence, the OLS regression, with robust standard errors to deal with the heteroskedasticity problem, was the most optimal method for the analysis of the model (1), while the OLS regression

with Newey–West standards errors method was more suitable for the analysis of the model (2) since it solved the problems of heteroskedasticity and serial correlation.

The estimated results of the model (1) with the ordinary least square regression and the fixed effect model demonstrate that the measurement variable of the crisis related to the COVID-19 pandemic had a negative impact on the dividend per share. However, only the OLS regression assumed these relationships to be significant at a significance level of 5%. Moreover, the coefficient of the COVID-19 crisis (−0.972) was the second highest coefficient in our model after the growth opportunity coefficient (1.211) which reflects the considerable effect of the crisis on dividend policies. Overall, five explanatory variables out of seven proved to be significantly correlated to our dependent variable. Indeed, firms' profitability (Roe) and Growth opportunity (Pbv) showed a positive association with the dividend per share, while leverage (Lev) and firm size showed a negative association with the dependent variable. The firms' age and firms' liquidity were negatively correlated to the dividend per share but demonstrated no significance of these relationships.

The OLS regression showed an F-statistic that is greater than the fixed model's F statistic at a significance level of 1%. Hence, the OLS is the optimal regression method that fit our model. However, our model suffers from heteroskedasticity and serial correlation problems. These two issues violate the basic assumptions of OLS and render it inefficient. In order to deal with this, we adopted the Newey–West standard errors regression with lag (1) with the option "Force" of the command Newey in Stata and the Driscoll-Kraay Pooled OLS regression with the lag (2) with the command XTSCC. These two methods are efficient in dealing with heteroskedasticity and autocorrelation in panel models (Hoechle 2007). As Table 9 shows, coefficients did not change over the three OLS models with the Robust option, the Newey–West model, and the Driscoll–Kraay model. This is because heteroskedasticity and autocorrelation do not affect the estimated coefficient but affect the standards errors. Hence, the results of the Newey–West model and the Driscoll–Kraay model were more robust and reliable than the OLS with Robust option model's result.

Table 9. Regression results of the second model "Cash dividend".

	Model 2 Cash_Dividend			
Variables	**OLS**	**Newey–West**	**Driscoll–Kraay**	**FEM**
COVID_crisis	−3.502 ***	−3.502 ***	−3.502 ***	−3.480 ***
	(0.648)	(0.727)	(0.494)	(1.033)
Roe	0.021	0.021	0.021	0.022
	(0.013)	(0.013)	(0.012)	(0.016)
Pbv	1.369 ***	1.369 ***	1.369 ***	0.461
	(0.178)	(0.213)	(0.085)	(0.318)
Liq	−0.208 **	−0.208 *	−0.208 **	−0.054
	(0.102)	(0.120)	(0.067)	(0.168)
Lev	−0.019 ***	−0.019 ***	−0.019 ***	−0.014 **
	(0.003)	(0.003)	(0.002)	(0.006)
Size	0.961 ***	0.961 ***	0.961 ***	1.845
	(0.207)	(0.250)	(0.058)	(1.529)
Age	−0.001	−0.001	−0.001	0.087
	(0.011)	(0.013)	(0.007)	(0.269)
Constant	0.003	0.003	0.003	−13.251
	(2.489)	(2.902)	(0.563)	(20.801)
Industry dummy				YES
R-squared	0.422	----------	0.422	----------
Within	----------	----------	----------	0.159
F-statistic	43.02 ***	31.86 ***	768.45 ***	7.02 ***
Number of id	----------	----------	----------	55
Number of groups	----------	----------	55	----------

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Overall, the results indicate that the crisis related to the COVID-19 pandemic had a negative and significant impact on the total amount of the dividends paid by Moroccan listed firms in the Casablanca Exchange Market. Comparing to the first model (1), the coefficient of the COVID_crisis (−3.502) is much greater, which means that the impact of the COVID-19 crisis was more important with regard to the total amount of paid dividends than regarding the dividends per share. Furthermore, the COVID-19 crisis coefficient was the highest one in comparison to other variables' coefficients, which reflects the big impact of the crisis on dividend payments in the Casablanca Stock Market. Growth opportunity and firm size showed a positive association with the Cash dividend at a significance level of 1%. The firms' liquidity and leverage had a significant negative impact on the amount of annual dividends, whereas firms' profitability and firms' age had no significant association with the firms' dividend policy

