Asian Journal of Economics, Business and Accounting

Volume 23, Issue 23, Page 179-199, 2023; Article no.AJEBA.110023
ISSN: 2456-639X

Quantitative Analysis and Comparative Review of Dividend Policy Dynamics within the Banking Sector: Insights from Global and U.S. Financial Data and Existing Literature

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJEBA/2023/v23i231180

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/110023

Review Article

Received: 03/10/2023
Accepted: 08/12/2023
Published: 13/12/2023

ABSTRACT

This paper presents a comparative review of academic research on dividend policies and payments within the banking sector. Dividends represent a critical area of focus due to their implications for bank capital levels, profitability, regulatory compliance, and investor signaling. The literature reviewed spans pre- and post-2008 financial crisis periods and adopts both global and emerging market perspectives. Methodologies include regression analyses, causality tests, descriptive statistics, and financial ratio computations based on regulatory filings, financial statements, and market data datasets. Key findings demonstrate the multifaceted nature of bank dividend strategies,

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differences across countries, shifts during crises, and complex interplays with financial health metrics. The studies find evidence that dividends provide valuable signals to investors on earnings prospects, aligning with signaling theories. However, interpreting crisis-induced behaviors warrants caution due to short-term deviations. Opportunities exist for further analysis of cross-country variances, crisis responses, and linkages to bank stability. This comparative review enhances academic comprehension of bank dividend policies' motivations, outcomes, and determinants. It highlights the need for judicious balancing of stakeholder demands for returns and growth, an increasingly crucial endeavor amidst global uncertainty.

Keywords: Dividends; banks; financial crises; capital; profitability; signaling; shareholder; emerging markets; financial health metrics and regulation.

1. INTRODUCTION

The intricate relationship between banking entities and their dividend policies has long been a focal point of financial studies [1]. This is predominant because banks are central to spurring economic advancement, and the dividends they declare indicate their fiscal well-being, growth potential, and management's confidence in future earnings, thereby serving as invaluable insights for investors [1]. Of the numerous analyses conducted on dividend policies, the span from 2002 to 2007 is particularly noteworthy, given its proximity to the 2008 global financial meltdown. This phase, marked by intense economic and financial activities, significantly shaped banks' dividend strategies. However, a gap persists in the comparative research between major economic powerhouses such as the U.S. and the U.K. Nguyen et al.'s [2] study addresses this lacuna, probing the association between shareholder wealth and dividend strategies of banks in these dominant economies [2]. Building upon this, Ghauri's [3] investigative model meticulously delves into how dividend disbursements relate to firm performance markers like Tobin's Q, ROA, and ROE; the author's multivariate approach offers an insight-driven framework to dissect how dividend policies influence varying dimensions of financial outcomes [3].

Global banking isn't solely a Western affair. Nguyen et al.'s [2] analysis of Vietnamese enterprises unravels the intriguing way rising economies conceptualize and implement dividend strategies. Within such burgeoning economies, the balance between immediate payouts and future investment requisites becomes paramount [2]. Hirtle [4] focuses on the pivotal 2007-2009 financial tumult, underscoring the responses of elite U.S. Bank Holding Companies (BHCs) in dividend-related decisions. Discerning the variables that affect dividend cuts is vital for crafting policy responses in such tumultuous times. Complementing this, insights from Acharya et al. [5] and Tripathy et al. [6] enrich the dialogue, shedding light on shifts in capital structures, dividend strategies, and their relationship with fiscal wellness. Beyond internal bank metrics, the external ambiance, exemplified by stock valuations and company profits, is instrumental. Basse et al.'s [1] empirical endeavor emphasizes this, elucidating the dividends' signaling capacity and its forecast value for corporate profits and stock values. This paper aims to synthesize these diverse research threads, thoroughly comprehending banking sector dividend policies, their ramifications, drivers, and outcomes.

2. LITERATURE REVIEW

2.1 Dividend Policy and Financial Performance

A crucial component of a bank's financial performance is its dividend payments [7]. They act as a channel by which banks pay dividends to their shareholders from a percentage of their profits. These dividend payments have many ramifications that significantly impact the banking industry's financial environment. Dividends can potentially lower a bank's retained earnings, restricting its ability to develop and reinvest [8]. Conversely, dividends can draw in investors as they are viewed as an indication of sound financial standing [9]. Maintaining a bank's financial well-being requires finding the ideal balance between these factors.

The complex relationship between dividend payments and important financial metrics in the banking industry has been the subject of numerous research [10]. These measures cover various variables, such as asset quality, liquidity ratios, and total profitability. However, because banks have such a wide range in their dividend

policy, the results of these studies frequently paint a contradictory image [11]. The banking sector is incredibly varied; some banks prioritize paying large dividends to draw in capital and enhance shareholders' value [12], while others hold onto their profits to maintain long-term stability and growth [13]. The relationship between the payment of dividends and financial measures is intricate and multifaceted, partly because of the variety of payout techniques available.

An important indicator of a bank's performance is the return on equity, or ROE [17]. The dividend policies a bank adopts can greatly impact its return on equity. Retained earnings that can be reinvested in the company are diminished when banks pay large dividends, which could result in a decline in ROE [18]. However, this decline in ROE might not always be bad because investors who desire a steady income stream may find a steady dividend policy appealing [19]. The perception of banks with dividend programs as financially solid and dependable by investors who aim to earn a consistent and predictable income might favorably impact their investment choices.

Jane [20] states that earnings per share (EPS) is a significant measure of a bank's profitability per share. The choice of dividends directly affects EPS. The amount of shares in circulation doesn't change whenever a bank pays dividends. Consequently, dividend payments decrease each share's earnings [21]. If all else is equal, this decrease in EPS could affect shareholder value and cause the stock price to fall. Banks must carefully consider the compromise between paying rewards to stockholders and their impact on their earnings per share (EPS) because it directly affects how investors see the bank's worth.

Sustaining sufficient capital adequacy ratios is paramount in the banking industry [22]. These ratios are a critical safeguard to ensure that banks maintain adequate capital buffers, thus fortifying their ability to withstand potential losses and preserve solvency. As highlighted by [23], these ratios play a pivotal role in reinforcing the resilience of banks in the face of financial challenges. However, the impact of dividend payments on these ratios is a significant consideration for banks. As Winnie [13] emphasized, regulatory authorities often impose stringent guidelines and standards for capital sufficiency. Banks that fail to meet these regulatory capital adequacy requirements risk substantial penalties and consequences. These sanctions may include fines, operational limitations, or even harsher regulatory actions that could seriously impair the bank's capacity to conduct business. Due to these regulatory requirements, banks must balance paying their shareholders dividends and ensuring they have enough capital reserves to meet the rules and maintain financial stability.

2.2 Market Reactions to Dividend Policies

Important insights can be gained from studies on how the market responds to bank dividend reports [14]. Banks declaring dividends is a show of their confidence in the well-being of their finances and has an impact on several areas of the banking system. These market reactions are influenced by various factors, including the payout size, the bank's stability in their finances, and the overall status of the economy [15]. The consequences on the price of stocks and market liquidity may be immediate and long-term.

