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Capital Market and Securities Digital Transformation: the Future and Challenges of Digital Assets

Conference Proceedings

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PREFACE

We are very grateful to God Almighty for his grace that the 8th Indonesian Finance Association (IFA) International Conference was held successfully on October 12-13, 2022. The 8th IFA International Conference was held virtually, supported by our generous host, the Indonesian Stock Exchange (IDX).

The theme of this conference is "Capital Market and Securities Digital Transformation: the Future and Challenges of Digital Assets". In today's ever-evolving financial landscape, the integration of digital technologies is reshaping the very essence of how we conceive, trade, and invest in financial assets. The rise of cryptocurrencies, tokenization of assets, decentralized finance (DeFi) platforms, and blockchain technology have ushered in a new era of innovation, creating opportunities and challenges that are redefining the rules of the game in the financial sector. We hope our conference can uncover some of the digital effects and challenges in the finance field. Nevertheless, most importantly, we will also foresee what the future holds for financial markets.

This event will not be a success without the close collaboration between the Indonesian Finance Association and the Self-Regulatory Organization of Indonesia's Capital Market as the main sponsor.

Finally, we would like to thank all participants and presenters who have been supporting the Indonesian Finance Association conference. We have a total of 40 submitted papers from 6 countries, Bangladesh, Greece, Indonesia, Macao, Mexico, and the United Kingdom. After a process of double-blind review, we hand-picked 39 high-quality articles to be presented at the conference. From these 36 articles, there were 14, from four countries, have agreed to include their full paper in the proceedings.

We sincerely hope that these proceedings will benefit all the participants and readers. We welcome any suggestions and constructive feedback to improve the next IFA conference and proceedings, and we look forward to seeing you again.

Yogyakarta, December 2022

Editors

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AGENCY PROBLEM ON FIRM PERFORMANCE WITH NATIONAL GOVERNANCE QUALITY AS A MODERATING VARIABLE ON AGENCY PROBLEM TYPE 2 IN INDONESIA AND SINGAPURA MANUFACTURING COMPANIES

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ABSTRACT

Corporate governance is mostly researched in developed countries such as the US, UK, and some developed countries in Europe which focus on agency problems type I (principal-agent), and there is a shortage of types of agency problems such as agency problems type II (principal majority-principal minority) and agency problems type III (principal-creditor). Some modern financial literature has transformed towards national governance quality in mitigating the influence of agency problems in increasing firm performance. Our results recommend that agency problems are more prone to occur in countries with under-national governance than countries with well-national governance. In addition, countries with good national governance have weakened the negative influence agency problem of type II on firm performance. The government must reform the quality of national governance to increase the firm performance.

Keywords: agency problem, national governance quality, firm performance, corporate governance.

1. INTRODUCTION

Increased firm performance can be realized by synergies between stakeholders such as investors, creditors, government, and other stakeholders. One indicator to measure a firm's market performance is Tobin's Q (Ghazali & Bilal, 2017) which has advantages over other proxies by including elements of market capitalization, assets, and liabilities that exist in the company so that it relatively describes all parties involved and is free from the possibility of manipulation or manipulation, earnings management (income minimization, income maximization, income smoothing) by company management and certain parties in the company to deceive shareholders (Ang et al., 2000).

Agency problems type I, II, and III can cause large agency costs in the company, even though the impact of the three agency problems occurs at different levels within one company (Kusumadewi & Wardhani, 2020). In emerging markets, such as Southeast Asia, agency conflicts are more complex, given weak institutional development and investor protection (Claessens & Yurtoglu, 2013).

However, managers with closer access to information tend to have a different view. Focusing on the agency problem type I, where shareholders tend to expect dividends and

capital gains. Therefore, managers may wish to retain most of the profits for asset purchases in developing technologies to increase firm performance. In addition, managers can make decisions that increase personal wealth, leading to ethical risks (Ang et al., 2000) that cause inefficiency and even losses for the company (Huu Nguyen et al., 2020).

The results of empirical studies showing that agency problems can increase firm performance were carried out by Lu et al. (2021) and supported by other research (Kusumadewi & Wardhani, 2020; Herdinata, 2019) while agency problems could reduce firm performance (Hung et al. (2021) and supported by other research (Sari & Sukmaningrum, 2020).

Empirical findings (OECD, 2021) show that Indonesian corporations show the most concentrated ownership, i.e., more than 60% of the company's shareholders are concentrated in one shareholder, followed by Singaporean corporations at 58% compared to other Southeast Asian capital markets. The more concentrated share ownership, the problem that arises is the agency problem type II (Wardani et al., 2020; La Porta et al., 2000). The majority shareholder has the power to make decisions within the company (La Porta et al., 1999). Initially, the majority shareholder's role is to monitor and control managers' decisions that increase firm performance. However, when the concentration of ownership gets higher, most majority shareholders make decisions from the power they have to improve their welfare at the expense of the interests of minority shareholders.

Similarly, Shleifer & Vishny (1997), Fama & Jensen (1978), and Morck et al. (1988) also found that ownership that is concentrated above a certain level can lead to a conspiracy of managers and majority shareholders in making decisions to withhold corporate earnings for risky projects that are profitable in the future rather than distributing profits as dividends to shareholders. All shareholders thus hurt firm performance. As previous empirical research, the positive effect is in line with the efficient monitoring hypothesis (Filatotchev et al., 2013). It is supporting by other research Nashier & Gupta (2020), while the negative effect is in line with the entrenchment hypothesis (protection) Wardani et al. (2020) and is supporting by research others (Altaf & Shah, 2018; Lozano et al., 2016; Khamis et al., 2015). Furthermore, the focus is on discussing agency problems type III (principals and creditors) on company performance. According to agency theory Jensen & Meckling (1976), leverage can increase firm performance because debt financing can reduce conflicts of interest between managers and shareholders: periodic payments of disciplined debt investors managers to make inefficient decisions on risky projects with negative NPV. On the other hand, leverage can reduce firm performance due to agency problems between shareholders and creditors: high debt obligations may prevent firms from taking positive NPV growth opportunities from external financing (Myers, 1977).

Firm performance is not only driven by industry conditions, corporate governance, and other company-specific characteristics but also by country-specific factors such as national governance quality in the country where the company operates (Ngobo & Fouda, 2012; Nguyen et al., 2015). In general, good national governance quality is considered to create shareholder trust and can be used as an index of investor protection (Wardani et al., 2020). The findings of Nguyen et al. (2015) support that national governance quality

weakens the positive relationship between ownership concentration and firm performance so that investors and potential investors can use national governance quality as one of the considerations in making investments.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Agency Problem Type I, II, III, and Firm Performance

Shareholders tend to expect dividends and capital gains. At the same time, managers as company managers who know the company's actual financial position information and the company's prospects, instead want retained profits for asset purchases that increase firm performance or there are other motives to increase the personal wealth that leads to moral risks (Ang et al., 2000) thus causing inefficiencies, even losses for the company (Huu Nguyen et al., 2020).

Differences of interest can trigger information asymmetry that lowers firm performance (Jensen & Meckling, 1976). Research (Kusumadewi & Wardhani, 2020; Ang et al., 2000; Singh & Davidson, 2003) uses the asset utilization ratio in measuring agency problem type I. The higher the value of the asset utilization ratio means that managers are more efficient in using assets, so the smaller the agency conflict that occurs. This means that the manager increases assets to maximize firm performance (Ang et al., 2000; Singh & Davidson, 2003; Fleming et al., 2005). In contrast, the asset utilization ratio is low, reflecting greater agency conflicts due to management inefficiencies in managing assets and lowering shareholder value (Wardhana & Tandelilin, 2015).

Hypothesis 1. Agency problem type I has a negative and significant effect on firm performance in Indonesia and Singapore.

The characteristics of a proprietary structure concentrated in companies registered in Indonesia and Singapore will encourage majority shareholders to have the power to take over minority shareholders (La Porta et al., 1999) in the form of transactions between related parties and transfer pricing between related parties. As a result of the takeover action by the majority shareholder, minority shareholders will likely attract investment in a company by selling the shares of the company it owns. The more minority shareholders sell their shares, causing firm performance is reflected by the company's stock price decrease (Claessens et al., 2002; Attig et al., 2009).

Hypothesis 2. Agency problem type II has a negative and significant effect on firm performance in Indonesia and Singapore.

Based on debt overhang theory, Myers (1977) implies that companies with higher leverage will forgo positive net value projects in the future to meet all debt obligations. Literature (Burunciuc & Gonenc, 2020) from another point of view, debt can also create financial difficulties "bankruptcy effect". Increased leverage increases the conflict of agency

between shareholders and creditors, leading to a decrease in the market value of the company. The company will try to choose the optimal level of loan to reduce the risk of bankruptcy, which the lender will take into account. Consequently, the company will try to control the risks associated with potentially high borrowing costs (Dao & Ta, 2020).

Hypothesis 3. Agency problem type III has a negative and significant effect on firm performance in Indonesia and Singapore.

National Quality Governance and Firm Performance

Good governance can affect the value of companies operating in the country. For example, in countries where government effectiveness can affect the cost of production inputs and in countries where the government has market-unfriendly policies, conducts price controls, regulatory quality, can create open and healthy competition, and good rules of law have an impact on the company's operating activities (Deari & Trinh, 2022; Ngobo & Fouda, 2012).

Hypothesis 4. National Quality Governance has a positive and significant effect on firm performance in Indonesia and Singapore

In general, good national quality governance is considered to create quality protection for minority shareholders (Wardani et al., 2020) and play a role in forming and implementing regulations that minimize the risk of takeover by majority shareholders (Lozano et al., 2016; Nguyen, 2015; Aslan & Kumar, 2014). When more protected, minority shareholders are more loyal to continuing to invest in the company. This impacts maintaining the company's market value, thus closing the possibility of a decrease in the company's market value caused by the sale of shares by minority shareholders. The higher the level of protection for minority shareholders, the lower the takeover. High national quality governance will reduce the negative influence of ownership concentration on firm performance.

Hypothesis 5. National governance quality significantly weakens the influence of agency problem type II firm performance in Indonesia and Singapore.

3. DATA AND METHODS

Table 1. Data and Methods

Variable	Formula
Firm Performance	**_Tobins' Q_** Market capitalization is added up by total debt and then divided by total assets (Chung & Pruitt, 2005)
Agency Problem Type I	**_Asset Utilization Ratio_** = Annual sales divided by Total annual assets Ang _et al._ (2000)
Agency Problem Type II	**Ownership Concentration** = Total Ownership of majority shareholder >5% divided by the number of outstanding shares Thomsen _et al._ (2006)
Agency Problem Type III	**Dummy _Leverage_** = A dummy variable with a value of 1 if leverage is above the industry median and 0 otherwise. Leverage is measured by Debt to Equity Ratio Aulia (2013)
National governance quality	**_Worldwide Governance Indicators_ (WGI)** = _Government Effectiveness + Regulatory Quality + Rule of Law_ Nguyen _et al._ (2015)

4. RESULTS

Table 2. Empirical Results

Negara	Variable	Coefficient	Std. Error	t-Statistic	Probability	R-Square	Prob. (F)
Indonesia	AP1	-0.241027	0.102705	-2.346789	0.0199	0,142	0,0000
	AP2	-0.226261	0.057900	-3.907807	0.0001		
	AP3	-0.185658	0.141089	-1.315900	0.1898		
	NGQ	0.229933	0.154393	1.489274	0.1380		
	NGQ*AP2	0.087724	0.159877	0.548700	0.5838		
	C	0.466401	0.152048	3.067448	0.0025		
Singapura	AP1	-0.304822	0.107902	-2.824980	0.0055	0,153	0,000
	AP2	-0.119593	0.077050	-1.552146	0.1233		
	AP3	-0.038625	0.156870	-0.246222	0.8059		
	NGQ	0.052376	0.023101	2.267265	0.0252		
	NGQ*AP2	0.046689	0.021253	2.196862	0.0300		
	C	-0.153058	0.241932	-0.632649	0.5282		

Based on hypothesis testing, it is found that agency problem type I has a negative and significant effect on firm performance in Indonesian manufacturing companies and Singaporean manufacturing companies. So hypothesis 1 states that the agency problem type I has a significant negative effect on firm performance received by the two countries. Therefore, a low asset utilization ratio can be a bad signal for investors because it can lead to high agency conflict, so investors perceive that management is acting out of self-interest that is not profitable for them, such as using company money for company transactions in the end in their favor (contracting employment contracts) with family businesses, excess expenses (expenditures that are not made for company profits but for personal gain), and self-image (making decisions to help famous managers) so that this can reduce firm performance (Madaschi, 2010).

Furthermore, based on the results of hypothesis testing, it was found that agency problem type II had a negative and significant effect on firm performance in Indonesian manufacturing companies. Still, agency problem type II had a negative but not significant effect on Singaporean manufacturing companies. So hypothesis 2, which states that agency problem type II has a significant negative effect on firm performance, is accepted by Indonesian manufacturing companies but is rejected by Singaporean manufacturing companies. Referring to previous empirical research, the insignificant effect in Singaporean manufacturing companies is in line with traditional agency theory in market-based Anglo-Saxon model countries (developed countries that have reliable control mechanisms, such as European countries and the United States in disciplining companies that do not comply with corporate rules). governance) where the majority shareholder will be difficult to take advantage of the power they have due to the condition of the country's capital market having

good regulations and laws like Singapore, so the results are contrary to the initial hypothesis (Filatotchev et al., 2013). This is also supported by limited studies that focus on developed economies. Minority shareholders will be protected even though there is a high concentration of ownership in the company (Oesterle et al., 2013). The results of this study are following the results of research conducted by (Demsetz & Villalonga, 2001), which found no significant relationship between ownership concentration and firm performance. However, the results of research showing that agency problem type II has a negative effect on firm performance (Wardani et al., 2020; Altaf & Shah, 2018; Lozano et al., 2016; Kusumadewi & Wardhani, 2020; Nguyen et al., 2015; Khamis et al., 2015; Jara et al., 2014).

Then based on the results obtained, agency problem type III has a negative but not significant effect on firm performance in Indonesian state manufacturing companies and Singapore state manufacturing companies. So hypothesis 3, which states that agency problem type III has a negative and significant effect on firm performance, is rejected in Indonesian and Singaporean state manufacturing companies. This hypothesis is rejected because the low debt based on the descriptive data minimizes agency conflicts between shareholders and creditors. Companies with fair debt are a signal to creditors that the company is able to pay off its debts and the company is in a reasonable risk business situation, so that type III agency conflicts are minimal (Ibhagui & Olokoyo, 2018). This is supported; among the five debt theories, only MM and Signaling theory support a positive relationship between leverage and firm performance, while the other three theories, such as agency theory, trade-off, and pecking order, support a negative relationship to firm performance (Dao & Ta, 2020). The results of this study are in accordance with the results of research conducted by (Dao & Ta, 2020; Kusumadewi & Wardhani 2020; Aggarwal et al., 2018), which shows that the agency problem type III has a negative and significant effect on firm performance. However, it is not in line with research conducted by (Chang et al. 2021; Jadiyappa et al., 2020; Ibhagui & Olokoyo, 2018), which shows that the agency problem type III has a positive and significant effect on firm performance.

Meanwhile, based on the results of hypothesis testing, it was obtained that national governance quality showed a significant positive effect on firm performance in Singapore manufacturing companies but showed no significant positive effect on firm performance in Indonesian manufacturing companies. So hypothesis 4, which states that national governance quality has a significant positive effect on firm performance, is accepted by Singaporean manufacturing companies but rejected by Indonesian manufacturing companies. Therefore, the research results are in line with the theory that good national governance quality can affect the value of companies operating in the country. For example, Singapore, which has good government effectiveness, regulatory quality, and the rule of law, has an impact on the company's operating activities that can increase firm performance. For example, the quality of government (government effectiveness) can affect the company's production input costs and carry out price controls or regulations in areas such as foreign trade (Ngobo & Fouda, 2012). In addition, independent and strong regulatory quality, such as antitrust regulations, can also improve company performance through open and healthy competition. Open competition will challenge incumbents and make them improve their

innovative products and capabilities for greater customer satisfaction and company performance. Likewise, the legal environment (the rule of law) and the level of economic freedom also encourage company productivity (Deari & Trinh, 2022). Meanwhile, the Indonesian state with relatively weak government effectiveness, regulatory quality, and the rule of law has an impact on the low government support in maximizing the company's business operations activities in Indonesia. The results of this study are in accordance with the results of research conducted by (Eldomiaty et al., 2019; Imran et al., 2020), which shows that national governance quality has a positive effect on firm performance.

Finally, based on the results of hypothesis testing, it is found that national governance quality weakens the influence of agency problem type II on firm performance in Indonesian manufacturing companies and Singaporean manufacturing companies. So hypothesis 5, which states that national governance quality has a significant positive effect on firm performance as proxied by Tobin's Q, is accepted in Singaporean manufacturing companies. However, it was rejected by the Indonesian state manufacturing company. The test results strengthen the theory that good governance (well-national governance quality) can control behavior in the use of its power with government effectiveness (government effectiveness), regulatory quality (regulatory quality), and legal principles (the rule of law). These countries thereby reduce agency costs by the majority shareholder, while in countries with under-national governance quality, such as Indonesia, meaning that the protection of the rights of minority shareholders will not optimally run so that they are vulnerable to profit taking by the majority shareholder's decision because there is no interference the government's hand in overseeing the actions of the majority shareholder (Burunciuc & Gonenc, 2020). The results of this study are following the results of research conducted by Wardani et al. (2020), Burunciuc & Gonenc (2020) Altaf & Shah (2018), Lozano et al. (2016), and Wang & Shailer (2015), which shows that national governance quality weakens the negative effect of agency problem type II on firm performance. However, this is not in line with research conducted by Nguyen et al. (2015), which shows that national governance quality weakens the positive influence of agency problem type II on firm performance.

5. CONCLUSION

This study also has limitations because this study only focuses on testing agency problem type II moderated by national governance quality on firm performance due to the limitations of previous research literature. For further research, it is possible to test the three types of agencies on firm performance moderated by national governance quality.

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ANALYSIS OF OPTIMAL SUPPORT AND RESISTANCE USING FIBONACCI RETRACEMENT ON LQ45 INDONESIA STOCK EXCHANGE

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ABSTRACT

This research aims to assist traders in determining stronger and optimal support and resistance. This research obtains three results, the thickness of the bars of each Fibonacci Retracement level, the strength of each Fibonacci Retracement level in becoming support and resistance, and the correction level that produces the highest rebound wave and the lowest bounce-back wave. Based on historical data collected from the research sample of 35 issuers, the result was classified into uptrend and downtrend. In uptrend conditions, the 50.0% Fibonacci Retracement level for the correction wave has the narrowest bar, and the 23.6% level owns the widest bar. In contrast, for the rebound wave, the 150.0% Fibonacci Retracement level has the narrowest bar, and the level of 176.4% owns the widest bar. The 23.6% level is the level that most often becomes the endpoint of the correction wave, while the 161.8% level is the level that most often becomes the endpoint of the rebound wave. In downtrend conditions, the 38.2% Fibonacci Retracement level for the correction wave has the narrowest bar, and the 76.4% level owns the widest bar. In contrast, for the bounce-back wave, the 161.8% Fibonacci Retracement level has the narrowest, and the 200.0% level owns the widest bars. The 23.6% level is the level that most often becomes the endpoint of the correction wave, while the 123.6% level is the level that most often becomes the endpoint of the bounce-back wave. The 38.2% level is the level that has the highest average rebound in uptrend conditions and, at the same time, has the lowest average bounce back in downtrend conditions.

Keywords: Technical Analysis, Support, Resistance, Fibonacci, Retracement.

1. INTRODUCTION

Plunging into the stock market is an option to earn additional income or serve as a primary source of income. In general, stock market participants are classified into investors and traders. An investor usually already has a primary income or has relatively high financial strength. This privilege causes the condition mentioned by Ellen May, which says that an investor is not affected by fluctuations in stock prices and seeks profits in the long term (May 2018, 4). Despite all the reasons behind it, a trader has the characteristics of wanting to make a profit quickly by making buy and sell transactions in a relatively short time (May 2018, 3). Thus, the main difference between investors and traders is in the expected timeframe for making a profit.

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Figure 1. Number of Stock Market Participants

Source: KSEI 2022

The Covid-19 pandemic that has hit the world since the end of 2019 has had a negative impact on the world economy, including Indonesia. This condition is confirmed by statistical data published by Badan Pusat Statistik, which states that Indonesia's economic growth in 2020 was -2.07%, whereas in the previous year, the Indonesian economy grew by 5.02% (BPS 2021). This negative economic growth led to massive layoffs. People who lose their jobs are forced to find new sources of income in a relatively short time, one of which is the stock market. Based on Figure 1, statistical data from KSEI shows that in 2021 stock market participants experienced a significant increase, approximately 93% from the previous year. Regarding the adverse effects of the pandemic, the author concludes that most of these new market participants are trying to plunge into the stock market to make short-term income and are classified as traders.

Technical analysis significantly impacts traders with a shorter time frame (Ong 2016, 7), so the researcher concludes that most new market participants prioritize technical analysis in trading stocks. Technical analysis is an analysis of stock movements through historical data of opening, closing, highest prices, lowest prices, and trading volume of a stock at any time (Wijaya 2014, 6). And one of the best ways that can be used to read the direction of stock movement is to read support and resistance. Support is an area or price believed to be the lowest point or area at a time that can be used as a reversal point in a trade. Resistance is an area or price believed to be the highest point or area at a time that can be used as a reversal point in trading (Wijaya 2014, 45-46). In practice, the determination of support and resistance can be done in several ways, one of which is the Fibonacci Retracement.

Every line formed from Fibonacci will become support and resistance, considered as one of the strong reasons that cause a reversal pattern to occur. The lines formed on the Fibonacci retracement are (Wijaya 2014, 50):

1. 0%
2. 23.6%
3. 38.2%

4. 50%
5. 21.8%
6. 78.6%
7. 100%

Before conducting the research, the authors tried to run a pre-research survey in attempting to match the Fibonacci Retracement on one of the research samples, BBCA. In an uptrend, there was a correction to the level of 37.5%, which then rebounded to the level of 137.76%. A correction level of 37.5% can be classified as a 38.2% Fibonacci level, and a rebound level of 137.76% can be classified as a 138.2% Fibonacci level. It is acceptable because to increase security in support and resistance, support and resistance are used in a price range (bar level), not a certain price level (Utomo 2016, 88). This study aims to determine the bar width for each Fibonacci level based on historical data by calculating each level's Mean Absolute Deviation (MAD).

Then, the frequency of reaching each Fibonacci level as support or resistance was calculated to determine the strength of each Fibonacci level in becoming support or resistance. This method is based on the opinion of Satrio Utomo, who states that there are events that have a higher probability that can be used as a direction or target for price movements (Utomo 2016, 121). So the author concludes that the more often a Fibonacci level becomes a reversal point, the stronger that level will become support or resistance in the future.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPTMENT

There are two activities in the world of stocks, trading, and investing. Trading is buying at a low price and selling at a higher price in a relatively short time to make a quick profit, or what is commonly called a capital gain (May 2018, 3). Capital gain is an advantage due to reselling the purchased shares and profit when the shares are resold (Wijaya 2014, 3). Generally, traders take advantage of trends and changes in momentum in stocks whose prices fluctuate greatly to generate profits. While investing is the placement of an amount of money or capital in an instrument, hoping the funds will increase (May 2018, 3). An investor also expects dividends more than capital gains. Dividends are a result of profit sharing given by the company to its shareholders in each period. However, the company has the right not to distribute dividends or profits for specific company progress policies (Wijaya 2014, 9). Although both are related to buying and selling shares in the capital market, trading is not the same as investing. The difference between trading and investing is as follows (Utomo 2016, 3-6):

1. Investment period

Investors expect prospects or company value for the long term, three years, five years, or even more than ten years. While traders buy stocks with short storage times, it can be in a matter of weeks, days, hours, or even minutes.

2. Source of profit

Investors see the prospect of the issuer, how the company will survive, how the company will experience growth, and how the value of the company will be. In comparison, traders must be able to take every opportunity from short-term price movements. In short, investors focus on value, and traders focus on price movements.