5. Discussion

The findings demonstrate that the crisis related to the COVID-19 pandemic, which was measured by a dummy variable, had a significant negative impact on firms' dividend policy as it was proven that it was negatively associated to firms' dividends per share and to the total annual amount of dividends. Therefore, our fundamental hypothesis is accepted and supported by our regression models. Indeed, the descriptive statistics presented in Figure 1 make it abundantly evident that the number of businesses that did not pay dividends reached its highest point (30 companies) in the course of the previous seven years in 2019. Thus, the vast majority of the companies that were listed on the Casablanca Stock Market cut their dividends. This number went down in 2020, and it decreased in 2021 as well. The high level of uncertainty prevailing during the onset of the crisis provided justification for the response exhibited by these companies. Given the unpredictable nature of the situation, it was understandable that firms adopted a cautious approach by cutting dividend payments. However, as the latter months of 2020 unfolded and the Moroccan government gradually eased the sanitary measures implemented to mitigate health risks, a reduction in uncertainty became evident. Consequently, we observed a positive shift in the behavior of Moroccan listed companies, as they resumed paying dividends. This development can be attributed to the improved clarity surrounding the business environment, which allowed these firms to regain confidence in their financial stability and make strategic decisions to distribute profits to shareholders once again.

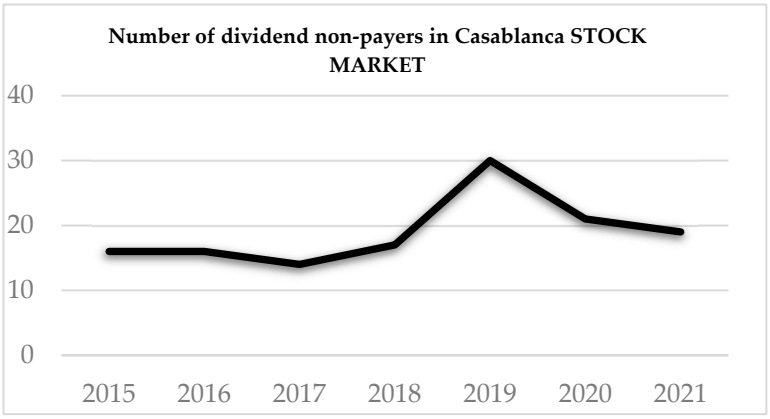

Figure 1. Evolution of dividend non-payers from 2015 to 2021.

Contrary to the findings of Al-Malkawi et al. (2014), which reveal that a financial crisis has no significant impact on corporate dividend policy, our reported results demonstrated that the financial and economic crisis related to the COVID-19 pandemic had a significant impact on the dividend payments of Moroccan listed firms. Furthermore, our results contradict those of Tinungki et al. (2022), who stated that the COVID-19 crisis led to an increase in dividend payouts in the Indonesian context.

Our results support those of Cejnek et al. (2021), who reported that the COVID-19 crisis led to an excess drop of dividends and that the impact of the crisis on dividend payouts was more severe for highly indebted firms. Also, the study of Krieger et al. (2021) provides similar results, demonstrating that the proportion of firms that cut or decreased dividends during the first two quarters of 2020 was three to five times higher than any previous quarter since 2015. Our results are also supported by those found by H. Ali (2022), which indicate that the COVID-19 crisis led to a significant increase in rates of dividend cuts and omission even though the majority of listed firms in the G-12 countries maintained their dividend payments or even increased them. In sum, signaling theory assumptions were not supported by the findings of our study. Indeed, we suggest that, under distressed and crisis circumstances, firms would prefer to retain their earnings to face potential financing problems, even though this would be seen as a negative signal. The results of our study demonstrate that, during distress and crisis, the validity of the signaling theory framework is questioned. During times of crisis, Moroccan listed firms demonstrated a preference for adopting risk-averse behavior. Instead of distributing dividends and emphasizing a positive signal of their financial well-being, these firms tended to prioritize prudent measures. They chose to retain earnings, consciously building up their reserves in order to effectively address future financing needs. By adopting this behavior, these companies proactively safeguarded their financial stability and ensured they were adequately equipped to face any potential challenges that may have arisen. This conservative strategy underscores their commitment to long-term sustainability and their ability to navigate through turbulent times with confidence.