According to empirical data, stock prices usually react favorably to dividend announcements in the near run [16]. Investors typically view dividends as a comforting indication of a company's financial stability, which can raise the price of shares [23]. Investors' confidence in the bank's capacity to turn a profit and uphold financial stability is reflected in this positive response. However, since other variables like interest rates and the state of the economy can affect things, the long-term effects of dividend reports can differ. A more intricate interaction between market and economic forces frequently shapes long-term consequences [24].

Trading volumes frequently rise after dividend announcements [25]. Investors might rush to purchase shares, hoping to benefit from dividend payments enhancing trading activity [21]. The amount of the dividend and the bank's size have different effects on market liquidity [26]. Larger banks may see a less noticeable effect on liquidity because of their wide activities and diverse portfolios. Conversely, smaller banks may experience notable increases in trading volumes since dividend payments may account for a larger percentage of their profits [11].

Numerous factors can impact investors' perception of particular dividend plans [15]. These comprise the bank's potential for expansion, general stability, and dividend

payment consistency [26]. Banks that uphold a consistent dividend policy, regardless of the payout level, can draw in investors who share their goals. Income-oriented investors looking for a consistent source of income may find high dividend payments especially appealing [27]. On the other hand, low dividend payments may draw growth-oriented investors who are more concerned with capital gains [28].

According to Tim [29], there is a variation in the market's response to bank announcements regarding dividends. Because they are viewed as foundations of financial strength, large, well-established banks frequently have more stable market reactions [30]. These banks are regarded as trustworthy investment choices since they often have a track record of making substantial dividend payments. On the other hand, smaller banks can cause the market to react more strongly since their dividend policies might have distinct effects. Studies on how the market responds to bank dividend announcements provide many important insights. Moreover, the distinct dividend policies implemented by financial institutions impact investor attitudes and draw in diverse categories of investors [31].

2.3 Corporate Governance Structures and Dividend Policy

After reviewing the existing research concerning dividend policy in the banking industry, Zaman et al. [32] state that a complex relationship with corporate governance frameworks becomes apparent. Gardi et al. [33] posit that enhancing transparency and fostering stakeholder interest alignment are potential outcomes of implementing effective corporate governance practices, which may impact dividend distribution. Overall, the literature review underscores the intricate interconnections between dividend policies and corporate governance frameworks within banking institutions, emphasizing their critical impact on financial outcomes.

According to Ye et al. [34], the diversity and autonomy of boards are pivotal factors in determining and authorizing dividend programs, thus exerting a substantial influence on this procedure. Although there is often a relationship between the existence of diverse and independent boards [35,36,37] argue that there is an increased degree of scrutiny regarding financial decisions and the allocation of dividends. Including independent directors on a company's board can promote an unbiased assessment of managerial concepts, thus guaranteeing that dividend policies align with the concerns and welfare of shareholders [38]. Wijayanti and Setiawan [39] emphasize that incorporating members possessing industry knowledge and financial expertise into the composition of a board enhances the holistic and exhaustive evaluation of dividend strategies. Thus, boards with a strong sense of independence and diverse knowledge and skills substantially impact the formulating and approval of prudent dividend policies [40,41,35].

According to Salah and Jarboui [42], the influence of board committees, including audit and risk committees, on the strategy for determining dividends is substantial. The combined expertise of the committees enhances the overall assessment of financial stability and possible risks [43,44]. However, these individuals contribute substantially to the board's decision-making process by meticulously analyzing financial statements and risk management protocols [45,46]. The enforcement of this particular supervision not only safeguards the organization's fiscal well-being but also influences the formulation of prudent dividend strategies that align with regulatory responsibilities and the enduring interests of shareholders [47,48].

According to Pahi and Yadav [49], how dividend policy is disclosed and communicated to stakeholders is significantly impacted by governance structures. However, by fostering transparent communication channels, effective governance guarantees stakeholders are adequately apprised of the processes used to determine dividends. Credibility is enhanced by implementing open financial reporting methods, often subject to unbiased directors' oversight [50]. Moreover, Harbal [51] posits that effective governance frameworks prioritize transparent communication to ensure stakeholders are adequately informed regarding dividend initiatives.

There is a prevalent association between sustainable dividend policies and strong governance systems consisting of autonomous councils and efficient oversight mechanisms [52]. The capability of organizations to sustain consistent dividend disbursements amidst economic uncertainties is substantially influenced by the standard of governance that guarantees accountable financial management [53]. Conversely, Gleißner et al. [54] assert that

insufficient governance could potentially lead to implementing short-term tactics, thereby jeopardizing the sustainability of dividend disbursements in the long run [55].

2.4 Regulatory Impact

According to Maqbool et al. [56], regulatory regulations impact the frequency and amount of dividend disbursements to preserve financial stability. Frequently, the imposition of stringent capital requirements restricts the capacity of a financial institution to allocate dividends, thus serving as a protective measure against possible economic challenges [57,58]. However, Zetzsche and Anker-Sørensen [59] further emphasize the significance of prudence in risk management and ensuring dividend policies are consistent with the broader stability of the banking sector. Financial institutions must comprehend and efficiently manage these regulatory dynamics to strike a balance that optimizes shareholder returns while ensuring compliance with regulatory obligations [60,61].

Kilincarslan [57] asserts that regulatory constraints concerning capital adequacy standards substantially impact the formulation of dividend policies. The regulations mandate that banks maintain a predetermined level of capital to prevent further losses [62]; therefore, Putri and Wiksuana [63] argue that this directly affects their ability to distribute dividends. However, by limiting dividend distributions, strict capital requirements ensure financial institutions maintain financial robustness. Moreover, these regulations impose restrictions on shareholder profits to preserve stability in the banking industry [64,65]. Achieving this necessitates a meticulous balance between compliance with legal obligations and satisfying investor demands in the dynamic domain of banking operations [66].

According to Berezinets et al. [67], regulatory agencies play a pivotal role in overseeing and authorizing the distribution of dividends within the banking industry. Financial regulators and central banks, among others, are tasked with implementing and enforcing regulatory frameworks that seek to safeguard and advance financial stability. However, banks must obtain regulatory approval before distributing dividends to ensure compliance with liquidity and capital adequacy standards [68,69,82]. The regulatory function underscores the importance of ensuring that dividend policy and the overall resilience of the banking sector are consistent.

As stated by Hordofa [70], extensive research examining the impact of regulatory changes on bank dividend policies has revealed a multifaceted and dynamic relationship. Deviations from capital adequacy regulations and other pertinent regulatory parameters directly influence dividend distribution [71]. DeAngelo [72] stresses that conservative dividend strategies are frequently adopted when more stringent regulations are enforced, with financial stability taking precedence over shareholder returns. Conversely, Lin et al. [73] allude that reducing regulatory oversight could motivate corporations to augment their dividend payouts.