3. Analysis tools

An investor must use fundamental analysis as an analytical tool and see the company's value. Because to know the value of the company in the very long term, market participants can only see it from the development of the company's condition through its financial statements. On the other hand, traders will use various analytical tools as long as they are profitable, such as fundamental analysis, technical analysis, behavioral financial analysis, news, and rumors.

4. Strategy to buy and sell shares

Investors will make long positions on attractive stocks that follow the fundamental criteria set. For investors, falling prices are the best opportunity to accumulate at lower prices. It's different with traders. Traders try to find every gap in the price movement. If the price moves up, the trader will take a long position. Conversely, if the price movement direction seems to be going down, the trader will take a short position.

5. Investment goals and how to achieve them

Traders will pursue the maximum profit in the shortest time. While investors often use data obtained directly from the company's financial statements and financial ratios. The huge differences between trading and investing mentioned earlier make the strategies carried out in trading and investing very different (May 2018, 5). An investor relies more on fundamental analysis, while a trader relies more on technical analysis (Utomo 2016, 5). Fundamental analysis is an in-depth analysis focusing on financial statements by looking at Profitability, Solvency, liquidity, and activity. In contrast, technical analysis analyzes stock movements through historical data of opening, closing, highest prices, lowest prices, and trading volume of a stock at any time (Wijaya 2014, 6).

Satrio Utomo defines technical analysis as the study of market movements, known as prices and trading volumes in the stock exchange. Technical analysis can also be used to predict the direction of price movements in the future by using price movement charts (Utomo 2016, 40). Technical analysis believes that all important things about the market have been included in the combination of price values in the chart. Therefore, traders only need to observe and analyze price movements (May 2018, 38).

There are three basic assumptions in technical analysis (Utomo 2016, 41-43):

1. Market action discounts everything

Price movements in the market reflect all information available, including all

information that the public can access, information that can be obtained specifically, various rumors, and even inside information.

2. Price moves in trend

People who want to study technical analysis must believe that price movements have direction.

3. History repeats itself

Prices move because of the supply and demand generated by people who are market participants. The behavior of groups of people tends not to change over time, especially when viewed from the side of the drive of fear and drive of greed. By studying past price movements, the direction of future price movements can be predicted.

There are several difficulties in trading shares, including (Wijaya 2014, 168):
1. Look for stocks that need attention.
2. Determine the correct value to enter (buy).
3. Determine the correct value to exit (sell).

In particular, traders face two of the three difficulties above, which are the main causes for a trader to fail; they do not know when to buy and when to sell shares. (May 2018, 6). A true trader knows when to buy and sell, when to act or wait for a favorable moment (May 2018, 12). The level of profit that a trader earns depends on the ability to predict and the ability to react based on those predictions (Utomo 2016, 44).

Humans are price drivers. Because humans have a memory, the price also has a memory. The existence of this memory makes price movements not free. There are price levels when buyers have a high probability of reappearing, and there are also levels when sellers have a high probability of reappearing. This price level is called support or resistance. Support is the lower limit of the price movement. At the support level, buyers have a greater chance of re-emerging. The emergence of buyers will make prices tend to bounce back up (rebound). In contrast, resistance is the upper limit of price movements. At this time, the seller has a greater chance of re-emerging. The emergence of sellers will make prices tend to bounce back. The support level is the ideal place to buy, and the resistance level is the ideal place to sell (Utomo 2016, 71-74).

Edianto Ong provides a slightly different definition of support but has a similar meaning, namely the level where there is a tendency for prices to rise because there are more buyers than sellers. In contrast, resistance is a level with a tendency for prices to fall because there are more sellers than buyers. Support and resistance lines are a reflection of the psychology of market participants. Market participants are divided into three categories:
1. People who buy
2. People who sell
3. People who do nothing

Market participants' selling and buying action is driven by fear and greed. When prices rise, a tendency to be greedy for market participants is formed. Likewise, when prices fall, it can trigger fear among market participants. The higher the volatility of a market, the higher the level of fear and greed that covers it. The stronger the feeling, the stronger the support or resistance level formed. In addition, the frequency with which stock prices "play" at support or resistance also determines their strength. That is, the more often the level is touched, the more tested or stronger that level is (Ong 2016, 49-51).

Ways to determine support and resistance are (Utomo 2016, 82):
1. Previous highs and lows
2. Psychological level
3. Trend line
4. Fibonacci retracement levels
5. Other indicators.

Support is said to have ended its function if the price continues to move down and has closed below the price level that became the support. Meanwhile, resistance is said to have ended its function as resistance if the price increase that has occurred has made the price successfully close above the price level that became the resistance (Utomo 2016, 80).

One way to determine support and resistance is Fibonacci retracement levels. Retracement is a term used in the stock world to describe the percentage decline in the value of a stock price from its highest peak to its next low. In every movement, both uptrend and downtrend, a stock price never continuously moves in the same direction. This movement, opposite to the original trend, is called a correction (Ong 2016, 205). The Fibonacci sequence was first proposed by an Italian scientist, Leonardo da Pisa or Leonardo Pisano. The Fibonacci sequence is a sequence of numbers in which the nth term results from the sum of several terms, namely the n-1 term with the n-2 term. So, the Fibonacci sequence is a sequence of numbers where a term in the sequence is the result of the sum of the previous two terms. The uniqueness of the Fibonacci series is that if one number from the Fibonacci series is divided by the following number, a stable ratio will be obtained, which is 0.618. And, if a number is divided by the following two numbers, it will result in a ratio that stays at 0.382. Meanwhile, if a number is divided by the following three numbers, it will produce a fixed ratio of 0.236 (FaktaTrading 2022, 3-5).

Fibonacci Retracement is a technical analysis tool used to measure the rate of return of price movements after the price moves from an upper/lower extreme point to an upper/lower extreme point of a trend. The retracement levels commonly used in Fibonacci retracements are (Utomo 2016, 102-104):
1. 23.6%
2. 38.2%
3. 50%
4. 61.8%
5. 76.4%

With the variety of levels in the Fibonacci Retracement, the strength of each level in its role as support and resistance is also different. For example, Ellen May mentions the 38.2% and 61.8% Fibonacci levels as "sacred" levels because these levels are often very strong and difficult to break support and resistance (May 2018, 51).

There are two ways to draw the Fibonacci line, from the highest point to the lowest point and from the lowest point to the highest point. In the withdrawal of the highest point to the lowest point, opportunities for price increases in the future can be seen. In comparison, the withdrawal of the lowest point to the highest point shows the opportunity for correction in the future. Every line formed from Fibonacci will become support and resistance that needs to be considered as one of the strong reasons that cause a reversal pattern to occur (Wijaya 2014, 50-52). The highest point (peak/top) is the highest price level that an uptrend can produce. This price level can be known after an uptrend ends. The bottom point (through/bottom) is the lowest point a price movement has reached during a downtrend. A new low is referred to as the bottom point if the previous downtrend has ended (Utomo 2016, 106).

Trends in stocks are the direction of stock price movements. Price movements day by day are random, but traders can determine the direction of price movements. The direction of price movements caused by the likes or dislikes of the market for a stock can last for a certain period, either in hours, days, weeks, months, or even years. Trends are divided into three namely (Utomo 2016, 91-100):

1. Uptrend

An uptrend is a condition of price movement marked by the emergence of new lows that continue to increase (higher lows) and new highs that continue to increase (higher highs) for a certain period.

2. Downtrend

A downtrend is a condition of price movement that continues to record new highs that experience a decline (lower highs) and lows that continue to decline (lower lows).

3. Horizontal

A horizontal trend is a condition where prices move temporarily in a certain price range in a period.

Figure 2. Fibonacci Retracement on an Uptrend

Source: MiraeAssets 2022

Figure 3. Fibonacci Retracement on a Downtrend

Source: MiraeAssets 2022

3. DATA AND METHODS

The data used in this study is the closing price of daily trading on the Indonesia Stock Exchange. Data collection is done through the Neo HOTS application from Mirae Asset. Determination of the start point and end point of each wave using the zigzag tool (8 periods), which is already available in the Neo HOTS application. The research population is issuers classified as LQ45 on January 2, 2020, which is the beginning of the observation period. Sampling was carried out with the criteria that population issuers must remain classified as LQ45 until the end of December 2021, the end of the observation period. With these criteria, a sample of 35 issuers was obtained.

The analytical method used in this study is to measure the correction wave level and the rebound wave level for each uptrend that appear. Meanwhile, the correction wave level and bounce-back wave levels are measured in the emerging downtrend. Then the correction, rebound, and bounce-back levels are adjusted to the levels in the Fibonacci Retracement.

Then the average difference between each collected data and the nearest Fibonacci Retracement level is calculated to obtain the Mean Absolute Deviation (MAD). The MAD obtained is one of the research results representing the width of the bar for each Fibonacci Retracement level. Then the frequency of each Fibonacci Retracement level, which becomes the reversal point, is measured so that the strength of each Fibonacci Retracement level becomes support and resistance. The last measurement calculates the rebound and bounces back levels generated by each Correction level. This measurement is intended to determine the correct level which produces the highest rebound wave and the correction level which produces the lowest bounce-back wave.

The following are the Fibonacci Retracement levels that will be used in this study:

1. 23.6%
2. 38.2%
3. 50%
4. 61.8%
5. 176.4%
6. 123.6%
7. 138.2%
8. 150%
9. 161.8%
10. 176.4%
11. 200.0%

4. RESULT

4.1. Uptrend

A. Correction Wave

a. Level 23.6%

The 23.6% level of the uptrend Fibonacci Retracement has a bar width of ± 4.86%. The chance of becoming the endpoint of the correction wave is 25.53%. The average rebound level for a reversal at the level of 23.6% is 185.20%.

b. Level 38.2%

The 38.2% level of the uptrend Fibonacci Retracement has a bar width of ± 3.47%. The chance of becoming the endpoint of the correction wave is 15.95%. The average rebound level for a reversal at the level of 38.2% is 210.26%.

c. Level 50.0%

The 50.0% level on the uptrend Fibonacci Retracement has a bar width of ± 2.83%. The chance of becoming the endpoint of the correction wave is 18.08%. The average rebound level for a reversal at the level of 50.0% is 174.98%.

d. Level 61.8%

The 61.8% level of the uptrend Fibonacci Retracement has a bar width of ± 3.00%. The chance of becoming the endpoint of the correction wave is 29.78%. The average rebound level for a reversal at the level of 61.8% is 163.97%.

e. Level 76.4%

The 76.4% level on the uptrend Fibonacci Retracement has a bar width of ± 2.95%. The chance of becoming the endpoint of the correction wave is 10.63%. The average rebound level for a reversal at the level of 76.4% is 168.29%.

B. Rebound Wave

a. Level 123.6%

The 123.6% level on the uptrend Fibonacci Retracement has a bar width of ± 3.26%. The chance of becoming the endpoint of the rebound wave is 23.72%.

b. Level 138.2%

The 138.2% level of the uptrend Fibonacci Retracement has a bar width of ± 3.41%. The chance of becoming the endpoint of the rebound wave is 16.94%.

c. Level 150.0%

The 150.0% level on the uptrend Fibonacci Retracement has a bar width of ± 2.63%. The chance of becoming the endpoint of the rebound wave is 15.25%.

d. Level 161.8%

The 161.8% level of the uptrend Fibonacci Retracement has a bar width of ±3.15%. The chance of becoming the endpoint of the rebound wave is 27.11%.

e. Level 176.4%

The 176.4% level on the uptrend Fibonacci Retracement has a bar width of ± 4.10%. The chance of becoming the endpoint of the rebound wave is 16.94%.

4.2. Downtrend
A. Correction Wave

a. Level 23.6%

The 23.6% level on the downtrend Fibonacci Retracement has a bar width of ±3.88%. The chance of becoming the endpoint of the correction wave is 25.42%. The average bounce-back level for a reversal at the level of 23.6% is 169.17%.

b. Level 38.2%

The 38.2% level of the downtrend Fibonacci Retracement has a bar width of ± 2.39%.

The chance of becoming the endpoint of the correction wave is 16.10%. The average bounce-back level for a reversal at the level of 38.2% is 210.43%.

c. Level 50.0%

The 50.0% level on the downtrend Fibonacci Retracement has a bar width of ±2.48%. The chance of becoming the endpoint of the correction wave is 19.49%. The average bounce-back level for a reversal at the level of 50.0% is 182.74%.

d. Level 61.8%

The 61.8% level of the downtrend Fibonacci Retracement has a bar width of ± 3.33%. The chance of becoming the endpoint of the correction wave is 22.03%. The average bounce-back level for a reversal at the level of 61.8% is 163.24%.

e. Level 76.4%

The 76.4% level on the downtrend Fibonacci Retracement has a bar width of ± 4.35%. The chance of becoming the endpoint of the correction wave is 16.94%. The average bounce-back level for a reversal at a level of 76.4% is 183.62%.

B. Bounce Back Wave

a. Level 123.6%

The 123.6% level on the downtrend Fibonacci Retracement has a bar width of ± 4.61%. The chance of becoming the endpoint of the bounce-back wave is 31.11%.

b. Level 138.2%

The 138.2% level of the downtrend Fibonacci Retracement has a bar width of ± 3.32%. The chance of becoming the endpoint of the bounce-back wave is 18.89%.

c. Level 150.0%

The 150.0% level on the downtrend Fibonacci Retracement has a bar width of ± 2.82%. The chance of becoming the endpoint of the bounce-back wave is 13.33%.

d. Level 161.8%

The 161.8% level of the downtrend Fibonacci Retracement has a bar width of ±2.67%. The chance of becoming the endpoint of the bounce-back wave is 6.67%.

e. Level 176.4%

The 176.4% level on the downtrend Fibonacci Retracement has a bar width of ± 5.79%. The chance of becoming the endpoint of the bounce-back wave is 18.89%.

f. Level 200.0%

The 200.0% level on the downtrend Fibonacci Retracement has a bar width of ±

6.54%. The chance of becoming the endpoint of the bounce-back wave is 11.11%.

Table 1. Fibonacci Retracement Research Results on Uptrend Conditions

Correction Wave				Rebound Wave		
Level	MAD	Frequency	Rebound	Level	MAD	Frequency
23,6%	4,86%	25,53%	185,20%	123,6%	3,26%	23,72%
38,2%	3,47%	15,95%	210,26%	138,2%	3,41%	16,94%
50,0%	2,83%	18,08%	174,98%	150,0%	2,63%	15,25%
61,8%	3,00%	29,78%	163,97%	161,8%	3,15%	27,11%
76,4%	2,95%	10,63%	168,29%	176,4%	4,10%	16,94%

Table 1 shows that for correction waves in uptrend conditions, the 50.0% Fibonacci Retracement level has the narrowest bar, which is ±2.83%. At the same time, the widest bar is owned by the 23.6% level, which is ±4.86%. Based on the probability of being the endpoint of the correction wave, the 76.4% Fibonacci Retracement level has the smallest chance, which is 10.63%. At the same time, the highest opportunity is owned by the 61.8% level, which is also the Fibonacci Golden Ratio, 29.78%. From the point of average rebound achieved, the correction wave ending at the 61.8% Fibonacci Retracement level had the lowest rebound, at 163.97%. Meanwhile, the highest rebound level is obtained when the correction wave ends at the 38.2% level, with the rebound at the 210.26% level.

Table 1 shows that for a rebound wave in an uptrend condition, the 150.0% Fibonacci Retracement level has the narrowest bar, which is ±2.63%. At the same time, the widest bar is owned by the level of 176.4%, which is ±4.10%. Based on the probability of being the endpoint of the rebound wave, the 150.0% Fibonacci Retracement level has the smallest chance, which is 15.25%. At the same time, the highest opportunity is owned by the 161.8% level, which is also the Fibonacci Golden Ratio, which is 27.11%.

Table 2. Fibonacci Retracement Research Results in Downtrend Conditions

Correction Wave				Bounce Back Wave		
Level	MAD	Frequency	Bounce Back	Level	MAD	Frequency
23,6%	3,88%	25,42%	169,17%	123,6%	4,61%	31,11%
38,2%	2,39%	16,10%	210,43%	138,2%	3,32%	18,89%
50,0%	2,48%	19,49%	182,74%	150,0%	2,82%	13,33%
61,8%	3,33%	22,03%	163,24%	161,8%	2,67%	6,67%
76,4%	4,35%	16,94%	183,62%	176,4%	5,79%	18,89%
-	-	-	-	200,0%	6,54%	11,11%

Table 2 shows that for the correction wave in downtrend conditions, the 38.2%

Fibonacci Retracement level has the narrowest bar, which is ±2.39%. At the same time, the widest bar is owned by the level of 76.4%, which is ±4.35%. Based on the probability of being the end point of the correction wave, the 38.2% Fibonacci Retracement level has the smallest chance, 16.10%. At the same time, the highest opportunity is owned by the 23.6% level, which is 25.42%. From the point of view of the average bounce back achieved, the correction wave that ended at the 61.8% Fibonacci Retracement level had the lowest rebound, at 163.24%. Meanwhile, the highest rebound level is obtained when the correction wave ends at the 38.2% level, with the rebound at the 210.43% level.

Table 2 shows that for the bounce-back wave in a downtrend, the 161.8% Fibonacci Retracement level has the narrowest bar, which is ±2.67%. At the same time, the widest bar is owned by the level of 200.0%, which is ±6.54%. Based on the probability of being the end point of the bounce-back wave, the 161.8% Fibonacci Retracement level has the smallest chance of 6.67%. At the same time, the highest opportunity is owned by the level of 123.6%, which is 31.11%.

5. CONCLUSION

From the discussion above, it can be concluded that in uptrend conditions, the 23.6% level is the level that most often becomes the endpoint of the correction wave, so traders can use the 23.6% level as the entry point. While the 161.8% level is the level that most often becomes the endpoint of the rebound wave, traders can use the 161.8% level as the exit point. The 38.2% level has the highest average rebound, so if a reversal correction wave occurs at the 38.2% level, traders can prepare for an exit at a higher point than other levels. For downtrend conditions, the 23.6% level is the level that most often becomes the endpoint of the correction wave, so traders can make the 23.6% level the exit point, provided the trader has owned the relevant stock before. Or traders can make the 23.6% level an entry point in short selling. While the 123.6% level is the level that most often becomes the endpoint of the bounce-back wave, traders can use the 123.6% level as an exit point for short selling. The 38.2% level has the lowest average bounce back, so if a reversal correction wave occurs at the 38.2% level, traders who sell short can prepare an exit point lower than other levels.

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ASTRA'S DETERMINATION IN A CHALLENGING TIME

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ABSTRACT

This study aims to find key factors influencing Astra's company in this economic turmoil. Five companies in Astra's group are PT Astra International Tbk, PT Astra Agro Lestari Tbk, PT Astra Graphia Tbk, PT Astra Otoparts Tbk, and PT United Tractors Tbk. The empirical period is from 2011 to 2021. The generalized structured component method is used to analyze the influences of factors. The results show that shareholders' ownership and capital structure have significantly influenced the market valuation. The mediation analysis is conducted, and they have competing relationships. The results from this study can explain the importance of capital structure and shareholders' ownership in financial governance.

Keywords: Shareholders' ownership; capital structure; generalized structured component method; Astra's group.

1. INTRODUCTION

In 2017 marked a significant turning point for Astra as it marked 60 years since its founding in 1957. In the six decades after Astra began its quest to "Prosper with the Nation," the company has evolved into an Indonesian group corporation with more than 210,000 employees dispersed over more than 200 businesses around the country. Astra overcame numerous commercial obstacles in 2017 by enhancing their inherent strengths, including their technical and non-technical competencies, strong corporate culture, established management system, extensive network, strong customer trust, and high value of the Astra brand. Astra, as a result, produced exceptional operational and commercial results in 2017. As a result, Astra is moving toward achieving its 2020 Goal of being the "Pride of the Nation" (Source: Astra International Annual Report 2017).

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Figure 1. Net Revenue, Comprehensive Income, and Assets 2011-2021 of PT Astra International Tbk.

Source: Authors compilation.

Figure 1 describes the billion Rupiahs taken from PT Astra International Tbk Annual Report. Astra Group continued to develop its capabilities by concentrating on four core areas: continuous innovation, developing globally oriented employees, being an agile organization, and being a partner of choice. This helped the company maintain the sustainability of its business despite challenges in the economy and business throughout 2018. Astra Group has increased its digitalization initiatives to drive more efficient business processes, optimize market penetration capability, and introduce various innovations and new services on digital platforms. This is in response to the enormous, rapid, and unpredictable changes in the business landscape. Astra Group advances its strategic path toward the Pride of the Nation by enhancing its digital capabilities while continuing to support the production of additional value for its clients, workers, business partners, shareholders, and the Indonesian people (Source: Astra International Annual Report 2018).

Figure 2. Net Revenue, Comprehensive Income, and Assets 2011-2021 of PT Astra Agro Lestari Tbk.
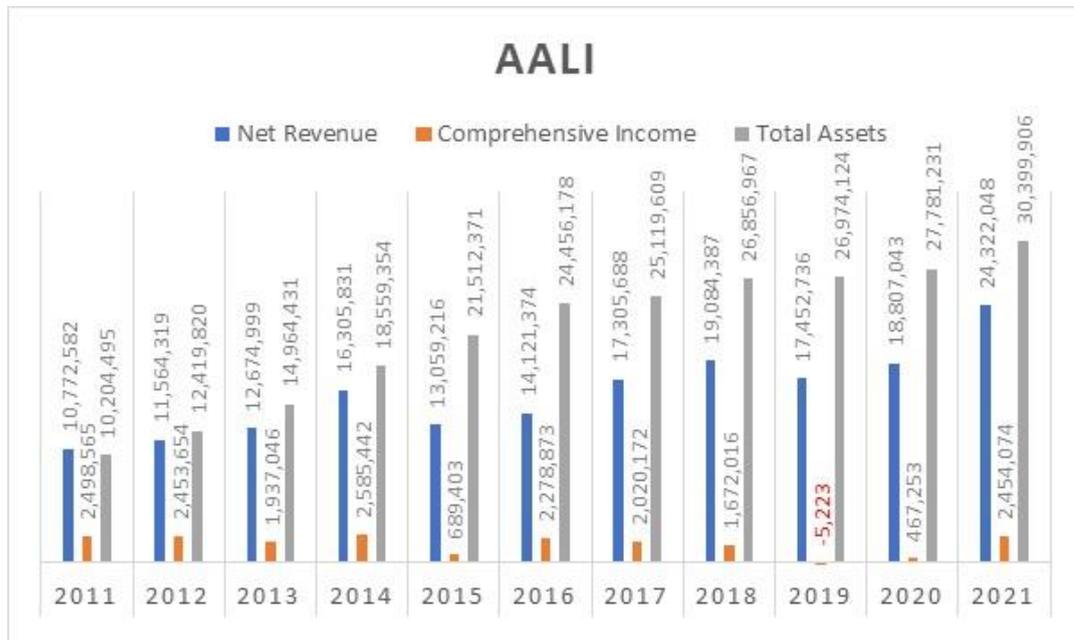
Source: Authors compilation.

Figure 2 describes the number in a million Rupiahs, taken from PT Astra Agro Lestari Tbk Annual Report. The performance of numerous business lines within the Astra Group has been impacted by changes in the business climate throughout 2019. The group simultaneously addressed problems for future growth through digital competency's planned and long-term development. Despite these difficulties, the group can maintain its reputation as a "partner of choice" by employing competent human capital with integrity, organizational ability to "make things happen," and other strengths. The Astra Group hopes that the numerous accomplishments and strategic moves noted this year and in the upcoming years can serve as an example to people and businesses in Indonesia and move the group closer to its goal of becoming the country's pride (Source: Astra International Annual Report 2019).