Globally, firms cut or decrease their dividend during complex situations and this has been proven by several studies (Cejnek et al. 2021; Krieger et al. 2021). We therefore suggest that signaling assumptions be questioned when it comes to explaining dividend decisions during crisis circumstances.

Regarding firms' profitability impact on dividend payout policies, we found out that high levels of profitability should lead to higher dividends since profitability (ROE) was positively correlated with the dividend per share and the cash dividend. However, this relationship was significant only in the model (1); these results are in line with those of Dewasiri et al. (2019) and those of Franc-Dbrowska and Mądra-Sawicka (2020), while they contradict those of Kaźmierska-Jóźwiak (2015) who reports that firms' profitability is negatively associated with the dividend payouts, consistent with the pecking order assumptions. In effect, POT assumes that firms prefer using internal sources in the first instance before debt and external equity. Therefore, profitable firms will pay less dividends and retain their earnings in order to finance their investment. Our findings suggest that growth opportunities have a positive significant relationship with dividend payouts, supporting the results of Tinungki et al. (2022), and contradicting the results of Dewasiri et al. (2019), who found a negative association between investment opportunities and dividend payouts. Thus, our results are in contradiction with the pecking order theory, insofar as firms with important growth opportunities should pay less dividends in order to maintain sufficient internal resources for financing their potential investment.

Moreover, we found out that firms' leverage has a significant negative relationship with both dividend per share and total dividends amount. This is consistent with Jabbouri (2016), Kaźmierska-Jóźwiak (2015), Mossadak et al. (2016), and with the agency theory of dividend policy. Firms' age reveals no significance in its negative relationship with dividend policies. Much previous research proved a significant association between firms' age and dividend payouts (Louziri and Oubal 2022; Ranajee et al. 2018; Tinungki et al. 2022). This association tends to be negative according to the signaling theory, since old firms suffer less from information asymmetry and no longer have the need to send signals to the market through dividend policy. Therefore, these firms will make decisions about their dividend policies depending on other relevant factors. Our results show that liquidity has no significant impact on firms' dividend per share. However, it was reported that

it is negatively and significantly correlated with the total amount of dividends, which contradicts the findings of Jabbouri (2016).

The results of our analysis revealed interesting findings regarding the impact of firm size on dividend-related variables. Firstly, when examining the relationship between firm size and dividend per share, we observed a significant negative impact. This suggests that larger firms tend to have lower dividend per share compared to smaller firms. On the other hand, when investigating the effect of firm size on the total amount of annual dividend, we found a significant positive impact. This implies that larger firms generally distribute a higher total amount of dividends compared to their smaller counterparts. These findings may be explained by the fact that large firms often have a great number of outstanding shares compared to small firms. Therefore, the large firms tend to have lower dividend per share ratio, even though the total annual amount of dividend may be important. This result suggests that larger firms, despite having lower dividend per share, compensate for it by distributing a greater overall dividend amount, which may be influenced by factors such as higher profitability. Indeed, we reject Hypothesis 6 which assumed that firms' size is positively associated with the dividend policies of Moroccan listed firms because our main dependent variable was dividend per share, with which firm size was proven to be negatively associated. However, we report that firm size is a relevant determinant of the corporate dividend policies of Moroccan listed firms.

The following Table 10 summarizes the results of the research.

Table 10. Summary of study's results.