According to Allio [74], the banking sector reconciles regulatory compliance with the adaptability required to execute adaptive dividend initiatives. While regulations are paramount in preserving financial stability, they can restrict the ability to adjust dividend policy in response to swiftly evolving market circumstances [75,76]. In order to attain an ideal state of equilibrium, it is imperative to enforce stringent risk management protocols, ensure adequate capital reserves are maintained, and foster open communication channels [77]. Successful banks adeptly navigate this equilibrium by adhering to governing bodies while retaining the essential adaptability to maximize dividend policies amidst a constantly changing financial environment [78].

2.5 Comparison study of U.S. and U.K. Banks from 2002-2007

In this research, the author conducted a comparative analysis of the dividend policies of U.K. and USA banks from the perspective of shareholders who can invest globally without any legal or economic restrictions tying them to their home country [3]. The study aimed to determine whether it is advantageous for shareholders to invest in either U.K. or USA banks. The research involved the examination of 11 U.K. banks and 15 USA banks, totaling 26 banks, and the data used for the analysis covered the years 2002 to 2007 [3]. To evaluate shareholder wealth for a specific year (t), the author utilized data from the previous year (t-1) in this study [3]. The results were obtained through multiple regression analysis, employing statistical techniques such as p-values, t-statistics, coefficient correlation, and adjusted R-squared. The author incorporated three new independent variables into the multiple regression analysis to bolster the research. A dummy variable was utilized, assigning "0" for U.K. banks and "1" for U.S.

banks [3]. The findings of this research indicate a stronger relationship between shareholder wealth and dividend policy in U.K. banks compared to U.S. banks [3]. Considering the four independent variables used in the study, the adjusted R-squared value for U.K. banks exceeds that of USA banks concerning the dependent variable, demonstrating a stronger correlation between shareholder wealth and dividend policy in U.K. banks compared to USA banks [3].

2.6 Consequence of Dividend Imbursement on a Corporation's Financial Performance

The study of Nguyen et al. [2] examined how dividend policies impact the financial performance of companies using a model with ROA, ROE, and Tobin's Q as outcome measures while considering dividend rate and dividend payment choices as influencing factors. Financial data was meticulously collected from 450 firms listed on the Vietnam stock exchange, covering the period from 2008 to 2019, in preparation for comprehensive analysis. As visualized in Fig. 1, the model took a multivariate approach by employing Tobin's Q, ROA, and ROE as metrics to gauge a firm's financial prowess. These indicators were set against five independent variables, offering a multi-dimensional view of the company's performance. The equations delineate how each performance measure relates to variables like size, growth, leverage, and dividend policies [2].

From the overarching model, the study broke it down into three distinct models, each corresponding to a specific dependent variable, as outlined below:

$$[ROAit] = \beta0 + \beta1[DPRit] + \beta2[DDPit] + \beta3[SIZEit] + \beta4[LEVit] + \beta5[GROWTHit] + \varepsilon it$$

$$[ROEit] = \beta0 + \beta1[DPRit] + \beta2[DDPit] + \beta3[SIZEit] + \beta4[LEVit] + \beta5[GROWTHit] + \varepsilon it$$

$$[TOBIN'S\ Qit] = \beta0 + \beta1[DPRit] + \beta2[DDPit] + \beta3[SIZEit] + \beta4[LEVit] + \beta5[GROWTHit] + \varepsilon it$$

The study results show that Vietnamese companies tend to provide a relatively low dividend rate, averaging around 10 percent. This low dividend rate indicates that companies retain profits for ongoing operations and future investments [2]. Consequently, some investors have faith in the company's prospects and continue to invest in them. However, the downside of this low dividend rate is that it can dampen market expectations regarding the firm's future growth [2]. The significant standard deviation of 16.3%, coupled with the extensive variance in dividend rates, which span from 0 to 214 percent, could indicate an absence of consistent and reasoned dividend strategies among Vietnamese firms listed on the stock exchange [2]. Companies might subjectively opt for a high dividend rate or significant cash dividends in a particular year to raise capital without fully considering the impact of such policies on the firm's financial performance, both from an accounting-based and market-based perspective [2].

2.7 Dividends and Stock Repurchases Amidst the 2007-2009 Economic Downturn

Hirtle [4] delves into the contrasting behaviors of dividends and share repurchases exhibited by prominent U.S. financial holding corporations (BHCs) during the financial catastrophe of 2007-2009. It identifies a crucial trend: numerous BHCs persisted in disbursing dividends consistent with pre-crisis figures deep into the

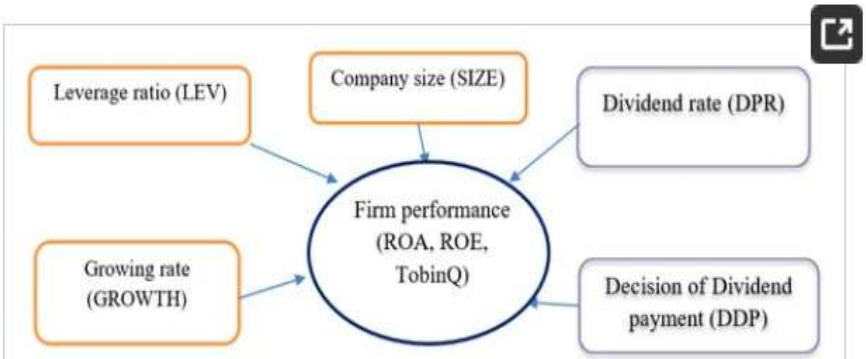

Fig. 1. Proposed research model
Source: (Nguyen et al. 2021)

crisis, yet they decisively curtailed share repurchases towards the end of 2007 [4]. Such a revelation marks a significant advancement in research, given the prior emphasis on dividend disbursements [4]. Evidence suggests that BHCs leaned on the curtailment of share repurchases to lessen capital distributions, thus conserving more capital internally during the crisis rather than immediately slashing dividends [4]. Such a strategy implies a preventive approach to bank capital management, contrasting the risk-transferring inclination underlying ongoing dividend payouts [4]. For smaller BHCs, the study ascertains that elevated repurchase figures before the crisis correlate with deferred and diminished dividend reductions amidst the crisis [4]. This intimates that repurchases acted as a cushion, enabling these BHCs to bypass the adverse implications of diminishing dividends.

Conversely, scant evidence suggests a repurchase cushion for the more substantial BHCs [4]. This research augments the scholarly discussion on bank payout strategies and signaling. While it aligns with investigations into bank dividend signaling and risk-transferring during tumultuous periods, it also offers a more intricate perspective by incorporating repurchases into the analysis [4]. In essence, this study amplifies comprehension regarding the strategies prominent BHCs employed in managing capital distributions during an era of notable strain [4]. Examining dividends in conjunction with repurchases furnishes fresh perspectives on the underlying motives and measures banks adopt concerning capital administration and signaling in the face of a crisis [4].

2.8 Dividend Policy in Post-Global Financial Crisis

Basse et al. [1] explored the dividend policy of financial companies during the Global Financial Crisis. Dividend policy is crucial in corporate finance. Despite the tax implications, firms continue distributing dividends. Theories such as the dividend signaling hypothesis suggest these distributions provide insights into future earnings for stakeholders [1]. Conversely, the dividend smoothing hypothesis argues firms aim for steady dividend growth, avoiding erratic changes that could confuse the market [1]. Earlier research mainly studied industrial firms, with mixed findings supporting both theories [1]. Basse et al. [1] extended this focus to Italian insurers from 2009 to 2021. The research supported the dividend signaling theory, using the Toda-Yamamoto Granger causality method, suggesting dividends predict earnings.