Figure 3. Net Revenue, Comprehensive Income, and Assets 2011-2021 of PT United Tractor Tbk.
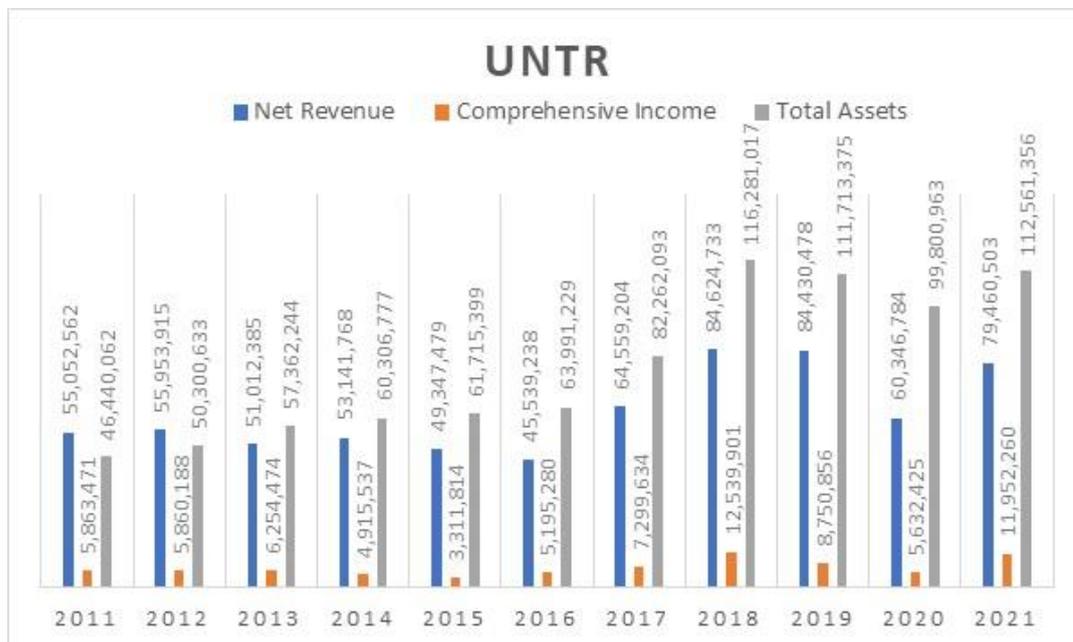
Source: Authors compilation.

The world was hit by the COVID-19 pandemic in 2020, resulting in a crisis unprecedented in the last 100 years. In response to this difficult and uncertain situation, Astra Group developed pandemic response strategies and policies to adapt and innovate to the new realities, which were implemented concurrently across all of Astra Group's business portfolios. Astra also supported its staff, the neighborhood, and the country in the face of the pandemic. Astra Group also reached a significant turning point in 2020 as it mapped out the following phase of its "Pride of the Nation" journey toward Goal 2030 of becoming one of the businesses that make Indonesia proud in the eyes of the world in all its endeavors (Source: Astra International Annual Report 2020).

Even in 2021, the pandemic persisted and impacted every facet of life. Astra Group, however, remained upbeat and resolved to be resilient in supporting domestic economic growth, providing for customers, and overcoming the pandemic's effects across the country. With the spirit of digitalization, Astra Group firms improved operational excellence and efficiency in the workplace by continually applying disciplined and prudent financial management and people development to foster creative Astra employees with leadership potential. All these programs are in place to strengthen Astra Group's high organizational resilience. Astra Group persisted in looking for chances to create new revenue streams, support sustainable growth, and advance the digital economy of Indonesia despite numerous obstacles. As part of its transition journey, Astra Group strengthened the integration of the environmental aspect into its Triple-P Roadmap strategy, which covers the business portfolio, human capital, and social contributions, in 2021 (Source: Astra International Annual Report 2021).

**Figure 4. Net Revenue, Comprehensive Income, and Assets 2011-2021 of PT Astra Graphia Tbk.**
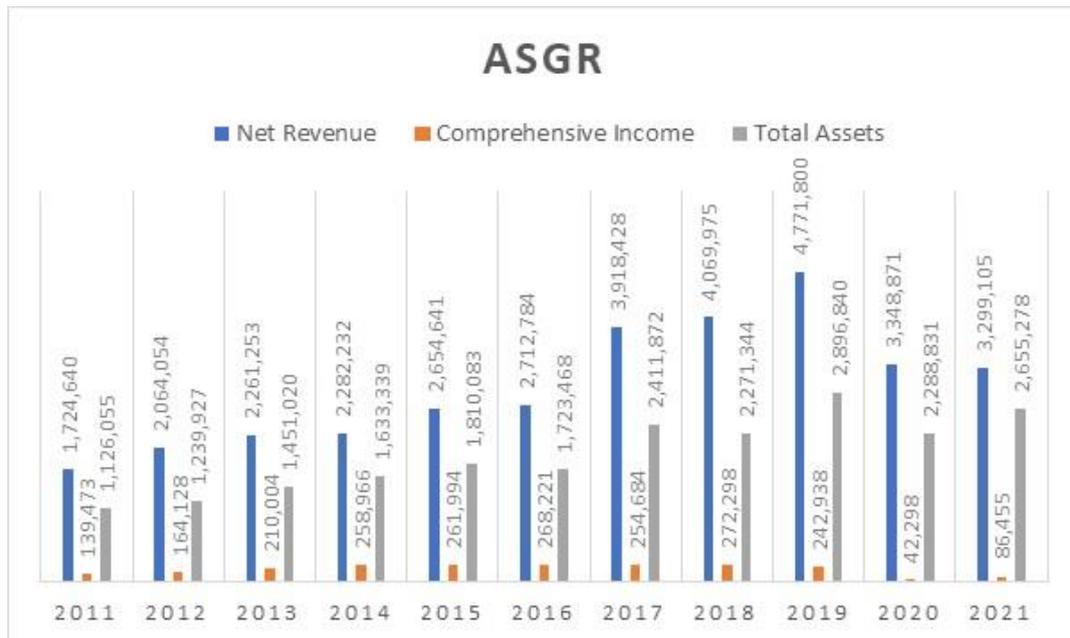
Source: Authors compilation.

Figure 5. Net Revenue, Comprehensive Income, and Assets 2011-2021 of PT Astra Otoparts Tbk.
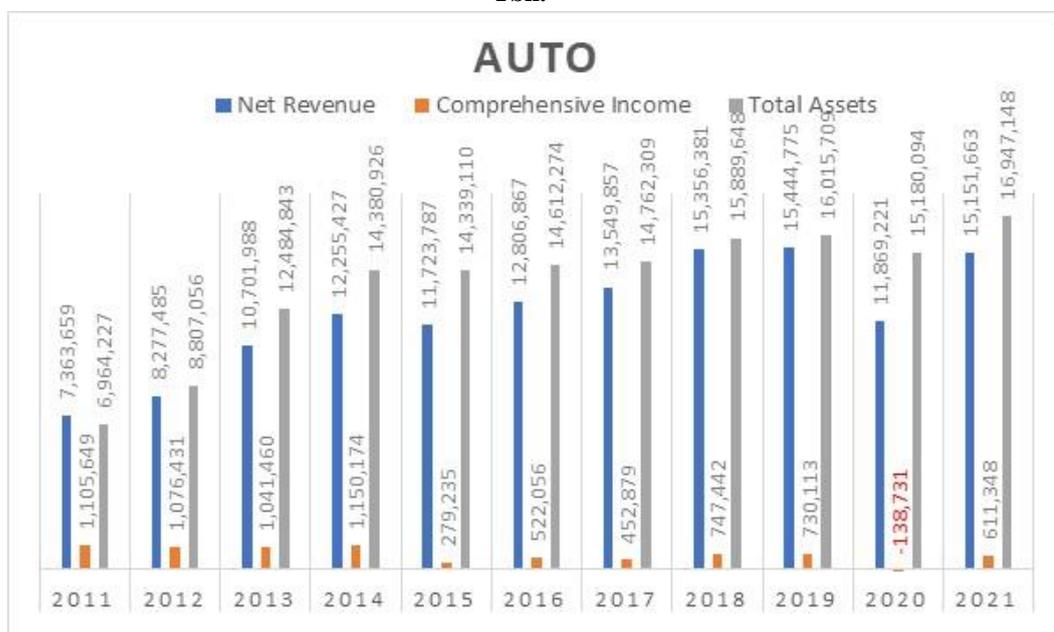
Source: Authors compilation.

La Porta et al. (1997) classified Indonesia as a French civil law nation and classified it as having civil law. Different legal treatments for investors in common law nations may require modifications to shareholder activities and company governance to maintain the agent's priorities in decision-making. Common law nations have more overall liabilities than French civil law nations and Scandinavian nations, but not German nations (La Porta et al.

1997).

Managers of some firms may not be good enough in an imperfect and evolving world, despite their best efforts. When controlling shareholders retain substantial cash flow rights in addition to control, they compromise strong incentives to monitor managers and maximize profits. As emphasized by Jensen and Meckling (1976) and Shleifer and Vishny (1986), these incentives also prevent controlling shareholders from diverting corporate resources and increase the value of minority shares.

This study aims to know Astra's key factors in maintaining the company's performance: resistance to economic turmoil. In this study, three steps are used to find the key factors. The key factors are shareholders' equity and capital structure, which influence market valuation positively. The other finding is a competitive mediation between shareholders' ownership and capital structure to market valuation.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Legal Determinants

The economic and legal institutions of corporate governance can be changed by political action, sometimes for the better (Shleifer and Vishny 1997). The diverse ways enterprises are financed and owned across nations may be explained by variations in investor protection laws. La Porta et al. (1998) examined how the legal system affects finances. According to the findings, common-law nations typically have the highest investor legal protections, while French civil-law nations have the poorest. German and Scandinavian civil law nations fall in the center (La Porta et al. 1997, 1998).

2.2. The Agency Problem and Large Shareholders

The so-called contractual view of the company, developed by Coase (1937), Jensen and Meckling (1976), and Fama and Jensen (1983a,b), includes the agency problem as a key component. The division of management and finance, or more conventional terminology of ownership and control, is the core of the agency problem. A management or entrepreneur will raise money from investors to invest wisely or sell his company stock. In this context, the agency problem refers to financiers' challenges in ensuring that their funds are not misappropriated or squandered on undesirable initiatives. Insiders with control over business assets may use such assets for various things that hurt outside investors' interests. In the simplest terms, they can steal corporate assets and use them for their benefit, dilute outside investors by issuing shares to insiders, pay themselves excessive salaries, sell assets to themselves or other corporations they control for a profit, or engage in transfer pricing with other entities they control (Shleifer and Vishny 1997).

Expropriating investors or improperly allocating corporate cash are two examples of managerial opportunism that lower investors' resources to contribute upfront to finance the company (Grossman and Hart 1986). Corporate governance is largely concerned with the limitations that managers place on themselves or that investors place on managers to reduce ex-post misallocation and persuade investors to commit more money ex-ante. Even with these restrictions, the results are typically less efficient than what would happen if the

manager personally funded the company (Shleifer and Vishny 1997).

Possibly, investors can obtain more effective control rights by being large if legal protection does not provide small investors with sufficient control rights to entice them to part with their money. Investor cooperation is considerably easier to achieve when control rights, such as votes, are concentrated in a small number of investors with a sizable collective cash flow stake than when they are distributed among many. A significant minority shareholder has the motivation to gather data and keep tabs on the management, preventing the classic free rider issue. Large minority shareholders are more challenging because they must form partnerships with other investors to exert power. The ability of the managers to sabotage these coalitions is substantially increased, and it is now much more difficult for the courts to uphold the interests of large shareholders. Because of this, significant minority shareholdings may only be effective in nations with rather complex legal systems, while absolute majority ownership is more likely in nations with seriously underdeveloped legal systems (Shleifer and Vishny 1997).

H1: Shareholders' ownership influences capital structure.

All significant investors agree that they should have at least some level of legal protection. Courts are necessary for creditors to be able to reclaim collateral, large shareholders to be able to assert their voting rights, and takeover artists to be able to buy shares and replace boards of directors. Large investors typically benefit from using relatively straightforward legal interventions that can be accepted by even uninformed and uninterested courts, except for takeovers. Compared to small investors who could try to pursue their rights, large investors place less pressure on the legal system. The fact that the major investors speak for their interests, which need not align with those of the company's other investors, employees, or managers, is a more basic issue. The huge investor can therefore transfer income from others efficiently and inefficiently as he exercises his control powers to optimize his well-being. This cost of concentrated ownership becomes especially significant when others, such as employees or minority investors, have firm-specific investments to make that are distorted by the possibility of expropriation by large investors (Shleifer and Vishny 1997).

H2: Shareholders' ownership has a positive influence on market valuation.

2.3. The Role of Dividends

Dividends can be helpful in a society where there are major agency issues between company insiders and outsiders. Insiders can no longer use business profits for their benefit because dividend payments restore profits to investors. Theoretical agency models of dividends that derive dividend policies as a component of some comprehensive ideal contract between investors and corporate insiders allowing for various workable financing methods are not entirely satisfactory (La Porta et al. 2000). Dividends are preferable to retained earnings (a bird in the bush) since the former may never become dividends in the

future (can fly away).

An efficient system prevents insiders from exploiting a disproportionate amount of corporate earnings for their gain by allowing minority shareholders to exercise their legal rights to compel companies to disgorge funds. Investors can achieve this by voting for directors who have stronger dividend policies, selling shares to possible hostile raiders who subsequently take control of companies that don't pay dividends or bringing legal action against businesses that spend excessively on activities that primarily benefit insiders. From a different agency perspective, receiving dividends serves as legal protection. This perspective heavily relies on the requirement that businesses occasionally turn to external financial markets for funding. (La Porta et al. 2000).

H3: Shareholders' ownership has a positive influence on dividends.

In countries with lax legal protection for minority shareholders, who have nothing else to fall back on, a reputation for the excellent handling of shareholders is worth the most. As a result, these countries have the highest need for dividends to build a reputation. Contrarily, the demand for a reputational mechanism and, thus, the necessity to pay dividends is weaker in countries with more shareholder protection. According to this theory, countries with weak shareholder protection laws should have greater dividend payment ratios than those with strong shareholder protection laws (La Porta et al., 2000).

H4: Dividends have a positive influence on market valuation.

2.4. Corporate Valuation

The controlling shareholders' ability to expropriate outside investors is limited by their financial incentives not to do so. The controlling shareholder's equity or cash-flow ownership is a significant source of such incentives. Expropriation is generally costly (Burkart, Gromb, and Panunzi 1998). Hence, if everything else is equal, increased cash-flow ownership should result in less expropriation. Higher corporate asset valuation is empirically linked to better shareholder protection (La Porta et al. 2002).

H5: Capital structure influences market valuation.

2.5. Generalized Structured Component Analysis

Three sub-models must be specified to specify a structural equation model using generalized structured component analysis. Measurement, structural, and weighted connection models are the three sub-models. A latent variable is a component or weighted composite of indicators according to generalized structured component analysis. When an indicator influences the corresponding latent variable, it is said to reflect; when it creates the latent variable, it is said to be formative. Such a link between indicators and a latent variable is expressibly using the weighted relationship model.

A latent variable is a component or weighted composite of indicators according to

generalized structured component analysis. Such a link between indicators and a latent variable is expressibly using the weighted relationship model. Two unknown parameters of the generalized structured component analysis model are weights (w′s) and path coefficients (b′s). Furthermore, loadings (c′s) will be unknowable parameters if reflective indicators are included in the model. To estimate model parameters, a single least-squares criterion is constantly minimized in generalized structured component analysis. This makes it possible to provide indicators of the general model fit. The generalized structured component analysis provides a generic measure of fit. FIT displays the percentage of the overall variation of all indicators and latent variables that a single model specification can explain. FIT has values between 0 and 1. The greater this number, the more the model specification accounts for the variance in the variables. Similar to the coefficient of determination or R-squared in linear regression, FIT has characteristics and an interpretation (Hwang and Takane 2015).

3. DATA AND METHODS

The data which is used in this research is secondary data. The annual financial reports are obtained from the company website and Osiris Database. The sampling method is purposive sampling. The observations focus on the company's capital structure and market valuation. The Astra Indonesia Group was chosen because of its markable reputation in Indonesia. It has contributed to bolstering the Indonesian people's daily lives through the various products it has produced.

The samples consist of five companies listed on the Indonesia Stock Exchange from 2011 to 2021. The samples for this study are PT Astra International Tbk, PT Astra Agro Lestari Tbk, PT United Tractor Tbk, PT Astra Graphia Tbk, and PT Astra Otoparts Tbk.

The GSCA Pro 1.18 analyzes the impact of exogenous variables on an endogenous variable. The yearly data is used to measure the capital structure and the market valuation. The data is processed using a generalized structured component method.

Figure 6. The Conceptual Framework
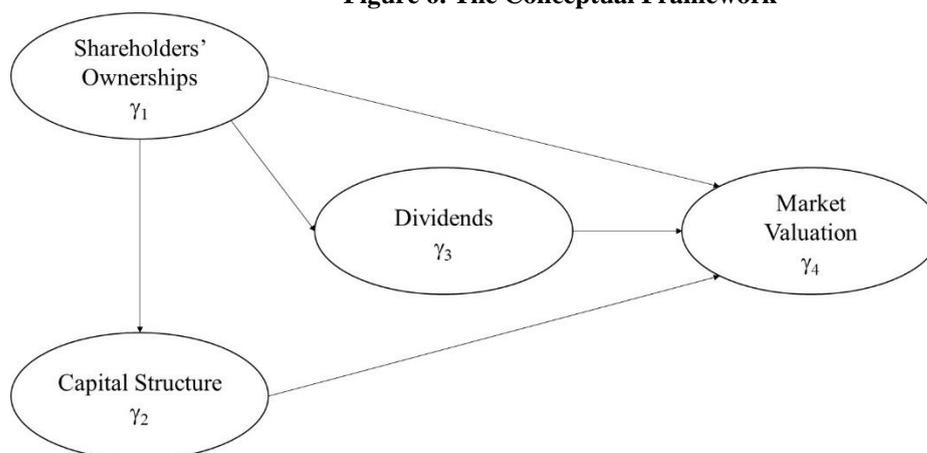
Source: Authors' illustration.
Words in brackets are used as proxies in the data processing.

The shareholders' ownership [OWN] is indicated by:

- Institutional ownership [ins] = proportion of institutional ownership in the company.
- Controlling ownership [con] = if the proportion is more than 50%, then equal to 1; if the proportion is less or equal to 50%, then equal to 0.
- Managerial ownership [man] = the company's managerial ownership proportion.

Dividends [DVD] are indicated by:

- Dividend payout [pay] = dividend to last year's earnings after taxes.
- Dividend yield [yie] = dividend to market capitalization.
- Dividend change [cha] = dividend change to last year's dividend.

Capital structure [CPS] is indicated by:

- Debt to assets [dta]
- Debt to equity [dte]
- Assets to equity [ate]

Market valuation [MVN] is indicated by:

- Book value multiplier [bvm] = market capitalization divided by book value each year.
- Price earnings ratio [per] = market capitalization divided by net income each year.

Figure 7. A Path Diagram of the GSCA Research Model

Straight lines show the weighted relationships between indicators and latent variables. In contrast, straight arrows indicate that the variable at the base of an arrow impacts the variable at the head of the arrow.
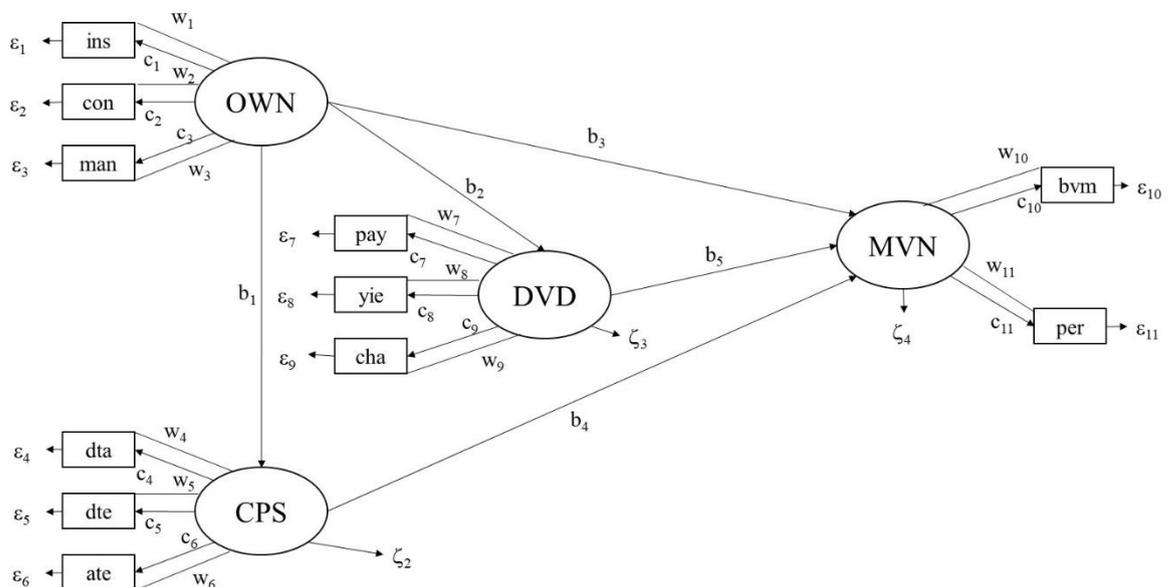
Source: Authors' illustration.

Each of the four latent variables ($\gamma1$, $\gamma2$, $\gamma3$, and $\gamma4$) influences three of the twelve indicators. One, two, and three latent variables ($\gamma1$, $\gamma2$, and $\gamma3$) are chosen to impact the other latent variables.

The measurement model specifies the relationships between indicators and latent variables.

$$ins = OWN\ c_1 + \varepsilon_1 \quad\text{..}(1)$$

$$con = OWN\ c_2 + \varepsilon_2 \quad\text{..}(2)$$

$$man = OWN\ c_3 + \varepsilon_3 \quad\text{...}(3)$$

$$dta = CPS\ c_4 + \varepsilon_4 \quad\text{...}(4)$$

$$dte = CPS\ c5 + \varepsilon_5 \quad\text{...}(5)$$

$$ate = CPS\ c_6 + \varepsilon_6 \quad\text{...}(6)$$

$$pay = DVD\ c_7 + \varepsilon_7 \quad\text{...}(7)$$

$$yie = DVD\ c_8 + \varepsilon_8 \quad\text{..}(8)$$

$$cha = DVD\ c_9 + \varepsilon_9 \quad\text{...}(9)$$

$$bvm = MVN\ c_{10} + \varepsilon_{10} \quad\text{..}(10)$$

$$per = MVN\ c_{11} + \varepsilon_{11} \quad\text{..}(11)$$

The study's structural model is as follows:

$$CPS = OWN\ b_1 + \zeta_2 \quad\text{...}(12)$$

$$DVD = OWN\ b_2 + \zeta_3 \quad\text{..}(13)$$

$$MVN = OWN\ b_3 + CPS\ b_4 + DVD\ b_5 + \zeta_3 \quad\text{.....................................}(14)$$

The study's weighted relation model:

$$OWN = ins\ w_1 + con\ w_2 + man\ w_3 \quad\text{..}(15)$$

$$CPS = dta\ w_4 + dte\ w_5 + ate\ w_6 \quad\text{..}(16)$$

$$DVD = pay\ w_7 + yie\ w_8 + cha\ w_9 \quad\text{...}(17)$$

$$MVN = bvm\ w_{10} + per\ w_{11} \quad\text{...}(18)$$

Various Generalized Structured Component Analysis (GSCA) model fit measures are as follows, according to Hwang and Choo (2021):

- **FIT** has values between 0 and 1. The amount of variance across all variables (indicators and components) that a given model specification can explain is known as the fit.
- AFIT (Adjusted FIT) cannot be read the same way as FIT, much like Adjusted R-squared in linear regression. The one with the highest AFIT value may be picked among competing models.
- **FIT$_S$** are the total variance explained by a specific structural model specification.

FIT$_S$ values range from 0 to 1. The greater this value, the more variance in the components the specified structural model accounts for.

- **FIT$_M$** denotes the overall variation of all indicators that a given measurement model specification can explain. FIT$_M$ has values between 0 and 1. The greater this number, the more the stated measurement model can account for the variance in the indicators.