Hypothesis	Expected Sign	Decision
H1: COVID-19 crisis→dividend policy	(−)	Supported
H2: Return on equity→dividend policy	(+)	Supported
H3: Growth opportunity→dividend policy	(−)	Rejected
H4: Liquidity→dividend policy	(+)	Rejected
H5: Leverage→dividend policy	(−)	Supported
H6: Size→dividend policy	(+)	Rejected
H7: Age→dividend policy	(+)	Rejected

Previous empirical research conducted on the dividend policies of Moroccan listed firms in the Casablanca Exchange Market have essentially adopted the dividend payout ratio or dividend yield proxies for dividend policy (Aguenaou et al. 2014; Louziri and Oubal 2022; Mossadak et al. 2016). However, the payout ratio was prone to undergoing profound changes in the midst of economic downturns because of the significant decline in company earnings. Thus, we assumed that dividend payout ratio would not be a relevant proxy for dividend payout policy. In this sense, we adopted the dividend per share proxy because of its relevancy as a signal that gives investors a clear vision on the dividend value for each detained share, which is more relevant as a signal in comparison to the payout ratio. Furthermore, the total dividend amount proxy has the advantage of its capacity to clearly and directly reflect the impact of the COVID-19 crisis.

Our study aimed to remedy the limitations of previous research such as using one single proxy for dividend policy (Aguenaou et al. 2014; Mossadak et al. 2016) and integrating financial companies in the sample regardless of the particularities of the banks and financial institutions' ratios (Louziri and Oubal 2022). Our research provides robust results and offers a valuable tool for understanding the impact of COVID-19 on the corporate dividend policies of Moroccan listed firms.

Our research is subject to certain limitations, primarily related to the relatively small sample size. The Casablanca Stock Exchange, in particular, encompasses a limited number of companies, with a predominant presence of banking institutions. Consequently, expanding the study's sample was beyond our control. However, it is important to note that, despite this limitation, our sample remains representative and sufficient for conducting the required statistical tests. Also, our model does not include some variables that may be

relevant for the overall understanding of dividend decisions during a crisis, such as firms' corporate governance. In fact, we did not include governance-related variables because of their unavailability or the difficulty in accessing related data and because the focus of this study was, primarily, to analyze the effect of the COVID-19 crisis on dividends payments. However, the existence of corporate governance data could significantly increase our understanding of corporate dividend policies during crises. For instance, the study of Mehdi et al. (2017) demonstrates that, during the global financial crisis of 2008–2009, dividend decisions were inversely related to CEO duality, board size, and the frequency of board meetings. Consequently, we recommend that future studies enhance our comprehension of corporate dividend policies during times of crisis by focusing on corporate governance variables and conducting survey-based research in order to capture the necessary primary data related to corporate governance. Furthermore, we recommend that future research use other proxies for the COVID-19 crisis. In effect, most of the existing studies have used the dummy variable (COVID-19 period = 1 before COVID-19 period = 0) to capture the COVID-19 crisis. However, it may be relevant to integrate other COVID-19 proxies in order to ensure robust results.

6. Conclusions

The primary objective of this article was to analyze the potential impact of the COVID-19 pandemic crisis on the corporate dividend policies of Moroccan firms listed in the Casablanca Stock Exchange. To achieve this, data were collected from non-financial listed firms spanning the period from 2015 to 2021. Descriptive statistics of firms' dividend policies were examined, and a regression analysis was conducted using two proxies of dividend policy to ensure the robustness of the findings.

The findings of the study revealed that the highest omissions of dividends over the last seven years (2015–2021) occurred in the first year of the crisis, namely 2019. The regression results further confirmed that the COVID-19 crisis had a negative effect on the dividend payouts of Moroccan listed firms. The extreme levels of uncertainty experienced during the crisis prompted these firms to adopt the prudent behavior of retaining earnings instead of distributing dividends. These results challenge the validity of signaling theory assumptions in explaining dividend policies, particularly in developing countries and during economic and financial crises.

Additionally, the study identified profitability, growth opportunities, leverage, and size as significant determinants of dividend payouts among Moroccan listed firms. These findings contribute significantly to the corporate dividend policy literature. However, it is acknowledged that incorporating other relevant variables, such as business risk and corporate governance, would provide a deeper understanding of the complexities surrounding dividend policy decisions. Overall, this research provides valuable insights into the impact of the COVID-19 crisis on dividend policies and sheds light on the key determinants of dividend payouts among Moroccan listed firms.

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