Furthermore, stock prices influenced dividends, indicating shareholders value dividends for informational reasons [1]. Yet, the study's time-bound, crisis-focused nature calls for careful interpretation. More research is needed to fully understand these strategies during volatile times, as this study specifically examines the post-crisis period in the financial industry. This study enhances understanding of dividend policies post-crisis in financial institutions. It adds to the debate on signaling versus smoothing, with implications for capital management and stakeholder interaction. The emphasis on Italian insurers provides sector-specific insights, setting the stage for future, broader investigations [1].

2.9 Effect of 2008 Financial Chaos on Dividends and Bank Capital

This study about Dividends and Bank Capital in the Financial Crisis of 2007-2009 is a descriptive study that documents the time profile of losses and the amount and type of new capital raised by banks during and after the financial crisis [5]. The authors posit that bank capital composition and dividend distribution decisions are intertwined with broader discussions on remuneration matters. They hint that the conventional perspective on corporate governance, which prioritizes amplifying shareholder value, could inadvertently lead to negative outcomes for struggling banks [5]. The research finds that banks raised new capital primarily through equity issuances and asset sales and that the composition of bank capital shifted towards common equity during the crisis [5]. The authors argue that this shift was driven by regulatory pressure and the recognition that common equity is the most effective form of loss-absorbing capital. It also finds that banks reduced their dividend payments during the crisis, which the authors argue was a prudent response to the need to conserve capital [5]. The authors suggest that dividend payments during crises can be undesirable, as they can signal to investors that the bank is financially sound when it may not be. The paper contributes to understanding the changes in bank capital during the financial crisis and new capital sources [5]. The authors argue that the composition of bank capital is an important determinant of financial stability and that policymakers should consider the implications of dividend policy and

compensation practices for bank capital structure [5].

2.10 Relationship between Dividends and Financial Health of US Banks

Tripathy et al. [6] examined the relationship between dividends and financial health in U.S. banks from 1986 to 2020. The study focuses on two proxies for financial health: nonperforming loan ratio (NPL) and z-score [6]. The authors find that banks with lower NPL ratios are more likely to pay dividends, while banks with higher z-scores are more likely to pay dividends and increase them. However, they also find that banks in poor financial health tend to pay higher dividends, suggesting that they may use dividends to signal their financial soundness to investors [6]. The research also investigates the effect of regulatory capital requirements on dividend payouts. The authors find that banks tend to reduce dividends in response to tighter capital requirements, but the effect is relatively small [6].

Additionally, they find evidence to suggest that banks with higher nonperforming loan ratios may be more responsive to changes in capital requirements, perhaps because these banks face greater pressure to maintain adequate capital levels [6]. The authors conclude that dividend policy is important when evaluating a bank's financial health. They caution that investors should not rely solely on dividends as a signal of financial soundness. They also recommend additional analysis of other financial indicators, such as nonperforming loans ratio and z-score [6]. The study also has important implications for policymakers, who may wish to consider the impact of capital requirements on dividend payouts when designing regulatory regimes [6].

3. METHODOLOGY AND DATA ANALYSIS

As economic agents, banks make decisions that reflect their strategies and underlying health. One such decision revolves around dividends – the portion of a company's earnings distributed to its shareholders. Numerous factors influence this decision, some evident, some less so. To understand these factors in the context of U.S. banks and provide a more granular analytical perspective, we embarked on a quantitative journey leveraging a comprehensive dataset of various banking entities within the United States.

Dependent Variable: Div2010: Dividend paid in 2010.

Independent Variables: NI2010 (Net Income, 2010); Ln(Tot Inc) (Natural Log of Total Income); TETA (Capital to Asset Ratio); Future Earn (Net Income in 2011) 2009Div (Dividends in 2009); 2010CV -coefficient of variation.

3.1 ANOVA Table - R2 and Adjusted R2 of Regression

For $ß_1$ H_1, the R-value of 0.961 suggests a very strong linear relationship between the predictors and Div2010. For $ß_1H_1$, an R^2 of 0.924 means that around 92.4% of the fluctuation in Div2010 is attributed to the variables included in the model. Such a high R^2 value points to a well-fitting model.

F-Statistic: The F value of 329.931 is very large, suggesting that the predictors are significantly related to the dependent variable. A large F-statistic (like the one observed here at 329.931) indicates that the variation explained by the model (with predictors) is significantly greater than the unexplained variation (residual). Because the p-value is significantly below 0.05 (a typical benchmark for significance), there's substantial evidence to reject the null hypothesis.

The intercept for H_1 is -5034.937. This signifies the estimated value of the dependent variable when all independent variables are zero. Consider it as a reference point.

NI2010 (X1): Coefficient: -0.347

For every one-unit increase in the 'Current Net Income in 2010 (NI2010)', the dependent variable (Div2010) is expected to decrease by 0.347 units, holding all other variables constant.

Ln(Tot Inc) (X2): Coefficient: 474.082

This suggests that for every one-unit increase in the natural logarithm of 'Total Income from All Sources in 2010', the dependent variable (Div2010) is expected to increase by 474.082 units, keeping all other factors constant.

TETA (X3): Coefficient: 102.293

This implies that for every one-unit increase in the 'Capital-to-asset ratio (TE/TA),' the dependent variable (Div2010) is projected to increase by 102.293 units, with all other predictors constant.

Future Earn (X4): Coefficient: -493.742

This indicates that for every one-unit increase in 'Net Income in 2011', the dependent variable (Div2010) is expected to decrease by 493.742 units, assuming all other predictors remain constant.

2009Div (X5): Coefficient: 1.561

For each one-unit rise in 'Total cash dividends paid to shareholders in 2009', the dependent variable (Div2010) is anticipated to grow by 1.561 units, holding all other predictors constant.

2010CV (X6): Coefficient: 6.829

This suggests that for every one-unit increment in the 'Coefficient of Variation of Net Income during the past five years,' the dependent variable (Div2010) is expected to increase by 6.829 units, keeping all other variables constant.

3.2 T statistic and p-value for Individual Coefficients

The t-values and p-values linked to each coefficient provide insight into the statistical relevance of that predictor. A p-value below 0.05 indicates a statistically meaningful connection between the predictor and the outcome variable. For instance, the p-value for 'Ln(Tot Inc)' is 0.027, which is less than 0.05, suggesting that this predictor has a significant relationship with the dependent variable, Div2010.