- The **GFI** (goodness-of-fit index) and the **SRMR** (standardized root mean squared residual) are proportional to the difference between the sample covariances and the covariances reproduced by the GSCA parameter estimates. Cho et al. (2020) suggested the following rules-of-thumb cut-off criteria for GFI and SRMR (The standardized root mean square residual) in GSCA:
    - When the sample size is 100, a GFI ≥ 0.89 and an SRMR ≤ 0.09 indicate a suitable fit. If SRMR ≤ 0.09, a GFI cut-off value of ≥ 0.85 may indicate a good fit.
    - When the sample size exceeds 100, a GFI ≥ 0.93 or an SRMR ≤ 0.08 indicates a suitable fit.

4. RESULTS

Three steps are taken in this investigation to reach an empirical result. Objectives are examined in the first phase, model fit is measured, and then significant indicators are chosen. The second step is to examine the model's accuracy before examining how exogenous variables affect endogenous variables. In the third phase, irrelevant exogenous variables are eliminated, and the consequences of mediation on developing a conclusion are then examined.

The first outputs are shown in tables 1, 2, and 3. The component weights and loadings were examined using a significance level of 0.05. According to Hwang and Choo (2021), the 95% confidence interval can be used to test an estimate's significance (i.e., an estimate may be considered statistically significant at 0.05 level if its confidence interval does not include 0). In tables 2 and 3, the indicators of insignificance have been highlighted in yellow in their confidence intervals range. Based on the confidence intervals, the insignificant indicators are con (controlling ownership), pay (dividend payout), cha (dividend change), and per (earnings per share). These indicators would be excluded in the next step. The sample size in this research is 55. The GFI in table 1 is 0.979, which is higher than the cut-off value of 0.85; the SRMR in table 1 is 0.059, which is lower than the cut-off value of 0.085, indicating this model is an acceptable fit.

Table 1. Model Fit Measures (first step)

FIT	AFIT	FITs	FITm	GFI	SRMR
0.563	0.543	0.146	0.715	0.979	0.059

Source: Authors' computation.

Table 2. Weights (first step)

	Estimate	SE	95%CI	
OWN				
ins	0.692	0.072	0.605	0.922
con	0.0	0.0	-0.0	0.0
man	-0.484	0.084	-0.628	-0.329
DVD				
pay	-0.402	0.403	-0.72	0.667
yie	0.555	0.179	0.005	0.73
cha	0.545	0.282	-0.431	0.653
MVN				
bvm	0.805	0.107	0.597	0.999
per	-0.458	0.267	-0.697	0.634
CPS				
dta	0.305	0.141	0.127	0.709
dte	0.35	0.07	0.146	0.438
ate	0.35	0.07	0.146	0.438

Source: Authors' computation.

Table 3. Loadings (first step)

	Estimate	SE	95%CI	
OWN				
ins	0.899	0.052	0.798	0.97
con	0.0	0.0	0.0	0.0
man	-0.781	0.126	-0.903	-0.388
DVD				
pay	-0.526	0.56	-0.898	0.915
yie	0.719	0.209	0.069	0.886
cha	0.714	0.405	-0.649	0.894
MVN				
bvm	0.894	0.087	0.694	0.996
per	-0.614	0.333	-0.805	0.712
CPS				
dta	0.99	0.004	0.984	0.999
dte	0.998	0.001	0.994	1.0
ate	0.998	0.001	0.994	1.0

The second outputs are shown in Tables 4, 5, 6, and 7. These are based on the confidence intervals included in 0 (highlighted in yellow). After excluding the insignificant indicators, FIT, AFIT, FITs, FITm, and GFI are shown higher, and SRMR is shown lower, as expected. Table 7 is shown the influence of OWN (ownership) on DVD (dividend), and DVD (dividend) to MVN (market valuation) is insignificant. The insignificant paths would be excluded in the next step process, and the path coefficients would be interpreted.

Table 4. Model Fit Measures (second step)

FIT	AFIT	FITs	FITm	GFI	SRMR
0.64	0.621	0.164	0.912	0.995	0.038

Source: Authors' computation.

Table 5. Weights (second step)

	Estimate	SE	95%CI	
OWN				
ins	0.7	0.058	0.596	0.848
man	-0.475	0.058	-0.586	-0.357
DVD				
yie	1.0	0.0	1.0	1.0
MVN				
bvm	1.0	0.0	1.0	1.0
CPS				
dta	0.208	0.135	0.011	0.671
dte	0.398	0.067	0.166	0.495
ate	0.398	0.067	0.166	0.495

Source: Authors' computation.

Table 6. Loadings (second step)

	Estimate	SE	95%CI	
OWN				
ins	0.903	0.035	0.824	0.966
man	-0.775	0.089	-0.905	-0.549
DVD				
yie	1.0	0.0	1.0	1.0
MVN				
bvm	1.0	0.0	1.0	1.0
CPS				
dta	0.987	0.005	0.979	0.998
dte	0.999	0.001	0.995	1.0
ate	0.999	0.001	0.995	1.0

Table 7. Path Coefficients (second step)

	Estimate	SE	95%CI	
OWN→DVD	0.022	0.13	-0.253	0.3
OWN→MVN	0.211	0.107	0.037	0.414
DVD→MVN	-0.2	0.12	-0.404	0.04
CPS→MVN	0.622	0.16	0.249	0.91
OWN→CPS	-0.592	0.084	-0.739	-0.437

Source: Authors' computation

Figure 8. A path diagram of the GSCA Research Model after Reducing Some Indicators
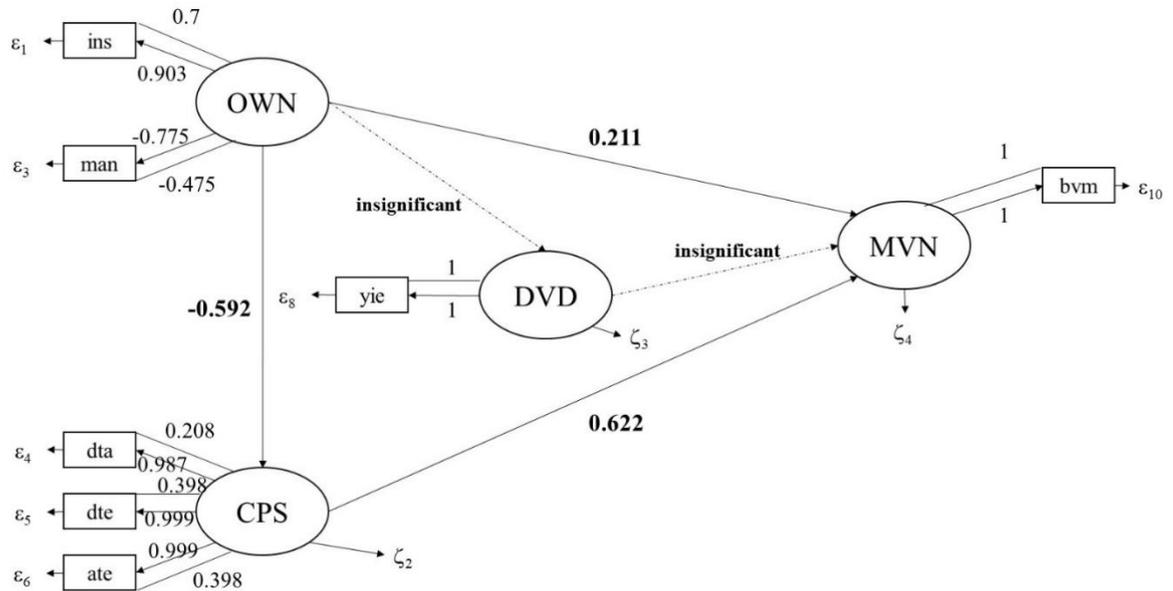
Source: Authors' illustration.

In the third step, the model fit measurements are shown as higher than before FIT, AFIT, and FITs. GFI has the same value, but FITm is lower, and SRMR is higher, as shown in Table 8. The weights, the loadings, and the path coefficients are significant at 5%, as shown in tables 8, 9, and 10. The study's structural models are as follows:

$$CPS = -0.592\,OWN + \zeta_2 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(19)$$

$$MVN = 0.196\,OWN + 0.605\,CPS + \zeta_3 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots...(20)$$

Table 8. Model Fit Measures (third step)

FIT	AFIT	FITs	FITm	GFI	SRMR
0.667	0.651	0.205	0.898	0.995	0.043

Source: Authors' computation.

Table 9. Weights (third step)

	Estimate	SE	95%CI	
OWN				
ins	0.696	0.072	0.602	0.932
man	-0.479	0.072	-0.578	-0.328
MVN				
bvm	1.0	0.0	1.0	1.0
CPS				
dta	0.195	0.14	0.003	0.617
dte	0.404	0.07	0.192	0.499
ate	0.404	0.07	0.192	0.499

Source: Authors' computation.

Table 10. Loadings (third step)

	Estimate	SE	95%CI	
OWN				
ins	0.902	0.046	0.823	0.965
man	-0.777	0.12	-0.902	-0.361
MVN				
bvm	1.0	0.0	1.0	1.0
CPS				
dta	0.986	0.005	0.981	0.999
dte	0.999	0.001	0.995	1.0
ate	0.999	0.001	0.995	1.0

Source: Authors' computation.

Table 11. Path Coefficients (third step)

	Estimate	SE	95%CI	
OWN→MVN	0.196	0.123	0.006	0.513
CPS→MVN	0.605	0.168	0.265	0.897
OWN→CPS	-0.592	0.078	-0.764	-0.418

Source: Authors' computation.

The structural models in this study have competitive mediation. Mediated influence (OWN □ CPS and CPS □ MVN) and direct influence (OWN □ MVN) both exist and point in opposite directions. Zhao, Lynch Jr., and Chen (2010) described this condition as an incomplete theoretical framework with a mediator identified following the hypothesized theoretical framework. But consider the likelihood of an omitted mediator in the direct path.

Figure 9. A path diagram of the GSCA Research Model for Mediation Analyses

Straight lines show the weighted relationships between indicators and latent variables. In contrast, straight arrows indicate that the variable at the base of an arrow impacts the variable at the head of the arrow.
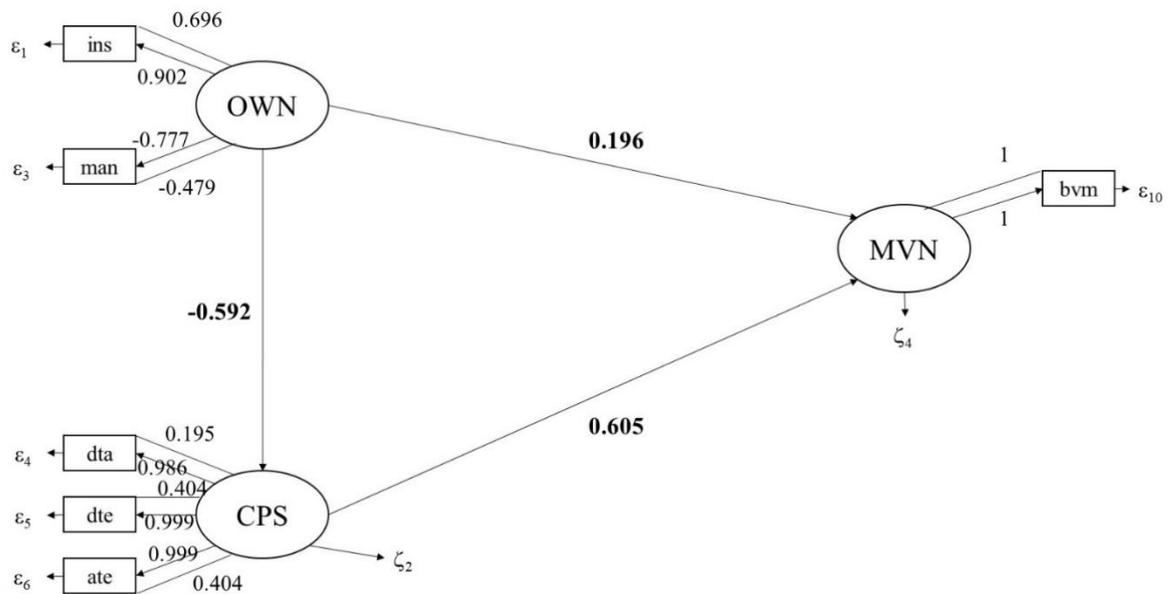
Source: Authors' illustration.

Table 12. Hypothesis Test Summary

Hypothesis	Result
Shareholders' ownership influences capital structure.	Accepted
Shareholders' ownership has a positive influence on market valuation.	Accepted
Shareholders' ownership has a positive influence on dividends.	Rejected
Dividends have a positive influence on market valuation.	Rejected
Capital structure influences market valuation.	Accepted

Source: Authors' compilation.

From the year 2011 – 2021, five companies of Astra's group, which are analyzed in this study empirically, have shown that shareholders' ownership has a central role in market valuation and capital structure; shareholders' ownership and capital structure have a positive influence to market valuation; shareholders' ownership has a negative influence to capital structure. The investors can get more controllership, which positively influences market valuation. Capital structure's positive influence on market valuation implies good governance in Astra. The agency problem can be reduced with debt usage.

Finance experts have long recognized the standard full information model of a firm's dividend-investment decision's inability to imply information asymmetries between the investing public and the firm's decision-makers (Miller and Rock 1985). Dividends do not influence market valuation, and shareholders' ownership does not influence the dividend. According to La Porta et al. (2000), derived dividend policies as part of some comprehensive ideal contract between investors and corporate insiders are not entirely satisfactory. Many investors and analysts acknowledge that any given payout will cause a price decline. Therefore, they tend to make baffling claims, like that a high dividend yield is advantageous when bond yields are low or that the consistency of dividend payments serves as a decent

hedge against uncertain market changes (Hartzmark and Solomon 2019).

The competitive mediation can be interpreted as the more shareholder ownership has reduced debt usage and indirectly influenced the market valuation. The leverage could be valuable, but the value could be modest if, as expected, the market views the tax-saving flow as risky (Modigliani 1982). Leary and Roberts (2005) have found evidence that firms are less likely to use external capital markets when they have adequate internal finances but more likely to do so when they have significant investment needs is consistent with the modified pecking order's expectations. As a result, even when businesses seem to employ a dynamic rebalancing strategy, adverse selection costs might significantly influence how much money they choose to borrow.

5. CONCLUSION

This study tries to explain the key factors identified as the determining factors in Astra's group company. The key findings in this research are the shareholders' equity and the capital structure. Astra's group has maintained good governance in financial aspects, so they have sustainability resistance in economic turmoil.

The limitation of this study is the number of observations. The mediation model has a competitive relationship. This has been noticed by Zhao, Lynch Jr., and Chen (2010) as an incomplete theoretical framework. The next studies can be considered to use broader perspectives to examine future capital structure determinants.

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CORPORATE GOVERNANCE ANALYSIS ON GREEN BANKING DISCLOSURE IN INDONESIA BANKING AT INDONESIA STOCK EXCHANGE

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ABSTRACT

This study aims to examine aspects of strengthening governance in the application of green banking. In Indonesia, which is in the early stages of implementing green banking, applying green banking practices and reporting requires internal governance mechanisms and regulations from the authorities. This study examines the practice of banking disclosure from a governance perspective as the focus of this research. The independent variable in this study is corporate governance, represented by board size, board independence, financial performance, and firm value. The analytical method used to assess green banking disclosure is through annual bank reports for 2017 to 2021. The results of this study indicate an increasing trend of green banking disclosure during the observation period.

Keywords: Board Size, Board Independence, Financial Performance, Firm Value, Green Banking Disclosure.

1. INTRODUCTION

Global warming due to climate change has recently been seen as a problematic phenomenon caused by the unwise treatment of the environment and industrial competition. In addition, public awareness of the importance of protecting the environment from damage impacts various sectors. The ethical issues of corporate responsibility and the environment also encourage the application of ethics in the bank's business practices.

Along with the increasing global attention to environmental issues, especially in the banking sector. Where the banking sector is required to carry out business transformation from its business activities, the banking industry is currently applying the concept of a green economy (1). In addition, corporate responsibility towards the environment is now a trend in improving the quality and profitability of companies, not only in companies but in the financial sector around the world.

Therefore, financial companies, especially banks, have a statement of environmental responsibility called green banking. In this case, green banking produces all green services and environmental sustainability, which is the bank's main focus. Green banking is an effort to increase environmental friendliness and reduce the carbon footprint or footprint of all banking

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activities. This program also reduces operational costs and raises the bank's standards (2).

The practice of green banking means that it is not only good for the environment but also benefits businesses in operational efficiency by developing inclusive banking strategies that ensure sustainable economic development by reducing errors and vulnerabilities to fraud and by reducing the costs of banking activities.

In Indonesia, the government has begun to pay attention to environmental reporting regulations with the issuance of Government Regulation Number 40 of 2007 concerning Limited Liability Companies and Government Regulation Number 47 concerning social and environmental responsibility. By testing the level of environmental disclosure, environmental disclosure is also tested. The nature of environmental disclosure is divided into two: hard and soft (3). With the disclosure of hard environmental disclosure, it is expected that the company can convince stakeholders and can form a corporate image in the community that the company has a good level of environmental performance because the items disclosed in the hard environmental disclosure can be verified and are not easily imitated by companies with poor environmental performance (4).

Various factors can motivate banks to adopt green banking, such as regulatory reasons, aspects of ownership, maintaining reputation, stakeholder demands, sustainability issues, and ethical business demands for the financial industry. However, empirical data on green banking practices are still relatively limited, especially in developing countries in the early stages of introduction and implementation in the financial sector, among the majority of studies that tend to explore the various factors driving banking adoption in developing countries.

Compared to other industries, banks can act as enablers of industrial activities that can cause environmental damage due to the financing provided. Green banking reporting practices are under pressure from stakeholders to practice more ethically, but the lack of green banking reporting regulations makes disclosure and reporting practices very diverse.

Banks implement green banking in various ways without reporting guidelines but as a stakeholder-driven process for financial institutions to practice more ethically. The corporate governance perspective in understanding green banking can encourage the internalization of sustainability issues through corporate governance arrangements in banking institutions.

An update from previous research on corporate governance and green baking disclosure: a study on banks in Indonesia. The results of this study indicate that the board size has a positive and significant effect on green banking disclosure, while the independent board does not affect green banking disclosure4. Other studies also have different results on corporate governance and green banking disclosure: case studies of banks in Indonesia for the period 2018 and 2019 give the results that the board of commissioners, the number of the board of directors, and the number of independent commissioners have a positive effect on green banking disclosure while institutional ownership, the size of the company and profitability harm green banking disclosure.

The difference between this study and previous research is the selected variables independent variables are board size, board independence, financial performance, and also company size. The next difference from this research is the development of previous research on board size, board independence, financial performance, and company size on green banking

disclosure and the population of previous studies using the population in 2018 and 2019.

With the increasing trend of reporting and green banking activities in registered banks in Indonesia, the results of this study help encourage the formulation of frameworks and guidelines for green banking and the internalization of banking and sustainability issues as a governance mechanism in banking companies.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Board Size

The number of boards with expertise and experience in environmental reporting.

The larger the size of the board of commissioners, it is possible to have a variety of expertise and experience. This allows the board to communicate with a wide and diverse range of external parties and groups. According to article 2 and article 20 of the regulation of the financial service number 33/POJK.04/2014 concerning the board of directors of the board of auditors of issuers or companies, it is emphasized that the board of directors of a company consists of at least two people, while the college of auditors consists of at least two members, one of which includes an auditor independent (Winarto, 2021).

Thus, the board of directors and the board of commissioners are responsible for audit supervision, with supervision expected to be able to control and complete the audit process on time.

H1: Board size has a significant effect on green banking disclosure.

2.2. Independence Board

An independent board of directors (board independence) plays a role in management's performance in the implementation of operational activities because, through their ownership, institutional investors can become a strong and legitimate stakeholder group that plays an important role in determining strategies for environmental disclosure.

H2: Board independence significant effect on green banking disclosureThis section.

2.3. Financial Performance

Financial performance is analyzing financial statements to see how far the company has followed well-adjusted financial implementation rules. Good and correct financial implementation rules by GAAP or other established rules. This financial performance is one of the bases used in assessing financial condition using information derived from the company's financial statements(7).

The level of profitability is intended to measure a company's capability in the profit it earns. Companies with a good profitability index and reputation will be more motivated to perform. Companies with higher profitability will have a higher level of disclosure. The variable used to measure profitability in banking financial performance is a return on assets (ROA) to measure the ability of bank management to achieve profitability and manage the efficiency level of bank activities as a whole. The higher the return on assets, the better the company's performance because the higher the return.

H3: Return on Assets has a significant effect on green banking disclosure.

2.4. Firm Value

Company value is a certain condition that the company has achieved as an illustration of public trust in the company after going through a process of activities for several years since the company was first established until the current situation. The indicator of company value is the price of the shares traded. For companies already listed on the Indonesia Stock Exchange, the movement of the company's value will be taken by potential investors to make the right investment.

A significant increase in the company's value indicates that the company is well managed and has good performance, which also shows that the company's goal is and can prosper the shareholders. The company's value is measured by using the ratio of price to book value. The prosperity of shareholders will follow the high value of the company.

H4: Firm value significant effect on green banking disclosure.

2.5. Green Banking Disclosure

The implementation of green banking manifests the company's concern, especially in the banking sector for the environment. There is still a shortage of environmentally friendly companies because many are still limited to implementation and do not disclose the implementation of green banking in companies.

To ensure the parties' satisfaction, the company applies green banking not only for profit. Companies that have implemented green banking can be said to have carried out the mandate of stakeholders. Implementation of the mandate entrusted to the company by the theory of legitimacy. The theory of legitimacy is a theory of environmental and social disclosure. Today, many companies realize that the company's sustainability depends on the environmental relationship with the company (5).

3. DATA AND METHODS

3.1. The method Sample set

This study describes the variables that influence green banking disclosure in banking industries that implement green finance systems that are listed on the Indonesian stock exchange. In this study, the dependent variable is green banking disclosure. The independent variables are board size, board independence, financial performance (return on assets), and firm value (price to book value). This study uses secondary data with the time series method in the 2017-2021. The population in this study are all banking companies that apply green finance to their companies listed on the Indonesian stock exchange, totaling nine companies.

Secondary data in this study were taken through www.idx.co.id and annual reports on related companies. The statistical data management used is the Eview 4.1 program, with a significance level of 95% or an error rate of 0.05.

Linear regression model:

$$Y = a + b_1X_{1it} + b_2X_{2it} + b_3X_{3it} + b_4X_{4it} + e$$

Information:

Y   = Green Banking Disclosure

A   = Coefficient

X_{1it} = Board Size

X_{2it} = Board Independence

X_{3it} = Return On Assets

X_{4it} = Price to Book Value

e = error (residual)

4. RESULT

Table 1. Descriptive Statistics

	Green Banking Disclosure	Board Size	Independence Board	Return On Assets	Price to Book Value
mean	1.0000000	4.800000	0.532222	0.962667	3.177111
median	1.0000000	4000000	0.5000000	1.390000	1.510000
Maximum	1.0000000	10,000000	0.710000	3.130000	37.50000
Minimum	1.0000000	2000000	0.330000	-9.230000	0.000000
Std. Dev.	0.000000	2.018100	0.094217	2.436464	6.523272
Jarque-Bera	0.000000	4.268503	1.200112	271.1686	799.8711
Probability	0.0000	0.0000	0.7380	0.9276	0.0782
Observation	45	45	45	45	45

Source: processed data, 2022

Table 1 shows that the number of observations made for board size, board independence, return on assets, and price to book value on green banking disclosure in this study was 45 observations in 2017-2021. The minimum value in this study is 0.000 in price to book value, and the maximum value in this study is 37.500. The standard deviation value in this study is 6.523.

Effect of Board Size on Green Banking Disclosure

The higher the board independence, the more positive impact it will have on increasing green banking disclosure. This causes the number of Board members to influence the disclosure of green banking in Indonesia. In other words, the higher the number of members of the board of commissioners in a bank, the better the environmental responsibility of the bank. The increasing number of boards will reflect diverse and very broad expertise and experience

related to financial and non-financial aspects, including environmental and community responsibility initiatives whose hypothesis is formulated as follows:

H2: Board independence affects green banking disclosure.