ANOVA table - R2 and Adjusted R2 of regression

Table 1. Regression Table

Linear Regression

Model Summary - Div2010

Model	R	R^2	RMSE
H_0	0	0	8572.249
H_1	0.961	0.924	2407.515

Anova

Model		Sum of Squares	df	Mean Square	F	p
H_1	Regression	$1.147\times10^{+10}$	6	$1.912\times10^{+9}$	329.931	< .001
	Residual	$9.448\times10^{+8}$	163	$5.796\times10^{+6}$		
	Total	$1.242\times10^{+10}$	169			

Note. The intercept model is omitted, as no meaningful information can be shown

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
H_0	(Intercept)	2751.471	657.462		4.185	< .001
H_1	(Intercept)	-5034.937	2239.992		-2.248	0.026
	NI2010	-0.347	0.048	-0.360	-7.161	< .001
	TETA	102.293	77.321	0.029	1.323	0.188
	Ln(Tot Inc)	474.082	212.194	0.064	2.234	0.027
	Future Earn	-493.742	278.332	-0.039	-1.774	0.078
	2009Div	1.561	0.062	1.233	25.200	< .001
	2010CV	6.829	45.184	0.003	0.151	0.880

Table 2. Coefficient table

Coefficients						
Model		**Unstandardized**	**Standard Error**	**Standardized**	**t**	**p**
H_0	(Intercept)	2751.471	657.462		4.185	< .001
H_1	(Intercept)	-5034.937	2239.992		-2.248	0.026
	NI2010	-0.347	0.048	-0.360	-7.161	< .001
	TETA	102.293	77.321	0.029	1.323	0.188
	Ln(Tot Inc)	474.082	212.194	0.064	2.234	0.027
	Future Earn	-493.742	278.332	-0.039	-1.774	0.078
	2009Div	1.561	0.062	1.233	25.200	< .001
	2010CV	6.829	45.184	0.003	0.151	0.880

A p-value of less than 0.05 proves that the coefficient differs from 0, suggesting an association between these independent and dependent variables. A smaller p-value provides stronger evidence to reject the null hypothesis.

3.2.1 Coefficients interpretation

(Intercept): t-value: -2.248, p-value: 0.026

The p-value for the intercept is less than 0.05, which indicates that the intercept is statistically significant.

NI2010: t-value: -7.161, p-value: < 0.001

Given the very small p-value, we can conclude that NI2010 is statistically significant in predicting Div2010.

Ln(Tot Inc): t-value: 2.234, p-value: 0.027

The p-value for Ln(Tot Inc) is less than 0.05, suggesting this predictor is statistically significant.

TETA: t-value: 1.323, p-value: 0.188

The p-value for TETA is greater than 0.05. This means that, based on our dataset and at the 0.05 significance level, TETA is not statistically significant in predicting Div2010.

Future Earn: t-value: -1.774, p-value: 0.078

The p-value for Future Earn is greater than 0.05, which means it's not statistically significant at the 0.05 level. However, it's close enough that in some contexts or with a more lenient significance level (e.g., 0.10), it might be considered significant.

2009Div: t-value: 25.200, p-value: < 0.001

With a very small p-value, 2009Div is highly statistically significant in predicting Div2010.

2010CV: t-value: 0.151, p-value: 0.880

The p-value for 2010CV is much greater than 0.05, indicating that this predictor is not statistically significant in predicting Div2010 based on our dataset.

Based on the t-statistics and p-values, NI2010, Ln(Tot Inc), and 2009Div are individually significant predictors of Div2010 at the 0.05 significance level. TETA, Future Earn, and 2010CV are insignificant at this level, though Future Earn might be more lenient (like 0.10). The interception is also significant.

3.3 Model Analysis for Dividend Prediction

This regression model tries to understand the relationship between a bank's current dividend and several other financial metrics, including its current net income, revenue, capital-to-asset ratio, future earnings, past dividends, and past earnings volatility.

R-squared and Adjusted R-squared: The R-squared value is 0.924, which means that the model explains 92.4% of the variability in the dependent variable (Div2010).

This value is quite significant, indicating that the model accounts for a substantial amount of the variability in the dependent variable.

The Adjusted R-squared is 0.921, which considers the number of predictors in the model. It's very close to the R-squared, indicating that most of the variables in the model are relevant to the prediction.

The F-statistic value is 329.931, and the associated p-value is less than 0.001. This means the overall model is statistically significant

at a confidence level greater than 99%. As a group, the predictors provide more information in predicting the dependent variable than using the mean of the dependent variable alone.

Significance of Individual Coefficients: Some variables like NI2010, Ln(Tot Inc), and 2009Div are statistically significant. These variables particularly contribute to the model's predictive power. However, some variables like TETA and 2010CV aren't statistically significant at 0.05.

Residual Analysis and Assumptions: While the provided data doesn't include details about residuals, it's important to ensure that assumptions like linearity, independence, homoscedasticity, and normality of residuals are met. Breaking these assumptions may result in faulty conclusions.

Root Mean Square Error (RMSE): The RMSE is 2407.515, which gives us an idea of the average magnitude of the prediction errors. In the context of the dependent variable, it would be useful to compare this value to the range or standard deviation of Div2010 to understand its relative size. A lower RMSE is better as it indicates smaller prediction errors.

The model seems to predict the present dividend (Div2010) strongly. The R-squared value of 0.924 suggests that the model explains 92.4% of the variance in Div2010. Furthermore, the model's overall statistical significance is evident from an F-statistic of 329.931. However, beyond these numbers, it's crucial to understand the practical implications and the specific business context when concluding. Additionally, verifying that the model adheres to foundational assumptions and addressing potential complications such as multicollinearity or overfitting would further validate the model's reliability.

3.4 Multiple Linear Regression – Dividend Analysis

3.4.1 Examining the model provided

Strength of the Model: the R-squared value, being 0.924, is impressively high, indicating that this model can explain 92.4% of the variance in Div2010 (the 2010 dividend). This value accentuates the model's efficacy in delineating the variations in 2010 dividends.

Validity of the Model: an F-statistic of 329.931 with a p-value less than 0.001 denotes that the model is statistically sound. It implies that the set of predictors offers more valuable insights about the dependent variable than just using Div2010's mean as a predictor.

Significance of Individual Predictors: beyond the overall model's significance, it's pivotal to understand each predictor's impact. In the data provided, certain variables, like NI2010 and Ln(Tot Inc), are statistically significant, underscoring their importance in forecasting dividends.

3.4.2 Upholding model assumptions

Given the intricate nature of factors determining dividends, multiple linear regression is an apt analytical method. The selected model and its predictors aptly describe the 2010 dividends from the data. However, validating model assumptions and being wary of challenges like overlifting and multicollinearity is always prudent. Meeting linear regression assumptions like linearity, independence, homoscedasticity, and normality of residuals is crucial for valid interpretation, and diagnostic checks on residuals are needed.

3.5 Correlation between the Independent Variables

The provided table represents a correlation matrix using Pearson's correlation coefficient. Here's an explanation in Table 3**.**

The table provides pairwise correlations between the listed variables, helping to understand their linear relationships.

3.5.1 Interpretation of the correlations

NI2010 and Ln(Tot Inc): Pearson's r = 0.628, p-value < 0.001

This indicates a moderately strong positive linear relationship between NI2010 and Ln(Tot Inc), which is statistically significant.

NI2010 and 2009Div: Pearson's r = 0.893, p-value < 0.001

Table 3. Correlation table

Correlation								
Pearson's Correlations								
Variable		**Div2010**	**NI2010**	**Ln(Tot Inc)**	**TETA**	**Future Earn**	**2009Div**	**2010CV**
1. Div2010	Pearson's r	—						
	p-value	—						
2. NI2010	Pearson's r	0.783	—					
	p-value	< .001	—					
3. Ln(Tot Inc)	Pearson's r	0.581	0.628	—				
	p-value	< .001	< .001	—				
4. TETA	Pearson's r	-0.002	0.010	-0.136	—			
	p-value	0.977	0.902	0.077	—			
5. Future Earn	Pearson's r	0.031	-0.016	0.079	-0.012	—		
	p-value	0.693	0.839	0.306	0.879	—		
6. 2009Div	Pearson's r	0.948	0.893	0.608	-0.016	0.048	—	
	p-value	< .001	< .001	< .001	0.838	0.536	—	
7. 2010CV	Pearson's r	0.010	0.003	-0.075	-0.075	0.048	0.014	—
	p-value	0.892	0.971	0.331	0.331	0.533	0.858	—

This indicates a strong positive linear relationship between NI2010 and 2009Div, which is statistically significant.

Ln(Tot Inc) and TETA: Pearson's r = -0.136, p-value = 0.077

This indicates a weak negative linear relationship between Ln(Tot Inc) and TETA. The p-value suggests this correlation might not be statistically significant at 0.05.

Future Earn and 2009Div: Pearson's r = -0.012, p-value = 0.879

This indicates a very weak negative relationship between Future Earn and 2009Div, and it's not statistically significant.

3.5.2 Visual data

Firstly, the dividend rate (DPR) positively impacts ROA, which is statistically significant at the 1% level. This outcome suggests that a higher dividend rate is associated with a slightly higher return on total assets, although the effect is quite modest. Specifically, a 1 percent rise in the dividend rate results in a mere 0.0008 percent increase in the ROA. This result aligns with Spatz's [79] findings but contrasts with Chen [80] study, which indicated a negative correlation between dividend rate and ROA. This difference may be explained by the fact that increasing dividends enables companies to raise more capital for further expansion, potentially leading to decreased profitability.

Second, choosing to pay dividends (DDP) adversely affects the ROA, exhibiting statistical significance at the 1% threshold. This implies that the announcement of dividends has an adverse effect on a firm's performance.

The graph in Fig. 3 visualizes the dividends paid by major bank holding companies in the U.S. for five years, highlighting a noticeable decline in dividends after 2008. The decrease in dividends in the latter years could be associated with the financial crisis of 2008, which had significant impacts on the banking sector globally.

Fig. 4 highlights the patterns of dividends and repurchases by major banks during a significant period in the financial industry. The variations between the banks might be due to different strategies, levels of exposure to the subprime mortgage crisis, and other economic factors during those years.

Each graph in Fig. 5 depicts a bank's dividend and repurchase trends from 2005-2009. The x-axis shows years, while the y-axis indicates amounts. Two lines exist: blue for dividends (payments to shareholders) and red for stock repurchases. Notably, many banks reduced both in 2008, likely due to the financial crisis. Some banks show distinct patterns.

The research model for ROA could be presented as the following equation:

$$ROA_{i,t} = 0.346 + 0.0008DPR - 0.0085DDP - 0.0080SIZE - 0.0014LEV + 0.0002GROWTH + \varepsilon_{it}$$

Fig. 2. Regression results

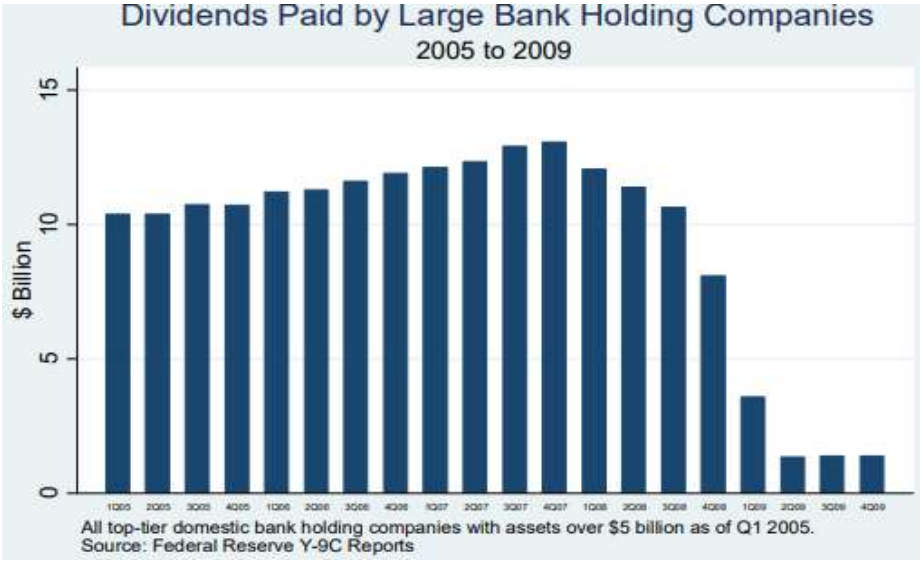

Fig. 3. Dividends paid by holding companies
Source: Hirtle (2016).

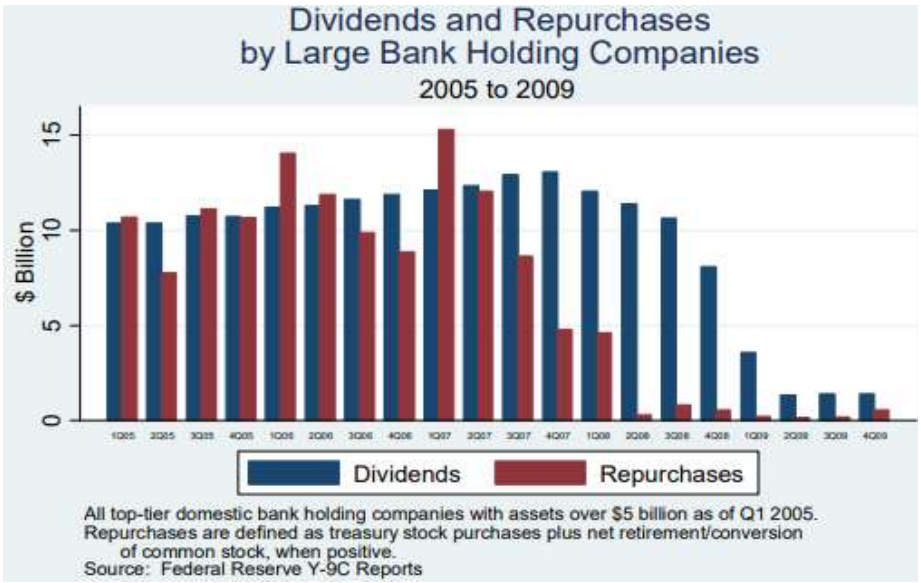

Fig. 4. Dividends and repurchases by large holding companies from 2005 to 2009
Source: Hirtle (2016)