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5. CONCLUSION

This study found that board size does not affect green banking disclosure. Meanwhile, board independence, financial performance, and firm value affect the green banking disclosure of banks that implement green finance on the Indonesian stock exchange.

This study also has limitations, such as a relatively small sample (9 banks). The limited number of samples is because green banking is still voluntary, so the number of banks that implement it is still limited with the existence of POJK number 51/POJK.03/2017 concerning sustainable finance for financial service companies, issuers, and public companies, we believe that green banking practices will develop.

Projek yang sebaiknya diterima adalah projek A, B, C, D, E.

Penjelasan: karena risiko masing-masing projek diasumsikan sama dengan risiko aset perusahaan yang telah ada (firm's existing assets), maka WACC masing-masing project setara dengan WACC perusahaan, yaitu sebesar 10,5%. Oleh karena itu, projek yang diterima adalah projek yang memiliki *rate of return* di atas 10,5%, yaitu projek A, B, C, D, dan E.

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www.idx.co.id

CULTURAL DISPERSION AND STOCK LIQUIDITY

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ABSTRACT-beluummm

This study aims to examine aspects of strengthening governance in the application of green banking. In Indonesia, which is in the early stages of implementing green banking, applying green banking practices and reporting requires internal governance mechanisms and regulations from the authorities. This study examines the practice of banking disclosure from a governance perspective as the focus of this research. The independent variable in this study is corporate governance, represented by board size, board independence, financial performance, and firm value. The analytical method used to assess green banking disclosure is through annual bank reports for 2017 to 2021. The results of this study indicate an increasing trend of green banking disclosure during the observation period.

Keywords: Board Size, Board Independence, Financial Performance, Firm Value, Green Banking Disclosure.

1. INTRODUCTION

Global warming due to climate change has recently been seen as a problematic phenomenon caused by the unwise treatment of the environment and industrial competition. In addition, public awareness of the importance of protecting the environment from damage impacts various sectors. The ethical issues of corporate responsibility and the environment also encourage the application of ethics in the bank's business practices.

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DO BUBBLE EFFECTS OCCUR ON BITCOIN, GOLD, AND EXCHANGE RATES (USD/IDR AND EUR/IDR) DURING THE COVID-19 PANDEMIC?

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ABSTRACT

This study aims to determine whether there are any bubbles in bitcoin, gold, and exchange rates (USD/IDR and EUR/IDR) using the GSADF test. This study will also look for the relationship between bubbles and observed returns on bitcoin returns using the volatility effect of the GARCH model. The period used in this study started from 1 January 2020 to 31 December 2021, when the Covid-19 pandemic occurred. The results in this study indicated that bubbles are confirmed on the bitcoin and gold variables. The relationship between the observed bubbles, namely bitcoin, and gold, is positive for bitcoin returns. Meanwhile, the relationship between gold and dollar returns to bitcoin returns is positive, and euro returns to bitcoin returns are negative.

Keywords: Bitcoin, Gold, Dollar, Euro, EGARCH, GSADF, Bubble.

1. INTRODUCTION

At the beginning of 2020, the world experienced the Covid-19 pandemic, which impacted several investment instruments such as bitcoin, gold, and exchange rates. Bitcoin price started to increase in January 2020 (Morangga, 2020), rose sharply in November 2020, and remained in the last price range until November 2021, see figure 1.

Figure 1. Bitcoin Price Chart 2020-2021
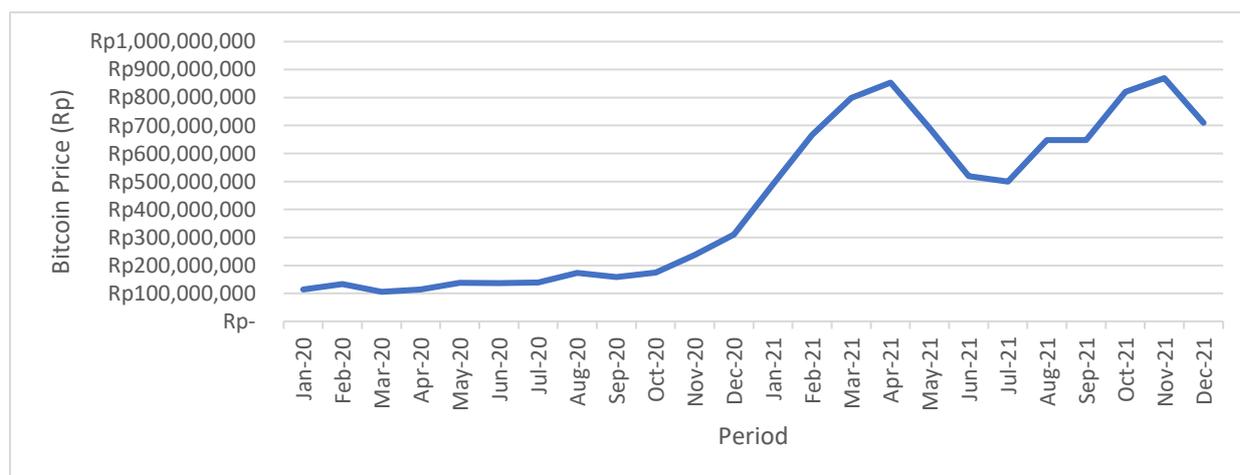
Source: Author's computation

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Another investment instrument that also had an impact on the Covid-19 pandemic is gold. Gold prices during the Covid-19 pandemic experienced a significant increase. According to CNBC Indonesia's research, world gold prices scored the highest closing price in 2020 and set a record. Global gold prices in the last 7.5 years are at their peak, and since the beginning of 2020, have shot up more than 15% (Simorangkir, 2020); see Figure 2.

Figure 2. Gold Price Chart 2020-2021
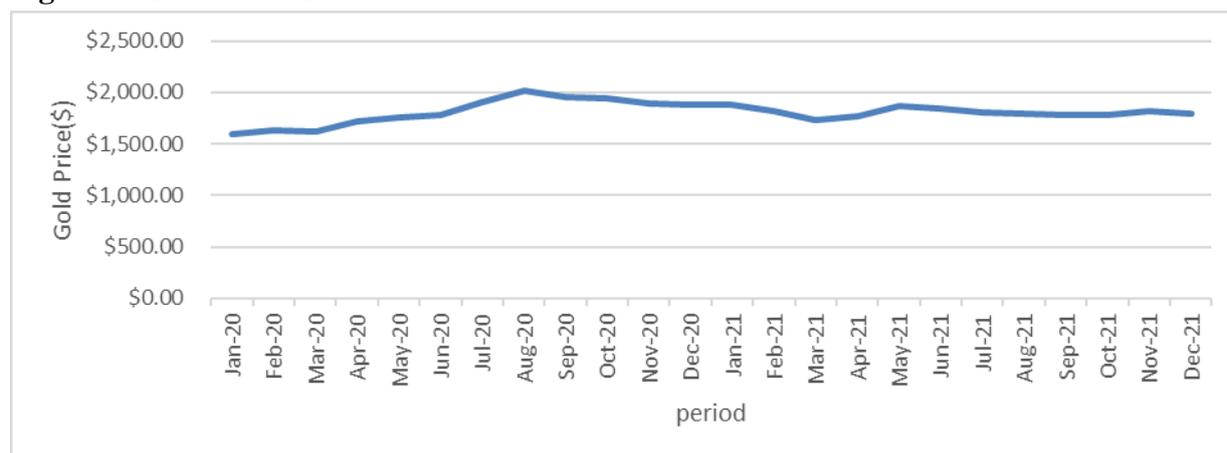
Source: Author's computation

In addition to bitcoin and gold, which had an impact on covid-19, the rupiah exchange rate was also impacted by the depreciation of the rupiah against foreign currencies, namely the dollar and the euro. The rupiah exchange rate against the dollar at the beginning of the year moved relatively stable, with an average value of Rp 13,732 per US dollar in January and Rp 13,776 per US dollar in February. The movement of the rupiah exchange rate in the first semester of 2020 tends to fluctuate and depreciate (Supriyatna, 2020). Meanwhile, the value of the rupiah against the euro penetrated Rp. 18,029 per euro on 31 March 2020. This is supported by USD/IDR and EUR/IDR price movements in Figure 3.

Figure 3. Gold Price Chart 2020-2021
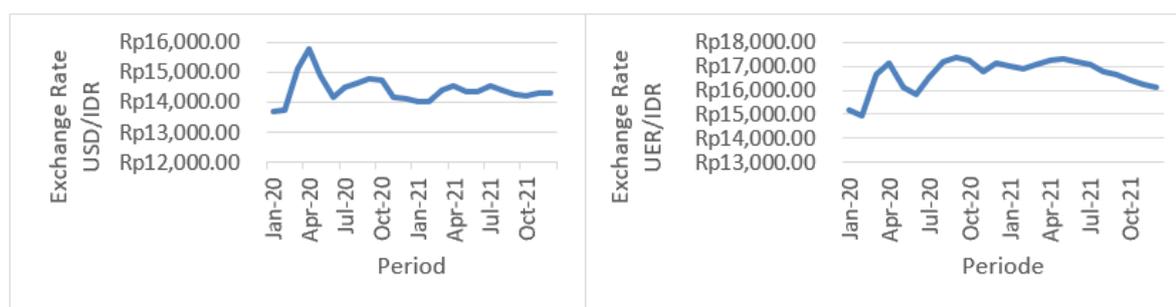
Source: Authors computation.

The price increase in the three variables above, namely bitcoin, gold, and exchange rates, can affect the financial behavior of investors. A bubble in an asset is one factor that changes investors' financial behavior. In behavioral finance theory, a stock bubble with a cognitive bias

can lead to the investor's thinking and disturb her behavior investing (Smith et al., 1988). The bubble is an economic cycle marked by an increase in the rapid market value of an asset (Kenton, 2022).

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Behavioral finance is a theory about the psychological influence on investors or financial analysts, where investors are not always rational. They have limits in self-control and are influenced by their own biases (CFI Team, 2022). It is also considered a field of economic behavior, assuming that psychological influences and biases influence investors' decisions (Hayes, 2022). Many things have led investors' behavior, one of the important issues is the financial bubble, where according to Smith et al. (1988), behavioral financial theory links the stock bubble with cognitive biases that lead to investor thinking. The studies of the financial bubble have been done by many researchers, such as Radaev (2000), who studied the financial bubbles during the Russian crisis in the mid of 1990-s; William & Evans (2011), who found that bubbles had an impact on risk-averse investors; Ventura (2012) said that bubbles present in the portfolio; Korkmaz (2018) argued that bubbles in gold, euro, and dollar reduce the returns on bitcoin, and affecting the return of gold, euro and dollar; and many more.

Recently, bitcoin has got its position in the investment world along with its studies. Nakamoto (2008) introduced bitcoin as a peer-to-peer electronic cash system for the first time. His studies were further continued in many subjects, such as bitcoin price prediction using time series Amjad & Shah (2017); price prediction using machine learning: Jang & Lee (2019), Karasu et al. (2018); efficiency of bitcoin Urquhart (2016), Nadarajah & Chu (2017); behavioral finance caused by bitcoin effect: Cheah & Fry (2015), Korkmaz (2018), Khuntia & Pattanayak (2018), Al-Mansour, B. Y. (2020), Rajput, Soomro &Soomro (2020), Gursoy & Sokmen (2021) and many more. In this last subject field, while bubble effect subject to the bitcoin effect was studied by Szetela et al. (2016), Baur et al. (2018), Cheah & Fry (2015), and Korkmaz (2018). The bubble is an economic cycle characterized by a rapid increase in the market value of an asset (Kenton, 2022). According to Amadeo (2021), a bubble occurs when the value of an asset binds quickly for no good reason. Segal (2022) has added that five stages describe the basic pattern of bubbles, namely: displacement, boom, euphoria, profit tracking, and panic. The study on the bitcoin bubble was first introduced by MacDonell (2014); he claimed that trustable bitcoin platforms and black-market trading caused the bubble; on the other side, bitcoin has high price volatility, which caused speculation in the market. His study was further extended by Cheah & Fry (2015), who argues that bitcoin grows speculatively and moves tend to form bubbles. Then Szetela et al. (2016), Baur et al. (2018), Korkmaz (2018), and Gursoy & Sokmen (2021) studied that exchange currency, gold, and bitcoin itself will affect bitcoin return. Bauer et al. (2018) found that bitcoin returns are not dependent on gold and dollar returns. In addition, the dollar's exchange rate against the pound shows a slightly negative relationship. Meanwhile, Bhattacharjee (2016) argues that bitcoin fluctuates more than the dollar and the euro.

Further extension in the bubbles effect research, Korkmaz (2018) has studied that the

bubbles observed in gold, the euro, and the dollar, will reduce the volatility of bitcoin returns and affect bitcoin returns. Meanwhile, Cheah & Fry (2015) argues that bitcoin grows speculatively and tends to form bubbles. According to Baur et al. (2018) and Gursoy & Sokmen (2021) that there is no relationship between bitcoin, the dollar, the euro, and the yuan. Meanwhile, Jumiarti & Hayet (2021) argue that bitcoin positively influences the rupiah. On the other hand, Baur et al. (2018) argue that bitcoin returns are not affected by gold and dollar returns, while the dollar exchange rate against the pound shows a slightly negative relationship to bitcoin. Bhattacharjee (2016) has also argued that bitcoin fluctuates more than the dollar and the euro.

For the aforementioned reasons above, this paper will study the effect of bubbles in bitcoin, gold, and exchange rate (the dollar and the euro against the Indonesian Rupiah (IDR)); on there, each returns. The bubbles will be found using Generalized Sup Augmented Dickey-Fuller (GSADF) and Backward Sup Augmented Dickey-Fuller (BSADF), which is found by Phillips, Shi & Yu, J. (2015), while the methodology to find the relationship between bubbles and observed returns will be using Korkmarz (2018) GARCH model.

The hypotheses that will be used in this study are:

H1a: There are bubbles in bitcoin, gold, dollar, and euro

H1b: There is a relationship between the bubble and the return of gold to the return of bitcoin.

H1c: There is a relationship between bubble and dollar returns to bitcoin returns.

H1d: There is a relationship between the bubble and the return of the euro to the return of bitcoin.

H1e: There is a relationship between the bitcoin bubble and bitcoin returns.

3. DATA AND METHODS

3.1. Data and Sample

Researchers use information in the form of daily data on bitcoin, gold, and exchange rates (USD/IDR and USD/IDR). The period used is from 1 January 2020 to 31 December 2021. Daily data were obtained from id.investing.com and finance.yahoo.com.

3.2. Methods

In this study, the Generalized Sup Augmented Dickey-Fuller (GSADF) test is used to detect bubbles in an asset. GSADF considers Long-term time series and structural breaks, which can provide more consistent and accurate results in a condition where more than one bubble is confirmed in a period (Phillips et al., 2015). According to the approach, PSY (2015), the price of P_t becomes the basic hypothesis.

$$P_t = dT^{-\eta} + \theta P_{t-1} + \varepsilon_{t,,} \ \varepsilon_t \sim^{iid} (0, \ \sigma^2) \ \theta = 1 \tag{1}$$

Notes: P_t Asset price in period t, P_{t-1} Asset price before period t, θ bubble, d constant, T number of samples, η coefficient that controls T, ε standard error.

In the GSADF test, the test hypothesis is defined as follows:
H_{0a}: $\theta = 1$ (H0 received) = bubble not confirmed
H_{1a}: $\theta > 1$ (H1 received) = bubble confirmed

Variables r_1 and r_2 are the starting and ending points of the sample. This regression model is as follows:

$$\Delta P_t = \alpha_{r1,r2} + \beta_{r1,r2} P_{t-1+r1,r2} + \varepsilon_t, \varepsilon_t \sim i.\ i.\ d\ (0, \sigma_{r1,r2}) \tag{2}$$

$\Delta P_t = P_t - P_{t-1}$, and k is the lag length. According to Ceylan et al. (2018), ADF, SADF, and GSADF Test as follows:

$$ADF_{r1,r2} = \beta_{r1,r2} / se(\beta_{r1,r2}) \tag{3}$$
$$SADF = sup_{r\varepsilon[r0,1]} ADF_r \tag{4}$$
$$GSADF(r0) = sup_{r2\in[0,r2-r0]}^{r1\in[r0,1]} ADF_{r1,r2} \tag{5}$$

When the bubble is confirmed, the test performed is backward SADF (BSADF). Backward SADF is used to find which period there is a bubble. BSADF equation:

$$BSADF_{r2}(r0) = sup_{r1\in[0,r2-r0]}\{ADF_{r1,r2}\} \tag{6}$$

The augmented Dickey-Fuller (ADF) and Phillips Perron (PP) test is an iterative root test to verify whether the data is stationary or not (Korkmaz, 2018). The stationary test hypothesis is as follows:

H_0: Probability >0,05 (H0 received) = data is not stationary.
H_1: Probability <0,05 (H1 received) = data stationary.

The Autoregressive Moving Average (ARMA) Model test is used to detect the ARCH effect in the residue or show autocorrelation in the residue (Korkmaz, 2018). The ARMA test hypothesis is as follows:

H_0: Probability >0,05 (H0 received) = no autocorrelation in the residue.
H_1: Probability <0,05 (H1 received) = there is an autocorrelation in the residue.

According to Korkmaz (2018), in the GARCH model, when the lag length Q of the error

square and the lag length of the autoregressive is expressed by P, $\omega, > 0, = ai \geq 0, \beta i \geq 0,$ $\sum_{j=1}^{p} \beta i + \sum_{i=1}^{q} ai < 1$, then the general GARCH (P,Q) is as follows:

$$h(t) = \omega + \sum_{j=1}^{p} \beta i \ h_{t-j} + \sum_{i=1}^{q} ai \ \in_{t-1}^{2} \tag{7}$$

In this study, the volatility model used is exponential GARCH (EGARCH). According to Nelson (1991), GARCH lacks invalid volatility assumptions, and the GARCH model does not adequately model leverage in financial time series.

$$log \ h_{(t)} = \omega + \sum_{j=1}^{p} \beta i \ h_{t-j} \log\left(h_{t-j}\right) + \sum_{i=1}^{q} ai \frac{[\in_{t-i}]}{\sqrt{h_{t-i}}} + \sum_{i=1}^{q} \gamma i \frac{\in_{t-i}}{\sqrt{h_{t-i}}} \tag{8}$$

Notes: βj GARCH effect, αi ARCH effect, γi Leverage effect

4. EMPIRICAL RESULTS

In this study, the results of the GSADF test are presented in table 1. The results from table 1 are the value θ of the bitcoin and gold price variables, namely 7.815714 and 1.868588, which means that H1a is accepted, where the existence of a bubble in the bitcoin and gold variables is confirmed.

Table 1. GSADF Test

Variable	GSADF	
	θ	p
Bitcoin	7.815714	0.000***
Emas	1.868588	0.011**
Dolar	0.443814	0.583
Euro	0.249919	0.745

the statistic in parentheses. * p< 10%, **p < 5%, ***p < 1%

Figure 4. BSADF Chart

The BSADF chart describes the bubble movement, from upper left to right, then lower left to right resp. Bitcoin, gold, dollar, and euro prices occurred from 1 January 2020 to 31 December 2021.
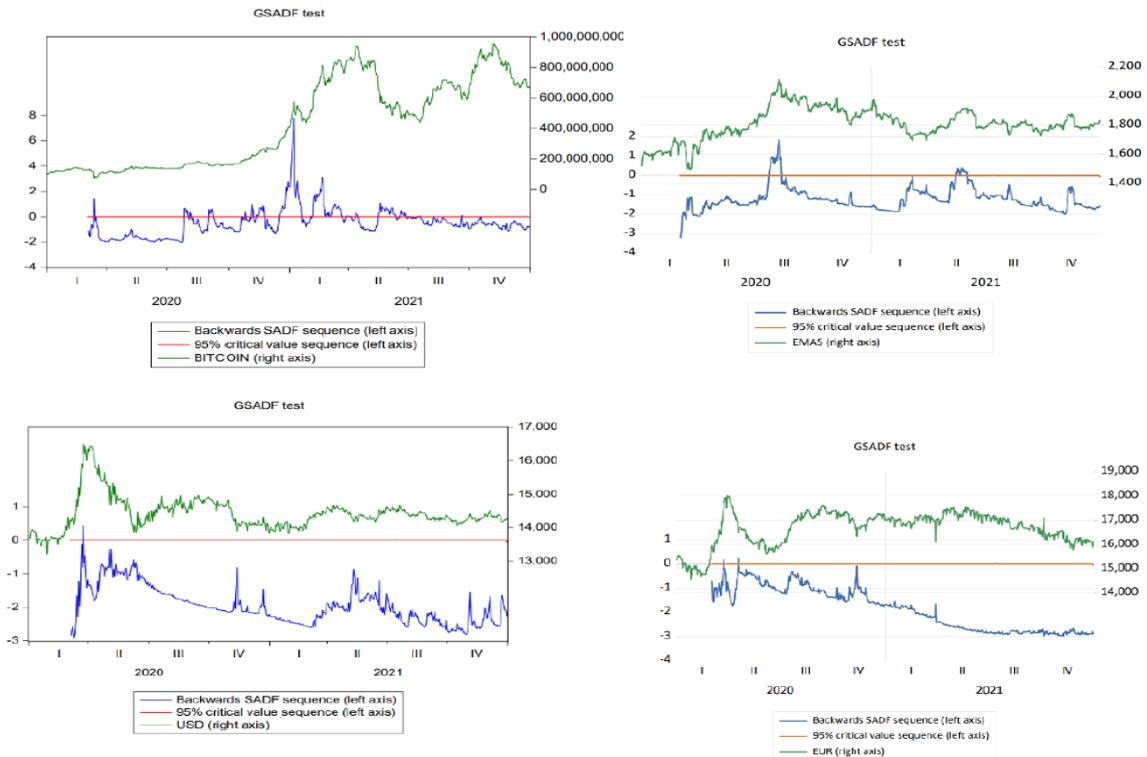
Source: Authors computation.

Table 2. Bubble Period

Bitcoin		Gold	
Start of Bubble	End of Bubble	Start Of Bubble	End of Bubble
12/03/20	12/03/20	23/07/20	10/08/20
16/03/20	16/03/20	17/05/21	02/06/21
28/07/20	03/08/20		
05/08/20	06/08/20		
03/09/20	09/09/20		
12/11/20	25/11/20		
17/12/20	20/01/21		
08/02/21	03/03/21		
05/03/21	23/03/21		
29/03/21	31/03/21		
05/04/21	05/04/21		
12/04/21	15/04/21		
17/05/21	11/06/21		
18/06/21	28/06/21		
01/07/21	01/07/21		
20/07/21	20/07/21		
21/09/21	21/09/21		

The Bubble period is presented in Figure 4 and Table 2. From the upper left of Figure 4, it can be seen that the longest bubble period occurred in the bitcoin variable, which was from 17 December 2020 to 20 January 2021, which is full of bubbles starting from 12 March 2020 to 9 September 2021. Meanwhile, for the gold variable, the bubble period occurred twice (see upper right of Figure 4). The first is from 23 July 2020 to 10 August 2020 and from 17 May 2021 to 2 June 2021.

Table 3. ADF and PP Test

Variable	Test	Probabilities	
		Constant	Constant end Trend
$R_{BITCOIN}$	ADF	0.0000***	0.0000***
	PP	0.0000***	0.0000***
R_{Gold}	ADF	0.0000***	0.0000***
	PP	0.0000***	0.0000***
R_{DOLLAR}	ADF	0.0000***	0.0000***
	PP	0.0000***	0.0000***
R_{EURO}	ADF	0.0000***	0.0000***
	PP	0.0000***	0.0000***

t-statistic in parentheses. * $p < 10\%$, **$p < 5\%$, ***$p < 1\%$

The test results for all variables are presented in Table 3. The ADF and PP test probabilities of all variables show values less than 0; this shows that there is a data stationary

Table 4. ARMA Model

Dependent Variable: $R_{BITCOIN}$				
Variable	Coefficient	St. Error	*t-statistics*	Probabilities
Constant	0.004504	0.002006	2.079743	0.0252**
AR(1)	0.541428	0.178201	3.038292	0.0025***
AR(2)	-0.502354	0.168083	-2.988722	0.0029***
MA(1)	-0.588677	0.161677	-3.64107	0.0003***
MA(2)	0.642785	0.153806	4.179196	0.0000***
SIGMAQ	0.001656	4.85E-05	34.151	0.0000***
R²=0.025720		Adjusted R²=0.016279		F= 2.724329
AIC=-3.542125		SIC= -3.493186		HQ=-3.522957

t-statistic in parentheses. * p< 10%, **p < 5%, ***p < 1%.

Table 4. shows that the ARMA model (2.2) is significant, meaning there is an autocorrelation in the residuals.

The EGARCH (1,1) model is the right model to describe the effect of the bubble and gold returns on bitcoin returns. The accuracy of this model is tested by looking at the news impact curve, which describes the relationship between residuals and symmetrical volatility

Figure 5. Curve EGARCH Model (1,1)

Figure 5 describes EGARCH model (1,1) for bubble and gold returns on the bitcoin returns effect.
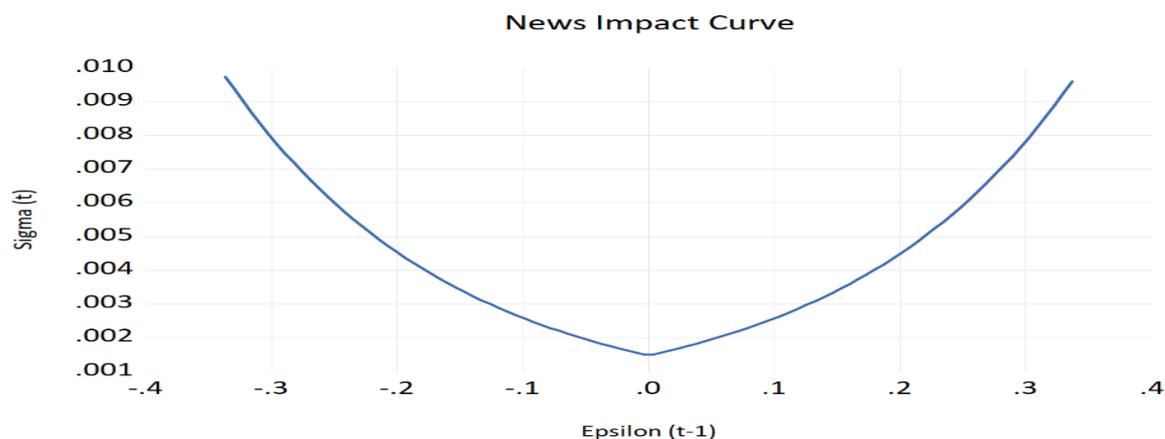
Source: Authors computation.

The EGARCH model for the relationship between the bubble and gold returns to bitcoin returns is as follows:

(9)

$$log\ h_{(t)} = 0.00523 + 0.94019\ h_{t-1} \log(h_{t-1}) + 0.23515\frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}} - 0.00092\frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}} -$$
$$6.95822 \times R_{Gold}$$

Table 5. Relationship Gold Bubble and Return on Bitcoin Return

Mean Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
Constant	0.00523	0.00230	2.27542	0.0229**
Bubble	0.00321	0.00178	1.80192	0.0716*
AR(1)	0.52924	0.28844	1.83481	0.0665*
AR(2)	-0.29095	0.26520	-1.09709	0.2726
MA(1)	-0.51886	0.27834	-1.86413	0.0623*
MA(2)	0.39065	0.25044	1.55985	0.1188
Variance Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
α_0	-0.56125	0.19745	-2.84251	0.0045***
α_1	0.23515	0.08401	2.79915	0.0051***
γ_1	-0.00092	0.04478	-0.02050	0.9836
β_1	0.94019	0.02526	37.21728	0.0000***
R$_{Gold}$	-6.95822	4.54639	-1.53049	0.1259
GED Parameter	0.95989	0.08561	11.21297	0.0000***
R²=0.013858		Adjusted R²=0.003344		
AIC=-3.837164		SIC=-3.731986		HQ=-3.795803

z-statistic in parentheses. * p< 10%, **p < 5%, ***p < 1%.

Table 5 coefficient values of the gold bubble are positive and insignificant with α=5%; this shows that H$_{1b}$ is accepted. It can be concluded that the relationship between the gold bubble and bitcoin returns is positive. Meanwhile, the coefficient of the gold return is negative and insignificant. It can be concluded that the relationship between gold returns and bitcoin returns is negative.

The EGARCH model (1.8) is the right model to describe the effect of dollar returns on bitcoin returns. The accuracy of this model is tested by looking at the news impact curve, which describes the relationship between residuals and symmetrical volatility.

Figure 6. Curve EGARCH Model (1,8)

Figure 6 describes EGARCH model (1,8) for dollar returns on bitcoin returns effect
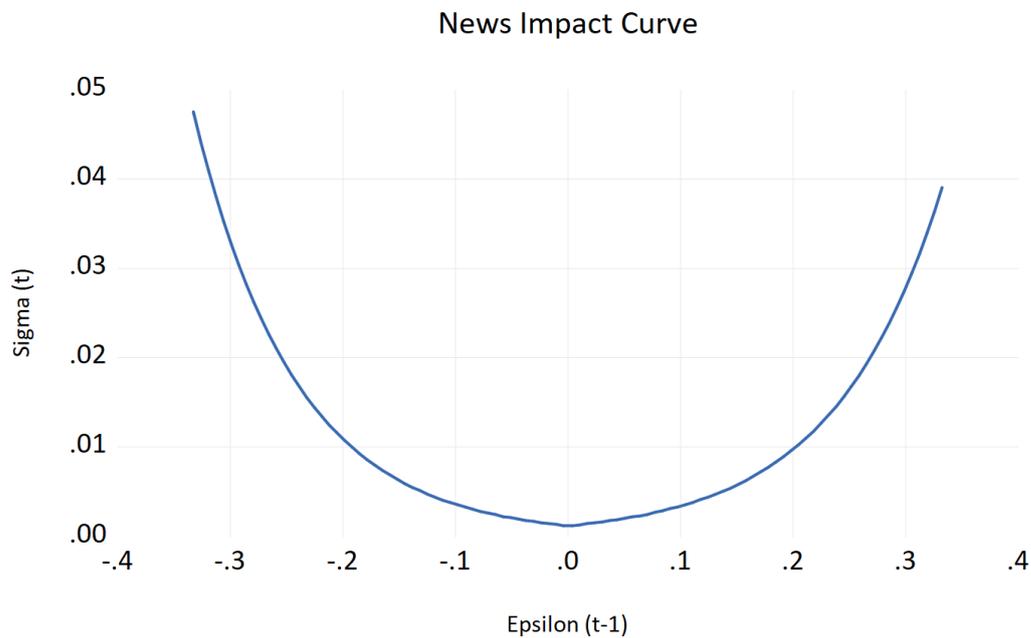
Source: Authors computation.

The EGARCH model for the relationship between dollar returns and bitcoin returns is as follows:

$$
\begin{aligned}
\log h_{(t)} =\ & 0.00118 \\
& + 0.83719\, h_{t-1} \log(h_{t-1}) + 0.03972\, h_{t-2} \log(h_{t-2}) \\
& + 0.65256\, h_{t-3} \log(h_{t-3}) \\
& - 0.77712\, h_{t-4} \log(h_{t-4}) + 0.22893\, h_{t-5} \log(h_{t-5}) \\
& - 0.47979\, h_{t-6} \log(h_{t-6}) + 0.88172\, h_{t-7} \log(h_{t-7}) \\
& - 0.43068\, h_{t-8} \log(h_{t-8}) + 0.43913 \frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}} - 0.01209 \frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}} \\
& - 23.92859 \times R_{dollar}
\end{aligned}
\tag{10}
$$

.

Table 6. Relationship of Dollar Return on Bitcoin Return

Mean Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
Constant	0.00118	0.00104	1.13504	0.2564
AR(1)	0.89486	0.11009	8.12853	0.0000***
AR(2)	-0.56185	0.09625	-5.83747	0.0000***
MA(1)	-0.88431	0.10304	-8.58265	0.0000***
MA(2)	0.65177	0.08320	7.83363	0.0000***
Variance Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
α_0	-0.62980	0.20311	-3.10086	0.0019**

α_1	0.43913	0.10112	4.34266	0.0000***
γ_1	-0.01209	0.04632	-0.26089	0.7942
β_1	0.83719	0.16753	4.99729	0.0000***
β_2	0.03972	0.13564	0.29281	0.7697
β_3	0.65256	0.09990	6.53222	0.0000***
β_4	-0.77712	0.17841	-4.35589	0.0000***
β_5	0.22893	0.16944	1.35115	0.1766
β_6	-0.47979	0.10495	-4.57141	0.0000***
β_7	0.88172	0.14804	5.95609	0.0000***
β_8	-0.43068	0.17152	-2.51098	0.0120**
Rdolar	-23.92859	4.63637	-5.16106	0.0000***
GED Parameter	1.08758	0.08716	12.47771	0.0000***
R²=0.021310		Adjusted R²=0.013709		
AIC=-3.909848		SIC=-3.762600		HQ=-3.852165

z-statistic in parentheses. * p< 10%, **p < 5%, ***p < 1%.

Table 6, the coefficient value of the dollar return is negative and significant with α=5%; this shows that H_{1c} is accepted. It can be concluded that the relationship between dollar returns and bitcoin returns is negative.

EGARCH model (1,3) is the right model to describe the effect of euro returns on bitcoin returns. The accuracy of this model is tested by looking at the news impact curve, which describes the relationship between residuals and symmetrical volatility

Figure 7. Curve EGARCH Model (1,3)

Figure 7 describes EGARCH model (1,3) for euro returns on bitcoin returns effect
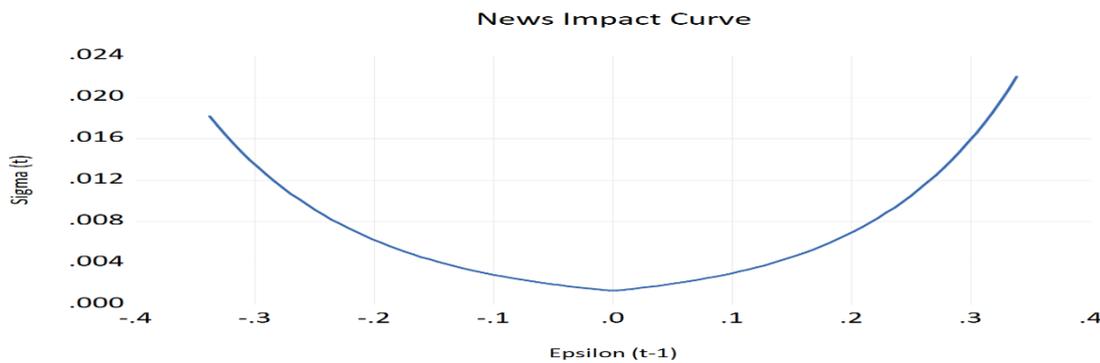
Source: Authors computation.

The EGARCH model (1,3) for the relationship between euro returns and bitcoin returns is as follows:

$$log\ h_{(t)} =\ 0.00251 + 0.57473\ h_{t-1} \log(h_{t-1}) \tag{11}$$
$$- 0.31097\ h_{t-2} \log(h_{t-2}) + 0.66948\ h_{t-3} + 0.32923\frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}}$$
$$+\ 0.01152\frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}} + 14.45625 \times R_{euro}$$

Table 7. Relationship of Euro Return on Bitcoin Return

| Mean Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
Constant	0.00251	0.00102	2.46413	0.0137**
AR(1)	1.34667	0.05470	24.61799	0.0000***
AR(2)	-0.86292	0.04941	-17.46342	0.0000***
MA(1)	-1.32213	0.05295	-24.96951	0.0000***
MA(2)	0.87333	0.04651	18.77750	0.0000***
Variance Equation				
	Coefficient	Std. Error	*z-statistic*	Probabilities
α_0	-0.66702	0.32030	-2.08248	0.0373**
α_1	0.32923	0.09943	3.31111	0.0009***
γ_2	0.01152	0.06228	0.18502	0.8532
β_1	0.57473	0.13769	4.17402	0.0000***
β_2	-0.31097	0.17037	-1.82526	0.0680
β_3	0.66948	0.13420	4.98877	0.0000***
R_{Euro}	14.45625	6.65273	2.17298	0.0298**
GED Parameter	0.92593	0.06534	14.17179	0.0000***
R²=0.012390		Adjusted R²=0.004719		
AIC=-3.859205		SIC=-3.752859		HQ=-3.817545

z-statistic in parentheses. * p< 10%, **p < 5%, ***p < 1%.

Table 7 shows the coefficient value of the euro return is positive and significant with α=5%; this shows that H$_{1d}$ is accepted. It can be concluded that the relationship between euro returns and bitcoin returns is positive.

EGARCH model (1,8) is the right model to describe the effect of euro returns on bitcoin returns. The accuracy of this model is tested by looking at the news impact curve, which describes the relationship between residuals and symmetrical volatility, sees Figure 8.

Figure 8. Curve EGARCH Model (1,8)

Figure 8 describes EGARCH model (1,8) for bitcoin bubbles on bitcoin returns effect
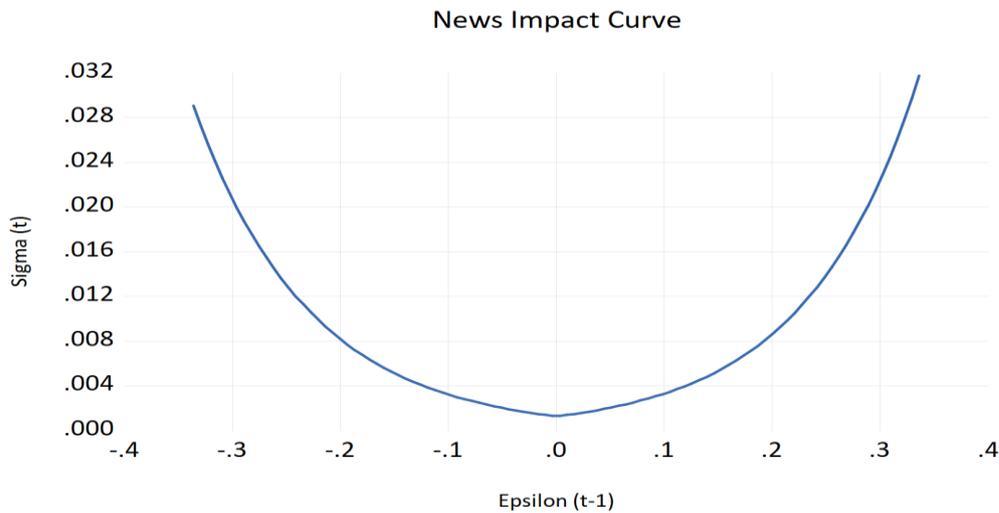
Source: Authors computation.

The EGARCH model (1,8) for the relationship of the bitcoin bubble to bitcoin returns is as follows:

$$Log\ h_{(t)} = 0.00327 \tag{12}$$
$$+ 1.19883\ h_{t-1}\log(h_{t-1}) - 0.48246\ h_{t-2}\log(h_{t-2})$$
$$+ 0.30462\ h_{t-3}\log(h_{t-3})$$
$$- 0.16788\ h_{t-4}\log(h_{t-4}) - 0.58195\ h_{t-5}\log(h_{t-5})$$
$$+ 1.05293\ h_{t-6}\log(h_{t-6}) - 0.66780\ h_{t-7}\log(h_{t-7})$$
$$+ 0.23015\log(h_{t-8}) + 0.39649\frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}} + 0.00544\frac{[\epsilon_{t-1}]}{\sqrt{h_{t-1}}}$$

Table 8. Relationship of Bitcoin Bubble on Bitcoin Return

Mean Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
Constant	0.00327	0.00138	2.37271	0.0177**
Bubble	0.00233	0.00101	2.29711	0.0216**
AR(1)	0.61297	0.21842	2.80636	0.0050***
AR(2)	-0.39430	0.18684	-2.11033	0.0348**
MA(1)	-0.63115	0.20532	-3.07394	0.0021***
MA(2)	0.49860	0.17240	2.89209	0.0038***
Variance Equation				
	Coefficient	Std. Error	z-statistic	Probabilities
α_0	-1.04645	0.28395	-3.68531	0.0002***
α_1	0.39649	0.10983	3.61017	0.0003***
γ_1	0.00544	0.04217	0.12893	0.8974
β_1	1.19883	0.32026	3.74327	0.0002***
β_2	-0.48246	0.44385	-1.08699	0.2770
β_3	0.30462	0.22528	1.35219	0.1763
β_4	-0.16788	0.15601	-1.07606	0.2819
β_5	-0.58195	0.17560	-3.31402	0.0009***
β_6	1.05293	0.28353	3.71362	0.0002***
β_7	-0.66780	0.45615	-1.46400	0.1432
β_8	0.23015	0.24845	0.92635	0.3543
GED Parameter	1.02423	0.09531	10.74616	0.0000***
R²=0.020304		Adjusted R²=0.009859		
AIC=-3.817952		SIC=-3.660185		HQ=-3.755910

z-statistic in parentheses. * $p < 10\%$, **$p < 5\%$, ***$p < 1\%$.

Table 8 shows that the coefficient value of the bitcoin bubble is positive and significant with $\alpha = 5\%$; this shows that H_{1e} is accepted. It can be concluded that the relationship between the bitcoin bubble and bitcoin returns is positive.

The discussion of the finding above and the answer to the hypothesis will be respectively given below:

Based on the results of H_{1a}, a bubble occurs in bitcoin and gold variables. Compared to Korkmaz (2018), this research gave a different result: there is no bubble in gold, but well in the dollar and euro.

Based on the results of H_{1b}, there is a positive relationship between the gold bubble and bitcoin returns, so the increase in the gold bubble increases the volatility of bitcoin returns. However, there is a negative relationship between gold returns and bitcoin returns, so the increase in gold returns reduces the volatility of bitcoin returns.

Based on the results of H_{1c}, there is a negative relationship between dollar returns and

bitcoin returns, so the increase in dollar returns reduces the volatility of bitcoin returns; this is also confirmed by the result of Korkmaz (2018)

Based on the results of $H_{1d,}$ there is a positive relationship between euro returns and bitcoin returns, so the increase in euro returns increases the volatility of bitcoin returns. This result is the same as Korkmaz (2018), but it has a different direction, which means that when the return of the euro increases, then the volatility of bitcoin will reduce.

Based on the results of $H_{1e,}$ there is a positive relationship between the bitcoin bubble and bitcoin returns, so the increase in the bitcoin bubble increases the volatility of bitcoin returns. This also has a different result from Korkmaz (2018), who said there is no significant relationship between the bubble bitcoin and its return.

5. CONCLUSION

This study finds that bubble effects are confirmed on the bitcoin and gold variables in the period of the Covid-19 Pandemic. Some hypotheses have a similar result to Korkmaz (2018), and some do not. We argue that the data that is used here is in the range of time of chaos that happened all over the world. The contribution of the investor's irrational behavior was big in this situation. Fear, uncertainty, and almost all negative feeling contribute to this behavior. Meanwhile, the time range and the country situation in Korkmaz (2018) are different compared to this study. To conclude, it is shown that the dollar and the euro are good investment instruments during COVID-19 in 2020-2021. On the other hand, bitcoin shows uncertainty in this range of time. Further research should be done to understand the bubble effect after the recession caused by Covid-19 Pandemic.

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DYNAMIC SPILLOVER FROM CRYPTO ASSETS TO THE EMERGING AND ADVANCED ECONOMIES FINANCIAL STABILITY

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ABSTRACT

Only a few studies synthesize different asset classes, such as stock index, exchange rate, and bond yield, to investigate crypto asset spillover within different economic classifications. The study will fill this void by scrutinizing the directional spillover of crypto price volatility to advanced economies and emerging markets. We harness the Dithe ebold-Yilmaz spillover method, pairwise rolling window correlation, and the Girvan-Newman algorithm to understand the influence of crypto assets set in the traditional financial system. Nowadays, crypto emerges with unprecedented hype. However, the price had extreme volatility and resembled a set bubble. Crypto assets grew by about 200% in 2021, and their transaction volumes steadily increased from $800 billion to $2.3 trillion in 2021 (Bank of England, 2021). Simultaneously, regulatory arbitrage magnifies the crypto market's vulnerability. Hence, financial regulators need to update their financial crisis prevention tools and understand the puzzling relationship between crypto assets and traditional financial systems. We discover that crypto asset is not a net spillover giver to the traditional financial market. In the global financial system, advanced economies' stock market is the chief net spillover giver. Furthermore, by using the Girvan-Newan network algorithm, we confirm that crypto spillover is isolated in its asset class. The results provide crucial insight into managing systemic risk caused by crypto markets.

Keywords: networks, international financial market, portfolio choice, crypto asset, financial markets, correlation-based network.

1. INTRODUCTION

In the last decades, global financial crises have continued: Asian Crisis, 1997; Technology Crisis, 2000; Subprime Crisis, 2007; and Sovereign Debt Crisis, 2011–2013. Although the source of the disaster is different for each event, the bubble of asset prices is the recurring theme. The researcher believes a blunder in asset price estimation is one of the main culprits (Roy, S., and Kemme, D. M. 2020). To prevent the next black swan, financial regulators must oversee how the market established prices, especially for crypto, which is a natural speculative asset. In the 2008 global financial crisis, markets demonstrated how a white swan product, a subprime mortgage, turned into a global catastrophe (Shiller, R. J. 2012).

In the past couple of years, crypto has become a speculative tool for investors, with hundred and hundred percent prices increase. However, is this sustainable? ADB stated that the failure to stop risky leveraging and extravagant risk-taking in the market causes supervision

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[1] Otoritas Jasa Keuangan (nanti 1 nya diganti a)

success at a minimum. In addition, rapid financial innovation discredited the current regulatory model (Lee, C. S., and Park, C. 2009). Hence, we recommend regulators incorporate crypto's price return and volatility in the financial stability surveillance framework. This research proposes an insightful knowledge of crypto assets related to advanced economies and emerging markets' financial stability.

2. LITERAURE REVIEW

From its inception, crypto has bolted the financial world. Materialized from a rebellious paper by Satoshi Nakamoto (Satoshi, 2008), finance society rushed to create a new investment asset, a success that is currently worth a billion dollars. The number of crypto assets reached 8,933 instruments, of which Bitcoin, Ethereum, Tether, and BNB are among the big four. In November 2021, crypto assets' market capitalization reached $ 3 trillion. Based on Global Crypto Adoption 2022, there are more than 300 million crypto users worldwide, where the US, India, and Pakistan are the top 3 countries. In addition, the crypto volume of transactions reached 2.3 billion dollars in 2021 (Bank of England, 2021).

The rapid development of the crypto asset market mimics the development of the asset bubble. This raises the alarm for financial regulators. We understand that a policy addressing asset bubble inefficiency and instability is important (Kunieda, T., and Shibata, A. 2016). However, the financial regulator has a minimum knowledge of the crypto universe. To make it worse, the financial stability board argues that crypto assets could harm financial stability because of the increasing connectedness with the traditional financial system (Financial Stability Board, 2022).

Mostly, the danger in the financial market comes from an investor who speculates on the crypto asset. Researchers report that most crypto is used as an investment portfolio and not as a means of payment, which Satoshi intended. In 2017, there was a bubble in the crypto market where the price rose by 400%, to crash later. A different study stated that, for a certain period, Bitcoin had a unidirectional movement with the S&P 500 stock index (Conlon and McGee, 2020). This fact points out the procyclical move with the stock market. It is safe to assume that market sentiment is the primary source of price movement in the crypto and stock market (Caferra, R, 2022). Speculation, procyclical movement, and connection are the recipe for becoming a source of financial disaster.

International Monetary Fund (2019) confirms that investor faces an immense risk in the crypto market. There is no fundamental value for the price, so the crypto price mechanism is purely speculative and highly correlated with the market sentiment. Arrived with a similar conclusion, ECB argues that the crypto market is highly speculative and can subject investors to heavy losses. In addition, ECB points out the importance of consumer protection given the low level of disclosure and supervision of crypto asset transactions (European Central Bank, 2019). The situation adds urgency to understanding the connectedness of the crypto market to the traditional financial system.