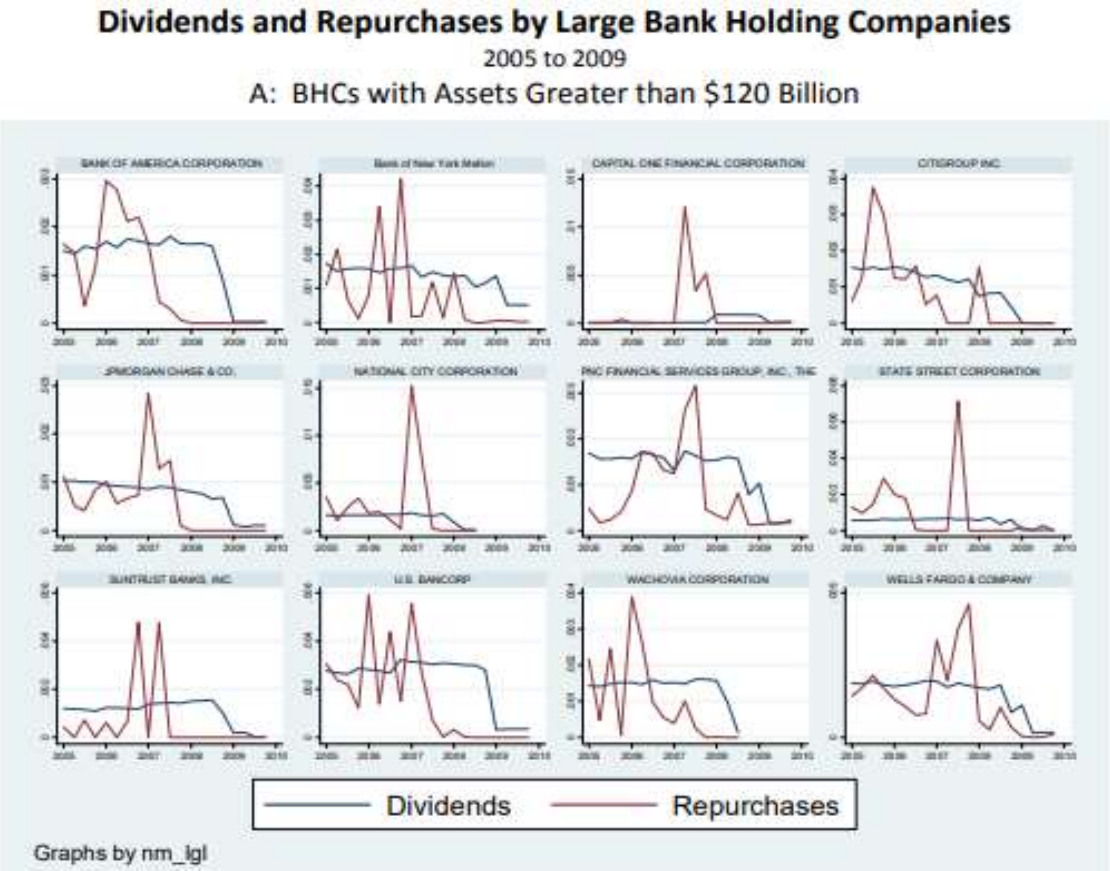

Fig. 5. Dividends and repurchases by large holding companies from 2005 to 2009

Fig. 6 below shows how inflation impacted dividend payments in the Italian insurance sector or any other sector.

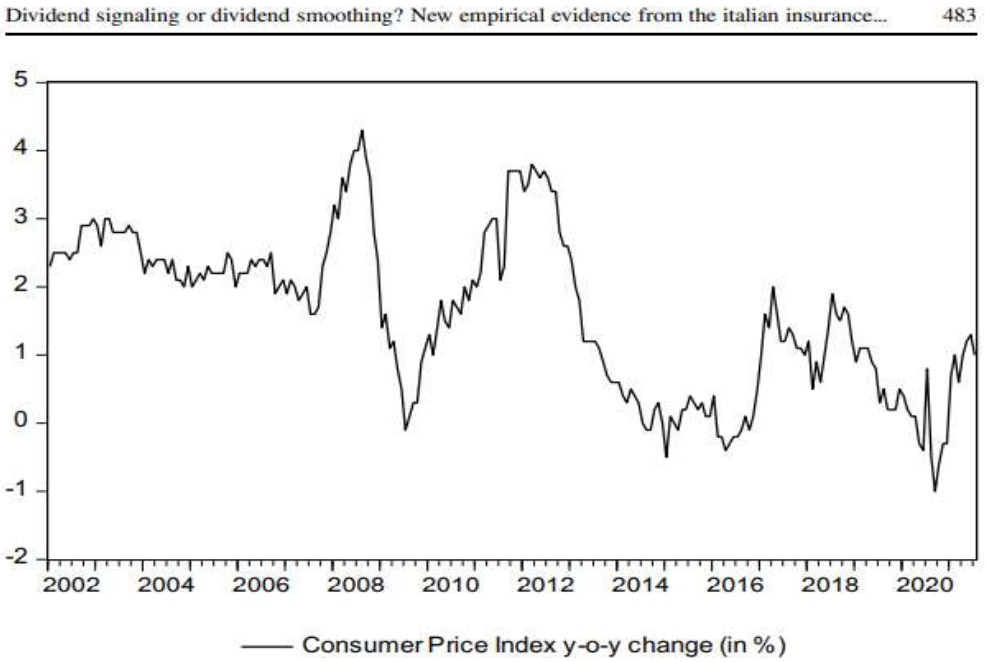

Fig. 6. Inflation in Italy

3.6 Implications for Bank's Dividends and Performance

- Coefficients Instability: With multicollinearity, even if the overall model can predict the dependent variable reliably, the coefficients for individual predictors may be unstable. Small changes in the data could result in large swings in the coefficient estimates.
- Difficulty in Identifying Important Predictors: Since NI2010, 2009Div, and Ln(Tot Inc) are correlated, it becomes challenging to isolate the impact of one predictor on the bank's dividends without the influence of others. We can't definitively say how much dividends would change with a unit change in one of these predictors while holding others constant.
- Potential Overfitting: Models with multicollinearity might fit the historical data well, but they can perform poorly on new, unseen data. The model may capture noise (random fluctuations) instead of the underlying relationship.
- Reduced Interpretability: Multicollinearity can obscure the understanding of relationships between predictors and the dependent variable. For instance, a predictor might be statistically insignificant in multicollinearity, even if genuinely impactful.
- Historical Reliance on Certain Predictors: The high correlation between NI2010 and 2009Div suggests that the bank's dividends in 2009 might have been influenced heavily by its net income in 2010 or vice versa. This can indicate that the bank's dividends are dependent on specific financial metrics, which might not be a sustainable strategy in the long run.
- Impacts on Performance Metrics: The bank's performance metrics, especially those related to dividends, could be driven by a few key variables. If these variables face any setbacks, it can have a cascading effect on the bank's overall performance and dividends.