In studying crypto asset connectedness, there is still a lack of research that synthesized three different asset classes, such as stock market, exchange rate, and ten years bond yield, into

one dimension. Most research studies the connection of crypto assets separately. For example, Uzonwanne, G. (2021), Caferra, R. (2022), Conlon, T., & McGee, R. (2020), Goodell, J. W., & Goutte, S. (2021), and Matkovskyy, R., and Jalan, A. (2019). focus on the stock market, Chemkha, R., BenSaïda, A., & Ghorbel, A. (2021) focus on the exchange rate (Urom, C., Abid, I., Guesmi, K., & Chevallier, J.,2020) focus on commodities. Yes, a study combines traditional asset classes, such as Bouri, E., Das, M., Gupta, R., & Roubaud, D. (2018). Still, they are not investigating a different economic class, such as advanced and emerging markets. This study will fill this gap by studying all asset classes at once and grouping them into different economic classes: advanced countries and emerging markets.

In summary, this study will contribute to two major areas of knowledge. First, we will combine different asset classes such as stock index, exchange rates, and ten years of bond yield to uncover the prominence of the crypto asset in advanced economies and emerging markets. Second, we will group and aggregate individual asset classes and countries to obtain a final result for the financial stability assessment. Most of the crypto connectedness studies mentioned using DY spillover by Diebold, F. X., & Yilmaz, K. (2009) and Diebold, F. X., & Yilmaz, K. (2012) framework to represent the spillover between the crypto market and another market. Here, we will harness the DY spillover model, correlation-based rolling window, and correlation-based network to uncover the connection between crypto assets and financial stability for a different economic class.

3. DATA AND METHODS

This research combines stock indexes, exchange rates, and bond yields from advanced economies (Singapore, Japan, UK, and Germany) and emerging markets (Indonesia, India, Vietnam, and China). For the stock index, we represent Singapore with STI, Japan with Nikkei, the UK with FTSE, Germany with DAX, Indonesia with JCI, India with BSE, Vietnam with VTI, and China with HSCEI. From 2017-2022, the data is structured as daily frequency, where the data for returns counted at 10307 observations and volatility counted at 18106 observations, while we include weekend value for volatility. We will process the data further to get the daily return with the following formula:

$$(i) \quad R_t = \frac{(P_t - P_{t-1})}{P_{t-1}}$$

Where: R_t = Return on period 0, Pt = Price on period 0, and P_{t-1} = Price in period $t-1$

and historical volatility:

$$(ii) \quad R_i = ln\left(\frac{C_i}{C_{i-1}}\right)$$

Where: $(i) \quad R_i$ = return period i, ln = natural log, Ci = Closing Price, and C_{i-1} = previous day closing price

the calculation for weekly standard deviation:

$$(iii) \quad \sigma = \sqrt{\frac{\Sigma_{i=1}^{n}(R_i - \underline{R})^2}{n-1}}$$

Where: σ = weekly standard deviation, R_i = return period i, and $\underline{R}$ = average weekly return n = number of data

and final historical volatility:

$$(iv) \ \ H_i = \sqrt{T} \ \sigma$$

Here, we are using the DY spillover framework to calculate the return and volatility spillover between a market with the following formula:

$$(vii) \qquad S^g(H) = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\theta}_{ij}^g(H)}{\sum_{i,j=1}^{N} \tilde{\theta}_{ij}^g(H)} \cdot 100 = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\theta}_{ij}^g(H)}{N} \cdot 100$$

With directional spillover:

$$(viii) \qquad S_{.i}^g(H) = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\theta}_{ij}^g(H)}{\sum_{i,j=1}^{N} \tilde{\theta}_{ij}^g(H)} \cdot 100 = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\theta}_{ij}^g(H)}{N} \cdot 100$$

The difference between our methodology than DY based research Corbet et al., (2018); Frankovic et al., (2021); Iyer, (2022), is that we combine the stock market, exchange rate, and 10-year bond to represent the country's financial system stability. There are studies on crypto connection to emerging markets, such as Balcilar, M., Ozdemir, H., & Agan, B. (2022) and Choi, S. Y. (2022). However, they lack a comparison between advanced economies and emerging markets. Generally, investor behavior in advanced economies and emerging markets are different. That is a crucial aspect of our study. We will compare how the crypto asset class differently influences advanced economies and emerging markets financial stability. Furthermore, we group each country into advanced economies and emerging markets classification to know the effect of the crypto spillover on each group. This aggregated study will open our insight and has more accuracy because we used aggregation that will erase individual biases.

The spillover research is not a complete analysis without a network map. Therefore, in this study, we will utilize network analysis to show the centrality and the connection between asset classes. We will use Girvan-Newman Algorithm to obtain the best network that represents real-world connectedness based on the historical volatility absolute correlation. We will find the community to provide a different way to confirm the isolation of crypto assets (Corbet et al., 2018). The Girvan-Newman algorithm is chosen because of its divisive method and suitability for the small community. The algorithm starts on the target network and searches for the least similar connected pairs to remove the edges in between. The process is repeated until it reaches the desired modularity. The algorithm produces a network community that is based on the edge-betweenness for each node (Newman, M. E. J., & Girvan, M. 2004).

The Girvan-Newman algorithm is as follows:
1. Calculate betweenness scores for all edges in the network.
2. Find the edge with the highest score and remove it from the network.
3. Recalculate betweenness for all remaining edges.
4. Repeat step 2.

To calculate the betweenness, we will use the following formula (Charles Perez and Rony Germon. 2016).

$$BC(v) = \sum_{s,t \, \epsilon \, V} \frac{\sigma_{st}(V)}{\sigma_{st}}$$

And finally, to find the best community division, we will use modularity (Newman, M. E. J., & Girvan, M. 2004) as follows:

$$Q = \sum_{i} (e_{ii} - a_i^2) = \text{Tr } e - \parallel e^2 \parallel$$

We aim to find the best community and the isolated network to reinforce our interpretation coming from the DY spillover method.

4. RESULTS

4.1. Statistic Summary

Here, we will provide the result of descriptive statistics to show an early indication of connectedness. The resulting descriptive statistic is as the following:

Table 1. Return Descriptive Statistic

	Minimum	Maximum	Mean	Median	Variance	Stdev	Skewness
BTC	-0.372	0.253	0.002	0.001	0.002	0.045	-0.178
ETH	-0.424	0.265	0.000	-0.001	0.003	0.055	-0.43
THT	-0.025	0.035	0.000	0.000	0.000	0.004	0.699
IDN	-0.066	0.102	0.000	0.001	0.000	0.011	0.015
IND	-0.132	0.09	0.001	0.001	0.000	0.013	-1.617
VNM	-0.067	0.048	0.000	0.001	0.000	0.013	-1.176
CHN	-0.107	0.06	0.000	0.001	0.000	0.014	-0.585
SGP	-0.074	0.058	0.000	0.000	0.000	0.009	-0.946
JPN	-0.061	0.071	0.000	0.000	0.000	0.012	-0.246
GBR	-0.109	0.091	0.000	0.001	0.000	0.012	-1.016
DEU	-0.122	0.125	0.000	0.001	0.000	0.015	0.182

Table 2. Historical Volatility Descriptive Statistic

	Minimum	Maximum	Mean	Median	Variance	Stdev	Skewness
BTC	0.040	3.600	0.546	0.470	0.128	0.358	2.510
ETH	0.050	4.340	0.704	0.620	0.178	0.422	2.601
THT	0.000	0.280	0.023	0.010	0.001	0.037	2.983
IDN	0.000	0.900	0.113	0.090	0.007	0.086	3.071
IND	0.010	1.320	0.123	0.100	0.013	0.113	4.797
VNM	0.000	0.620	0.131	0.100	0.010	0.100	1.877
CHN	0.000	0.700	0.145	0.130	0.008	0.091	1.632
SGP	0.010	0.880	0.099	0.080	0.006	0.078	4.157
JPN	0.000	0.810	0.134	0.120	0.008	0.090	1.951
GBR	0.000	0.930	0.116	0.090	0.009	0.097	3.449
DEU	0.000	0.950	0.138	0.110	0.012	0.110	2.848
B10.IDN	0.000	0.390	0.078	0.060	0.004	0.061	1.676
B10.IND	0.000	0.310	0.075	0.060	0.003	0.054	1.536
B10.VNM	0.000	1.130	0.130	0.090	0.020	0.141	2.527
B10.CHN	0.000	0.490	0.076	0.060	0.003	0.054	2.434
B10.SGP	0.010	2.150	0.230	0.180	0.039	0.196	3.704
B10.JPN	0.000	34.440	3.253	1.770	19.007	4.360	3.200
B10.GBR	0.010	5.560	0.781	0.540	0.518	0.720	2.369
B10.DEU	0.000	16.850	1.509	0.950	4.053	2.013	3.991
ER.IDN	0.000	0.370	0.036	0.030	0.001	0.036	3.729
ER.IND	0.000	0.190	0.042	0.040	0.001	0.026	1.758
ER.VNM	0.000	0.080	0.007	0.000	0.000	0.009	2.641
ER.CHN	0.000	0.130	0.029	0.030	0.000	0.020	1.359
ER.SGP	0.000	0.120	0.029	0.030	0.000	0.016	0.978
ER.JPN	0.000	0.420	0.048	0.040	0.001	0.034	3.892
ER.GBR	0.010	0.300	0.061	0.050	0.001	0.035	1.799
ER.DEU	0.000	0.180	0.049	0.050	0.001	0.025	1.261

Statistic descriptive point out that crypto is the most volatile asset where the standard deviation for return and historical volatility in each crypto asset (Bitcoin Return STD: 0.045, ETH Return STD: 0.055, and THT Return STD: 0.004) is higher than the highest of a stock index (DEU Return STD: 0.015 and DEU Volatility STD: 0.110), an exchange rate (ER IDN: 0.036), but lower than Japan bond yield (4.360). This is because, during the period of Covid19, Japan took an extraordinary monetary policy. An unbacked coin is visibly more volatile than a backed coin. This points to the mechanism of a backed coin, which was created to be more stable and pegs to other asset classes.

4.2. Pairwise Correlation and Rolling Window Correlation

We also conduct a graphical return analysis and rolling window pairwise correlation to get the initial views on the connection of return and volatility between each asset class. First, we conduct pairwise correlation at a snapshot point in time as follows:

Graphic 1. Return Pairwise Correlation
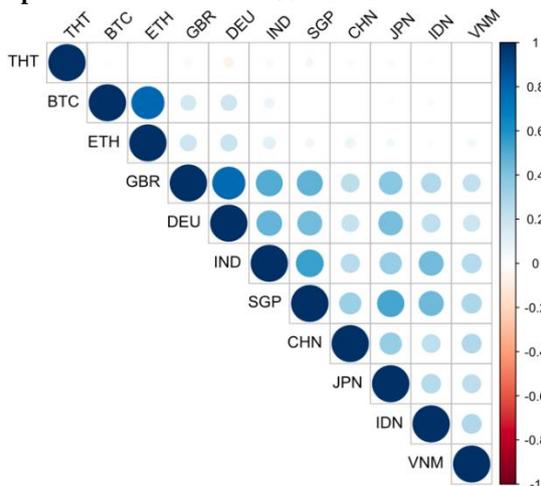
Graphic 2. Historical Volatility Pairwise Correlation
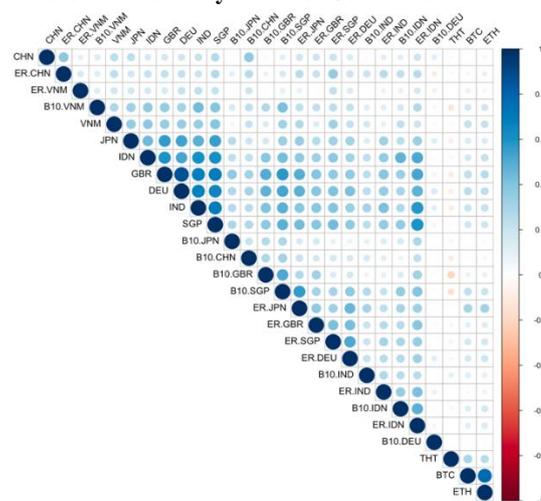
From the pairwise correlation on return, we know that unbacked crypto is positively correlated within its asset class, as shown by the correlation between ETH and Tether. At the same time, the backed coin is weakly correlated to other asset classes. Furthermore, as former research points out, regional connectedness between stock markets are strong where they are located in the same region, and developed market interconnectedness is more substantial than in advanced economies and emerging market (Yarovaya, L. *et al*., 2016). We understand that the stock market is strongly correlated with each other than with different asset classes such as UK – Netherlands, Singapore – Japan, and Indonesia – Singapore.

In the historical volatility, we found the same relationship, with some interesting new findings, that is, the negative correlation between stablecoin tether to 10-year yield bond UK. This relationship might explain by the US dollar acting as the proxy, where the tether is pegged to the US dollar, and the movement of 10 Year bond Yield UK is connected to the movement of the US dollar.

Additionally, we want to unearth return's bidirectional relationship between crypto assets and stock markets. We produce a return (Graphic. 3) and rolling window pairwise correlation (Graphic. 4) for each asset:

Graphic 3. Return Comparison for each asset class
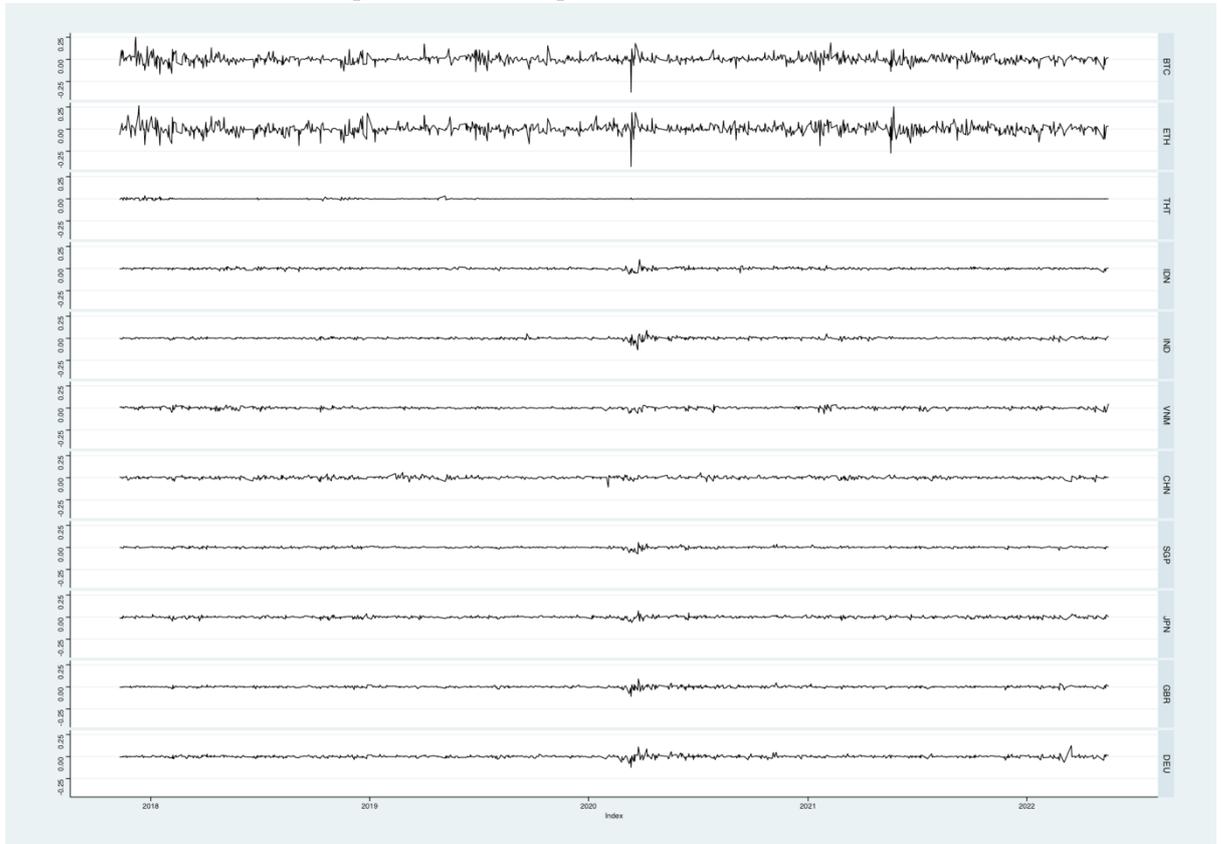
Graphic 4. Pairwise Correlation Return Comparison for Bitcoin and Stock Index
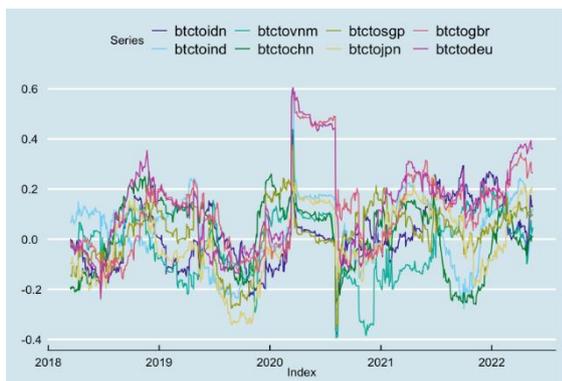
Graphic 5. Pairwise Correlation Return Comparison for Ethereum and Stock Index
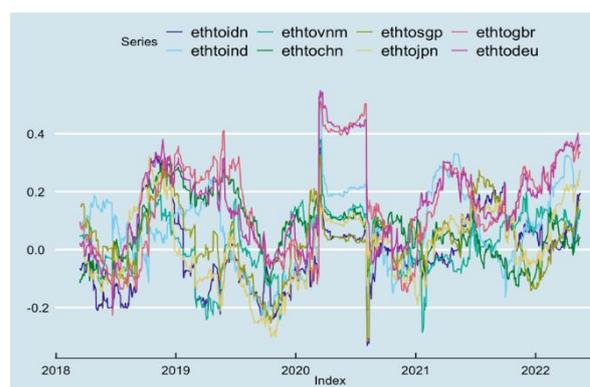
Graphic 6. Pairwise Correlation Return Comparison for Tether and Stock Index
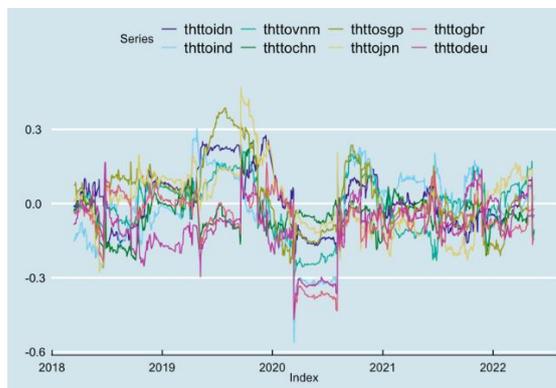
In the covid period, Graph 3 points out that return volatility between the crypto asset class and stock markets increased. Researchers argue that in times of crisis, returns of different asset classes tend to converge (Yarovaya L. *et al*., 2016). This feature is important because if investors use the crypto asset as a hedging tool for their portfolio, the hedging function will backfire, caused by the return converge effect. Moreover, this means that crypto assets and stock markets are exposed to identical systemic risk in the pressured macroeconomic scenario.

To verify this further, we used a rolling window with 80 burns-in periods (3 months) to track the correlation dynamic of the crypto asset and stock markets. Graphs 4, 5, and 6 show an extreme swing from a negative to a positive correlation. This means it's almost impossible to use crypto as a diversifying investment because of the erratic correlation with the stock markets. Unbacked coins such as Bitcoin and Ethereum reach the peak of positive correlation during the crisis period. However, in the same period, a stablecoin does the opposite when it reaches the lowest negative correlation. This indicates stablecoin might be a better-diversifying portfolio in a crisis period. This support the intended creation of a stablecoin.

4.3. DY Directional Spillover Result

We produce DY spillover result for return and volatility as follow:

Table 3. DY Directional Spillover Return

To/From	BTC	ETH	THT	Subtotal Crypto	IDN	IND	VNM	CHN	Subtotal Emerging Market (Excluding Own)	SGP	JPN	GBR	DEU	Subtotal Advanced Countries (Excluding Own)
BTC	57.43	35.28	1.09	36.37	0.82	0.85	0.13	0.16	1.96	0.42	0.09	1.83	1.92	4.26
ETH	35.3	55.69	0.46	35.76	1.1	0.9	0.52	0.33	2.85	0.47	0.37	2.41	2.45	5.7
THT	0.21	0.73	95.66	0.94	0.11	0.29	0.51	0.19	1.1	0.44	0.4	0.7	0.77	2.31
Subtotal Crypto (Excluding Own)	**35.51**	**36.01**	**1.55**	**73.07**	**2.02**	**2.04**	**1.16**	**0.68**	**5.9**	**1.33**	**0.86**	**4.94**	**5.13**	**12.26**
IDN	0.51	0.32	0.09	0.93	53.97	9.46	3.34	2.63	15.43	9.84	3.94	8.6	7.3	29.68
IND	0.6	0.66	0.09	1.35	7.84	44.69	3.27	2.37	13.48	11.96	4.95	12.59	10.98	40.48
VNM	0.45	0.45	0.69	1.59	5.2	5.88	63.11	4.16	15.24	4.79	3.42	6.18	5.66	20.05
CHN	1.19	0.87	0.28	2.35	2.73	3.69	4.36	64.93	10.78	5.97	6.29	4.98	4.72	21.96
Subtotal Emerging Market (Excluding Own)	**2.75**	**2.3**	**1.15**	**6.22**	**15.77**	**19.03**	**10.97**	**9.16**	**54.93**	**32.56**	**18.6**	**32.35**	**28.66**	**112.17**
SGP	0.97	0.63	0.19	1.79	7.53	10.84	2.6	3.66	24.63	39.21	9.55	12.86	11.96	34.37
JPN	1.67	1.24	0.2	3.12	2.37	5.12	2.74	4.6	14.83	11.2	46.17	10.86	13.82	35.88
GBR	1.25	1.33	0.21	2.79	4.57	10.84	2.84	2.27	20.52	9.14	6.76	38.25	22.54	38.44
DEU	1.64	1.63	0.3	3.57	3.1	9.32	2.35	1.67	16.44	8.17	7.92	24.17	39.74	40.26
Subtotal Advanced Countries (Excluding Own)	**5.53**	**4.83**	**0.9**	**11.27**	**17.57**	**36.12**	**10.53**	**12.2**	**76.42**	**28.51**	**24.23**	**47.89**	**48.32**	**148.95**

The spillover result on return points out that crypto asset gives more spillover to their own asset class (73,07 – excluding own) than the stock asset class (17,49 – excluding own). This means most of the crypto return spillover power is isolated. The behavior is replicated in the stock markets, where individual stock also gives higher spillover to its own asset class. For the advanced economies and emerging markets, advanced countries are the net return spillover giver to the emerging market (35.75 – excluding own). Furthermore, stock markets influence the crypto market as the net giver of spillover (0.67).

Inside the stock market asset class, the emerging market is the net spillover receiver (0.32), and advanced countries are the net spillover giver (6.73). In addition, GBR – DEU is pair of stock markets with the highest magnitude of spillover (GBR to DEU (24.17) and DEU to GBR (22.54).