4. DISCUSSION

The 2010 dividend analysis for the United States banks on their dividend payment utilizing multiple linear regression offers insight into the forces influencing dividend decisions that year. This understanding is substantiated by notable metrics like the R-value of 0.961 and R^2 of 0.924, which show a strong linear relationship, indicating that our model aligns well with the dividend patterns from 2010. Also, the model is supported by a significant F-statistic of 329.931 and a p-value below 0.001. However, banks should tread with caution. They face potential pitfalls such as multicollinearity. For instance, there is an overlap among certain variables like NI2010, 2009Div, and Ln(Tot Inc). Such overlap might cloud the comprehension of how each factor impacts dividends, leading to unpredictable financial forecasts. This can pose challenges in developing dividend strategies that accurately mirror a company's fiscal well-being. Further, relying too heavily on this overlap may make our model overly dependent on past performance, jeopardizing its capacity to adapt to new data or future scenarios.

Consequently, banks aiming for wise decision-making should remain vigilant for overlapping financial indicators to maintain clarity on the distinct influence of each metric. It's also crucial for banks to ensure the model remains flexible and not overly attached to historical figures, given the ever-evolving nature of the financial domain. Prioritizing consistent refinements and updates to the model to mirror present market conditions is also pivotal for its sustained accuracy and relevance.

Strengthening our findings, it is evident that within the vast landscape of dividend disbursements in the banking world, myriad research techniques have been harnessed to shed light on the elements that shape and are shaped by these financial distributions. This section delves into a comparative review of these methodologies, illuminating the diverse research practices employed by scholars and analysts.

The investigation of Ghauri [3] discussed earlier revealed a strong relationship between dividend policy and shareholders' wealth among banks in the USA and a stronger relationship among U.K. banks. However, the relationship depends on the context and prevailing circumstance, as the study tested only four independent variables, resulting in diverse relationships from variable to variable. This is consistent with our findings, which reveal that the impact of one predictor on the model can be positively or negatively influenced when another variable is factored into the model, showing that no variable can be studied independently. Thus, it is plausible that how dividend policies are implemented can significantly affect shareholders' wealth; thus,

there is no one-size-fits-all formula for maximizing shareholders' wealth through dividend policies.

Hirtle [4] highlights that smaller BHCs used repurchases as a safety net against significant dividend changes during the financial crisis in addressing the various factors that can affect a firm's capacity for high or low dividends. The research factored in controls like firm size, profitability, and nonperforming loans. Notably, capital ratios, both risk-weighted and leverage, were influential. Pre-crisis repurchase habits showed disparities between large and small BHCs. While larger BHCs reduced dividends, smaller ones used repurchases as a cushion. The nuanced relationship between payouts, dividends, and repurchases is essential for understanding financial stability and capital regulation. Higher profitability and fewer loan issues decrease dividend cut chances.

As per [2,80], businesses with high dividends often attract investors seeking a consistent income stream rather than significant share price growth [2]. Consistent with the findings of this study, companies with low dividend payments prioritize reinvestment in business growth, potentially leading to higher future capital gains for investors [2].

However, the study of [2] reveals that dividend payment negatively affects organizational performance regarding financial measures. If firms reduce their dividend rates, accounting-based performance can increase significantly and positively. Furthermore, the study found that although dividend payment affects organizations' financial health, it positively impacts market expectations and performance.

Thus, we suggest that, in designing dividend policies, stakeholders should balance all factors involved in such policy formulation to achieve maximum performance and maximize satisfaction for all stakeholders.

5. CONCLUSION

The study provides invaluable insights into the underlying motivations, outcomes, and factors that drive dividend payout decisions. An intriguing cross-country comparison shows that U.K. banks exhibit a more pronounced connection between shareholder wealth and dividend strategies than their U.S. counterparts [3]. In contrast, banks in emerging markets like Vietnam prioritize internal reinvestment over high dividend payouts, as suggested by their lower dividend rates [2]. Historical upheavals, notably the financial crisis from 2007 to 2009, accentuate the adaptability of bank dividend practices in response to capital necessities and regulatory impositions. Large banks marginally decreased their dividends, whereas smaller ones leveraged share repurchases to sustain their dividend payouts [4].

Moreover, there's a discernible correlation between dividend payouts and pivotal bank health metrics, such as nonperforming loans, profitability measures, and risk metrics [6,82]. Through causality examinations, dividends appear to play an informational signaling role, reinforcing investor perception theories [1]. However, it's imperative to approach short-term, crisis-induced behaviors cautiously and delve deeper into the nuances of long-term dividend practices, encompassing both smoothing and signaling inclinations [1]. The ramifications of bank dividend payouts span capital configurations, operational outcomes, regulatory adherence, and investor communications. Although the studies significantly enhance our understanding, a rich vein of potential exploration remains in areas like cross-national variations, crisis-driven responses, and ties with bank fiscal stability [67,79,81]. Given their pivotal role in economic frameworks, banks must judiciously shape their dividend policies to harmoniously serve the multifarious requirements of stakeholders, encompassing return on investment, growth potential, and financial robustness [5].

6. LESSONS FROM THE ANALYSIS

Here are the key lessons from the study:

1. Diverse Methodologies for Different Insights: Research methodologies vary significantly, depending on the study's specific objectives. Each methodology offers a unique perspective on dividend policies and their implications, highlighting the need to tailor one's approach based on the desired outcome.
2. Comparative Studies Offer Broad Perspectives: Comparing data across countries, such as between the U.S. and the U.K., can provide nuanced insights into the influence of different regulatory environments, market conditions, and cultural factors on dividend payments and their relation to shareholders' wealth.

3. Quantitative Metrics are Essential but Require Context: Metrics like Tobin's Q, ROA, and ROE are crucial in assessing a firm's financial performance, but they become even more insightful when studied about other variables like size, growth, leverage, and dividend policies.
4. Crisis Management in Financial Institutions Varies: Banks and financial institutions respond differently to crises. While some larger entities reduce dividends during financial turbulence, others, particularly smaller ones, may leverage repurchases as a buffer.
5. Regulatory Pressures Play a Key Role: In times of financial crisis, regulatory pressures can shape a bank's actions. For instance, banks might shift towards more transparent, loss-absorbing capital forms, like common equity, to maintain investor and market trust.
6. Dividend Policies are Strong Indicators of Financial Health: A bank's dividend policy can be a robust gauge of its financial health. Higher dividend payout ratios and increases often correlate with better financial conditions, providing valuable stakeholder insights.
7. Regional Differences Impact Dividend Policies: Geographical context matters. For example, Vietnamese firms offer lower dividend rates, implying a preference for retaining profits for future ventures.
8. Dividend Signaling is Essential: The relationship between dividend payments and subsequent corporate earnings or stock price changes underscores the importance of dividend signaling in certain sectors and regions.
9. Communication is Paramount: Firms must communicate clearly when adjusting dividend payments to ensure that the market comprehends the reasons behind such moves and avoids potential misunderstandings.
10. Research Limitations and Potential Biases: It's crucial to be aware of and acknowledge the potential limitations, biases, and challenges inherent in the research methodologies and data sources used in these studies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/110023