Table 4. DY Spillover Volatility

To/From	BTC	ETH	THT	Subtotal	IDN	IND	VNM	CHN	Subtotal Stock Emerging Market (Excluding Own)	SGP	JPN	GBR	DEU	Subtotal Stock Advanced Countries (Excluding Own)	B10.IDN	B10.IND	B10.VNM	B10.CHN	Subtotal Bond Yield Emerging Market (Excluding Own)	B10.SGP	B10.JPN	B10.GBR	B10.DEU	Subtotal Bond Yield Advanced Countries (Excluding Own)	ER.IDN	ER.IND	ER.VNM	ER.CHN	Subtotal Exchange Rate Emerging Market (Excluding Own)	ER.SGP	ER.JPN	ER.GBR	ER.DEU	Subtotal Stock Advanced Countries (Excluding Own)
BTC	48.56	26.35	4.47	30.82	1.05	0.22	1.22	0.11	2.6	0.76	0.44	0.95	1.27	3.42	1.1	0.21	1.38	1.1	2.92	5.44	0.3	0.7	0.29	6.73	0.27	0.55	0.04	0.46	1.32	0.52	2.35	0.11	0.65	3.63
ETH	24.93	49.6	3.43	28.36	2.04	0.32	1.27	0.05	3.68	0.87	0.87	1.12	1.23	4.09	1.73	0.19	1.27	1.05	4.24	4.06	0.06	0.34	0.31	4.77	0.39	0.11	0.12	0.52	1.14	0.46	2.52	0.05	1.07	4.1
THT	0.36	2.06	92.3	2.42	0.4	0.09	0.17	0.05	0.71	0.07	0.1	0.08	0.21	0.46	0.81	0.12	0.44	0.03	1.4	0.1	0.02	0.14	0.12	0.38	0.14	0.39	0.17	0.49	1.19	0.4	0.16	0.44	0.13	1.13
Subtotal Crypto (Excluding Own)	25.29	28.41	7.9	61.6	3.49	0.63	2.66	0.22	7	1.7	1.42	2.15	2.7	7.97	3.63	0.53	3.09	1.31	8.56	9.59	0.39	1.18	0.71	11.87	0.81	1.05	0.33	1.48	3.67	1.38	5.04	0.59	1.85	8.86
IDN	0.45	1.26	0.08	1.79	41.92	4.89	3.12	1.33	9.34	7.38	1.98	5.44	3.63	18.43	4.83	0.58	1.29	0.84	2.71	2.84	0.24	1.73	0.35	5.16	6.98	1.62	0.34	0.42	2.38	0.98	2.09	1.73	1.66	6.46
IND	0.64	0.94	0.16	1.75	6.76	31.46	2.1	1.66	10.52	6.76	0.8	5.42	4.53	17.51	2.56	1.53	1.52	1.16	5.24	8.74	0.15	1.41	1.08	11.38	6.93	1.9	1.37	0.45	8.75	0.67	4.6	2.32	2.37	9.96
VNM	0.32	0.47	0.21	0.99	3.13	0.88	64.51	2.35	6.36	3.27	1.55	2.02	2.87	9.71	1.54	0.92	1.3	0.37	2.83	2.94	1.21	0.32	0.16	4.63	0.65	0.91	0.67	0.74	2.3	2.69	1.47	1	1.53	6.69
CHN	0.6	0.37	0.44	1.41	0.65	1.19	3.95	61.18	5.79	3.63	2.21	1.73	1.15	8.72	1.31	0.28	0.29	0.08	1.88	1.88	0.86	0.43	0.25	1.72	3.26	1.14	0.33	0.21	6.33	1.68	0.89	1.16	1.1	3.67
Subtotal Stock Emerging Market (Excluding Own)	2.01	3.04	0.89	5.94	10.54	6.96	9.17	5.34	26.67	21.04	6.54	14.61	12.18	54.37	10.24	3.31	4.4	8.45	17.95	15.38	2.03	3.71	3.31	24.43	15.7	4.76	2.59	7.94	23.05	5.23	9.32	6.15	6.08	26.78
SGP	0.36	0.53	0.1	0.99	4.67	4.99	2.87	2.8	15.33	36.18	2.57	6.54	5.66	14.77	3.29	0.36	1.66	1.43	6.74	4.39	0.07	1.6	0.9	2.57	6.8	0.56	0.5	0.99	8.85	0.9	4.67	2.31	2.3	9.28
JPN	0.25	0.19	0.19	0.64	1.87	3.47	2.97	2.35	10.66	8.07	43.91	7.43	7.18	22.68	1.31	0.6	0.87	1.15	3.94	3.29	0.87	0.17	1.29	4.75	2.69	1.34	0.48	0.42	4.93	1.61	1.8	0.99	3.22	5.82
GBR	1.09	1.22	0.15	2.46	4.31	4.68	2.2	1.27	12.46	7.24	2.51	28.28	17.27	27.02	1.97	0.76	0.86	1.91	5.5	5.75	0.26	3.38	0.62	6.63	3.95	1.55	0.38	0.39	6.27	0.63	4.75	1.21	1.41	6.79
DEU	1.04	1	0.04	2.08	2.76	5.09	2.35	1	11.2	5.98	1.61	19.05	31.24	26.64	1.72	0.66	0.67	1.6	4.65	4.72	0.04	2.82	1.68	7.58	2.55	1.17	0.67	0.25	4.64	1.27	5.34	1.32	2.38	7.93
Subtotal Stock Advanced Countries	2.74	2.94	0.48	6.17	13.61	18.23	10.39	7.42	49.65	21.29	6.69	33.02	30.11	91.11	8.3	2.38	4.06	6.09	20.83	18.15	1.24	7.97	4.49	31.85	15.99	4.62	2.03	2.05	24.69	4.41	16.56	5.83	9.31	36.11
B10.IDN	0.24	0.63	0.44	1.31	6.4	0.87	1.38	0.77	9.42	3.52	0.24	1.65	1.05	6.46	59.45	1.01	0.19	0.41	61.06	1.17	0.19	0.27	0.28	1.91	10.51	2.57	0.19	0.98	14.25	1.16	2.12	1.07	1.22	5.57
B10.IND	0.34	0.23	0.39	0.96	1.87	1.81	1.33	0.6	5.61	0.58	0.26	1.74	1.44	4.02	3.16	66.9	0.5	2.67	73.23	2.86	0.48	0.49	0.51	4.34	1.7	2.42	0.15	0.73	5	0.58	3.92	1.27	1.06	6.83
B10.VNM	0.28	0.17	0.59	1.04	1.3	5.1	2.11	1.02	9.53	2.4	1.1	0.29	0.49	4.28	0.74	0.41	68.16	2.4	71.71	7.3	0.49	0.56	0.18	8.53	1.12	0.23	0.35	0.8	2.5	0.57	0.63	0.49	0.73	2.42
B10.CHN	0.45	0.22	0.16	0.82	1.05	0.2	2.46	6.19	9.9	1.6	0.53	3.48	3.58	9.19	0.32	0.47	1.06	65.23	67.08	2	0.37	1.76	0.45	4.58	1.05	0.27	0.63	3.59	5.54	0.32	0.87	1.04	0.66	2.89
Subtotal Bond Yield Emerging Market	1.31	1.25	1.58	4.13	10.62	7.98	7.28	8.58	34.46	8.1	2.13	7.16	6.56	23.95	4.22	1.89	1.75	5.48	13.34	13.33	1.53	3.08	1.42	19.36	14.38	5.49	1.32	6.1	27.29	2.63	7.54	3.87	3.67	17.71
B10.SGP	0.85	0.17	0.36	1.37	3.66	1.17	1.93	1.13	7.89	1.94	0.34	6.05	3.74	12.53	6.54	0.82	3.05	3.17	13.58	45.38	0.39	4.48	0.29	50.54	1.67	0.61	0.17	0.28	2.73	0.38	8.81	0.52	1.68	11.39
B10.JPN	0.59	0.53	0.06	1.19	0.77	0.67	0.24	0.06	1.74	2.15	0.87	3.4	2.17	8.59	1.09	0.56	1.25	4.9	7.8	0.89	71.97	2.88	0.1	75.84	1.77	0.13	0.04	0.33	2.27	0.32	1.66	0.35	0.24	2.57
B10.GBR	0.49	0.52	0.5	1.51	4.2	2.41	0.59	0.75	7.95	1.92	0.06	7.31	6.7	15.99	0.63	0.13	0.49	1.95	3.2	8.11	0.14	55.5	1.11	64.86	1.79	0.18	0.1	0.37	2.44	0.39	1.09	1.58	1.01	4.07
B10.DEU	0.34	0.14	0.03	0.52	0.47	1.69	0.16	0.55	2.87	0.61	0.26	1.09	0.61	2.57	0.38	0.26	0.07	0.27	0.98	1.57	0.08	0.89	86.51	89.05	0.17	0.48	0.13	0.47	1.25	0.43	1.43	0.13	0.79	2.78
Subtotal Bond Yield Advanced Countries	2.27	1.36	0.95	4.59	9.1	5.94	2.92	2.49	20.45	6.62	1.99	17.85	13.22	39.68	8.64	1.77	4.86	10.29	25.56	10.57	0.61	8.25	1.5	20.93	5.4	1.4	0.44	1.45	8.69	1.52	12.99	2.58	3.72	20.81
ER.IDN	0.34	0.49	0.04	0.88	3.69	4.85	0.55	1.59	10.68	5.23	0.34	3.7	2.04	11.31	6.72	0.39	0.52	1.57	9.2	3.21	0.56	1.73	0.59	6.09	47.19	2.99	0.55	0.97	51.7	0.75	3.57	3.81	2.02	10.15
ER.IND	0.66	0.32	0.27	1.25	2.26	6.76	0.26	0.81	10.09	2.9	1.01	4.06	2.52	10.49	2.72	2.06	0.34	0.39	5.51	1.12	0.33	0.4	0.42	2.27	6.98	52.08	0.11	2.59	61.76	3.32	1.43	2.25	1.63	8.63
ER.VNM	0.1	0.14	0.05	0.29	0.52	0.4	1.74	0.47	3.13	1.43	0.29	0.22	0.84	2.78	0.35	0.48	0.12	1.85	2.8	1.26	0.32	0.58	0.41	2.57	0.21	0.4	84.38	0.66	85.65	1.29	0.38	0.44	0.68	2.79
ER.CHN	0.4	0.46	0.7	1.57	1.07	1.04	2.99	6.65	11.75	1.95	0.49	2.35	2.34	7.13	1.61	0.74	0.44	3.75	6.54	1.47	0.78	0.36	0.47	3.08	3.15	1.52	0.75	52.72	5.42	4.22	3.05	2.5	1.98	11.75
Subtotal Exchange Rate Emerging	1.5	1.41	1.06	3.99	7.54	13.05	5.54	9.52	35.65	11.51	2.13	10.33	7.74	31.71	11.4	3.67	1.42	7.56	24.05	7.06	1.99	3.07	1.89	14.01	10.34	4.91	1.41	4.22	20.88	9.58	8.43	9	6.31	33.32
ER.SGP	1.03	1.08	0.1	2.21	2.17	2.54	2.05	1.53	8.29	4.14	0.76	2.78	4.1	11.78	2.15	0.6	1.14	0.65	4.54	1.32	0.06	0.73	0.64	2.75	2.85	2	0.87	3.06	8.78	43.94	2.78	5.61	9.31	61.64
ER.JPN	0.88	1	0.09	1.97	2.74	0.51	2.2	1.15	6.6	2.14	1.17	4.41	3.75	11.47	3.75	1.63	0.53	1.9	7.81	7.42	0.51	1.07	0.48	9.48	1.6	0.46	0.37	1.03	3.46	1.7	50.89	2.25	4.35	59.19
ER.GBR	0.18	0.73	0.34	1.26	1.1	2.18	0.36	1.87	5.51	2.25	0.6	3.68	3.17	9.7	1.51	0.76	0.65	1.13	4.05	2.21	0.34	3.81	0.51	6.87	2.02	1.17	0.06	1.05	4.3	6.63	4.8	50.62	6.27	68.32
ER.DEU	0.63	0.9	0.18	1.71	1.86	1.53	1.69	0.67	5.75	2.33	1.27	3.75	3.95	11.3	2.69	1.51	1.06	0.87	6.13	1.81	0.17	0.57	1.61	4.16	1.79	1.37	0.6	0.85	4.61	8	6.55	6.2	45.58	66.33
Subtotal Exchange Rate Advanced	2.72	3.71	0.71	7.15	7.87	6.76	6.3	5.22	26.15	10.86	3.8	14.62	14.97	44.25	10.1	4.5	3.38	4.55	22.53	12.76	1.08	6.18	3.24	23.26	8.26	5	1.9	5.99	21.15	16.33	14.13	14.06	19.93	64.45

The volatility spillover result points out that crypto volatility is more connected to the stock market (12.11) than other asset classes, such as Bond Yield (8.72) and Exchange Rate (11.14). Furthermore, the directional spillover from crypto asset to the emerging market is lower than in the advanced countries (Stock Emerging Market: 5.94, Stock Advanced Countries: 6.17, Bond Yield Emerging Market: 4.13, Bond Yield Advanced Countries: 4.59, Exchange Rate Emerging Market: 3.99 and Exchange Rate Advanced Countries: 7.15).

Here, crypto asset act as a net receiver of the spillover from the traditional financial system (Stock Market, Bond Yield, and Exchange Rate). In addition, for unbacked coins, their own class directional spillover is significantly higher than those given to other asset classes (BTC to ETH 24.93 and ETH to BTC 26.35).

4.4 Girvan-Newman Algorithm

We build the Girvan-Newman algorithm based on the pairwise correlation of each asset class. The study focuses on the volatility cross-correlation to draw the volatility network, with the pairwise correlation value shown in Graphic 2. We use a 0.4 absolute correlation value as a threshold of connection between each individual asset.

ISLAMIC LAWS, OWNERSHIP STRUCTURE AND CORPORATE RISK-TAKING: EVIDENCE FROM INDONESIA

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ABSTRACT

This research mainly discusses the influence of Islam and ownership structure on the degree of corporate risk-taking. It conducts empirical analysis using Indonesian-listed companies from 2011 to 2019 as a sample. The empirical results find that Islam significantly negatively impacts the degree of risk-taking, showing that managers who follow Islamic teachings tend to lower the degree of risk-taking. In addition, after considering the ownership structure, the higher the shareholding ratio of legal persons in companies that comply with Shariah, the higher the degree of risk-taking, indicating that the performance orientation of institutional investors can adjust the conservative thinking of the doctrine; however, in terms of insider shareholding, compliance In a doctrinal company, the higher the shareholding of insiders, the higher the degree of risk taking. This research contributes to how religious beliefs affect the operation of company managers and management practices in emerging markets.

Keywords: Islamic law, ownership structure, risk-taking, institutional ownership, insider ownership, Indonesia.

1. INTRODUCTION

The majority of past studies on religions focus on Protestantism, Christianity, or Buddhism. There is a lack of research on Islam, the world's third-largest religion. More than ¼ of the world's population is Muslim. Islamic finance has experienced rapid growth and evolution in the global financial market.

The principles of Islamic finance are based on the teachings of the Koreans and the social life of Muslims. Islamic finance is a collective term for Shariah-compliant (i.e., halal) financial transactions. Islam prohibits Muslims from a number of activities, which restricts the types of investments they are allowed to participate in. To be specific, Islam forbids excess risk-taking (gharar), gambling (maysir), risk transferring instead of risk sharing, investing in immoral businesses (e.g., businesses related to alcohol and sex establishments), improper or unsubstantiated economic assets or activities, and receipt or payment of interests (riba). These rules constitute the main principles of Islamic finance. In fact, these principles mean Muslims are prohibited from involvement in uncertain or excess risks, risk transfers, or speculation via

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derivatives (e.g., credit default swaps). Regular loans (e.g., regular bonds and bonds) cannot be issued or accepted either. These seemingly stringent rules restrict the perspectives and decision-making of insiders about investment behaviors.

The uniqueness of Islamic finance is the prohibition of the collection of interests, nominal or excess. To comply with Sharia, investments cannot involve interests (riba). Islamic finance has a powerful financial network of institutions around the world. For example, the Dow Jones Islamic Market Index tracks nearly 600 Sharia-compliant companies (Naz et al., 2017). However, how Islam affects the financial markets and corporate behaviors is yet to be sufficiently studied and discussed. Mollah et al. (2017) examine how the differences between Islamic and traditional banks in corporate governance mechanisms influence the degrees of corporate risk taking and performance. The study indicates significant differences in the corporate governance mechanism between Islamic banks and traditional banks, and such differences play an important role in the degree of risk taking and financial performance. Imamah et al. (2019) sample the Indonesian market to explore the influence of Islamic law, corporate governance, and growth opportunities on dividend policies. The results suggest that Shariah-compliant companies report higher dividend payouts. Institutional investors, as a corporate governance mechanism, exhibit powerful supervisory effects on the dividend payouts of high-growth companies. This shows the profound influence of Islam on corporate insiders.

How religions affect managers' behaviors has been widely discussed. It has been proved that religions affect economic choices and outcomes in different contexts. In particular, managers' honesty, risk aversion, and attitude are deeply influenced by religious norms, as avoiding behaviors and principles prohibited by religious groups can avoid punishments in the afterlife. Dyreng et al. (2012) refer to the level of religious beliefs at the headquarters of U.S. companies as a proxy for religious and social norms. The results show that a high level of religious beliefs correlates with a low incidence of financial statement restatements and a low risk of distortion. This indicates the influence of religious and social norms on corporate financial reporting. Mazar et al. (2008) also suggest that the honesty and attitude of managers affect the insiders' choice of accruals. When surrounded by people of religious beliefs, managers are likely to interact more with religious figures. Such interactions constrain and guide insiders, and as a result, the deviation of accruals about economic performances is smaller.

To comply with Shariah, companies must meet all of the following requirements: revenues from immoral commercial activities less than 5% of the total revenues; the market value of debt to equity (24-month average) smaller than 33%, accounts receivable to the equity market value (24-month average), smaller than 49%; and cash to equity market value (24-month average) smaller than 33%. These capital constraints on Islamic companies result in various judgments and decisions on risks and investment opportunities. The financial restrictions lead to relatively low debt obligation ratios among Shariah-compliant companies (Adamsson et al., 2014; Hayat and Hassan, 2017). Hence, one of this paper's research objectives is to examine whether the risk attitude chosen by the management of Shariah-compliant companies should be different from that of non-Shariah-compliant companies, given

the capital source limitations.

Meanwhile, literature shows that religion may not necessarily be a good corporate governance mechanism. In particular, the Islamic restrictions on debt financing undermine the effectiveness of debt as a governance mechanism (Hayat and Hassan, 2017). Yermack (1997) also notices that debt is an alternative to corporate governance. Good corporate governance is often accompanied by higher leverage. Similarly, Jiraporn & Liu (2008) suggest that companies with weaker governance reduce debt levels. Both studies show that entrenched insiders avoid debts to evade the likelihood of being controlled. Hence, explicit corporate governance plays an important role to corporate insiders.

There is extensive literature on the relationship between ownership structures and corporate risk taking (Berle 1932; Monsen et al., 1965; Jiambalvo et al., 2002). Due to the asymmetry between the degree of risk taking and the level of returns, the separation of ownership and management results in a misalignment between the interest of institutional investors and insiders. Such asymmetry is a stronger incentive to institutional investors than to insiders. To ensure un-diversifiable human capital within the company, insiders invest in less risky projects. In contrast, institutional investors prefer risky projects to maximize the call option value embedded in equity. Therefore, the attitudes toward risks from insiders and institutional investors determine the number of profits available to a company. However, when human behaviors are subject to the influence of religions, can the attitude towards risk become a validatable empirical issue as assumed by the agency theory? This paper refers to Islam as the case for validation by examining how Islamic teachings and ownership structures influence a company's degree and risk-taking behavior. This will enable a deeper understanding of how religions and ownership structures impact the decision-making and judgment of insiders and institutional investors. This paper researches the influence of shareholdings by institutional investors and shareholdings by insiders as ownership structures on company management.

In practice, institutional investors are better at using current information than non-institutional investors to make better predictions about future earnings (Jiambalvo et al., 2002). The research by Jensen & Meckling (1976) on ownership structures posits that the principal-agent problem can only be resolved with the interest of directors aligned with the interest of external shareholders. This can be achieved by increasing the stakes held by insiders (Jensen and Meckling, 1976). This is why many listed companies today issue stock options, discount shares, and free shares to directors as part of the performance-linked remuneration program. Han & Suk (1998) also provide new evidence in support of the above arguments (Han and Suk, 1998). They notice a positive correlation between share returns and ownership by insiders and institutional investors. The former is due to the alignment of directors and the interest of external shareholders. The latter is a result of the growing influence of institutional shareholders on corporate management. Moreover, studies indicate that if institutional investors can ensure effective oversight, it will boost firm values and counter entrenched insiders more effectively. Therefore, this paper's second and third research objective is to examine the influence of institutional shareholdings and insiders' shareholdings, respectively, on the degree of risk taking.

In Asia, Muslims are in Indonesia, Malaysia, Singapore, the Philippines, and India.

Indonesia is not only the largest Islamic country in Asia but also the country with the largest Islamic population in the world. Prior studies on listed companies in Indonesia include validating earnings management by Indonesian listed companies (Siregar and Utama, 2008). However, studies are scarce on how Islam influences the risk attitude of insiders in Indonesian companies. This is how the research topics of this paper came about. With abundant growth opportunities ahead of Indonesian companies over the next few years, insiders' risk-taking and attitude will affect company growth and decline. Therefore, this paper examines how Islam and ownership structures influence the risk attitude of insiders. In sum, the contributions of this paper are as follows:

For a long time, economists and sociologists have recorded the strong impact of religious beliefs on wider social behaviors. Financial researchers also record the overall influence of religious beliefs on government performances, creditors' protection, and economic growth (La Porta et al., 1999; Stulz and Williamson, 2003; Guiso et al., 2003). Past studies also show that religious beliefs influence the degrees of risk taking, such as a higher portfolio concentration, higher portfolio turnovers, more aggressive short-term trading, and more competitive risk transfers (Shu et al., 2012). However, previous studies are mostly on Catholicism, Christianity, and Buddhism. There is limited literature on Islam, the world's third-largest religion. Islamic teachings are deeply ingrained in all aspects of Muslim life. It also affects the behavior and the decision-making of insiders. Through the research conducted by this study on how Islamic teachings influence the risk attitude of insiders, a better understanding of how corporate functioning in the Islamic world impacts shareholder value can be established.

The agency theory emphasizes that separating ownership and management diverges institutional shareholders' and insiders' interests. To maximize the value of equity, institutional investors prefer risky projects. However, insiders invest in less risky projects to protect the un-diversifiable human capital. Meanwhile, people's risk attitudes are also greatly influenced by religion. When religions influence human behaviors, can the attitude towards risk become a validatable empirical issue as assumed by the agency theory? This paper refers to Islam as the case for validation by examining how Islamic teachings and ownership structures influence a company's degree and risk-taking behavior. This will enable a deeper understanding of how religions and ownership structures impact the decision-making and judgment of insiders and institutional investors.

Prior studies of the influence on the degrees of risk taking by insiders are mostly about the influence of remunerations of insiders. For example, Holmstrom & Costa (1986) examine the relationship between the remunerations of insiders and the degrees of risk taking. The results indicate that boards can use distributed remunerations to incentify insiders to take greater risks and seek higher profits (Holmstrom and Costa, 1986). Nonetheless, there is extensive literature addressing the impact of cultures and religions on the degrees of risk taking by insiders. Mihet (2013) suggests that cultures have different influences on the degrees of corporate risk taking. He samples data from 50,000 companies in total from 51 countries to research the influence of uncertainty aversion and individualism levels on the degrees of risk taking. The results indicate that the higher the uncertainty aversion in the corporate culture, the stronger the inclination to assume low risks. The lower the level of individualism, the lower

the inclination to assume risks. Meanwhile, corporate cultures are rigid. The cultures in most companies have stayed the same after the global financial crisis (Fahlenbrach et al., 2012). Religions are an important variable that influences corporate cultures.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Iannaccone (1998) studies the relationship between religious beliefs and risk attitudes and identifies a positive correlation between religious beliefs and risk avoidance (Iannaccone, 1998). Muslims conduct financial transactions by following the Islamic teachings, i.e., Shariah derived from the Koran, and adhere to the legal principles in Islam about the promotion of intellectual properties, sharing of profits and risks, and the sacredness of contracts (Zaher and Hassan, 2001). Islam prohibits profiteering and usury. All these show that Islamic views about risks differ from other religions.

This paper argues that Shariah-compliant companies abide by the legal principles about the promotion of intellectual properties, sharing of profits and risks, and the sacredness of contracts and have a relatively low degree of risk taking. Meanwhile, the Islamic restrictions on debt financing also constrain the company's risk-taking capability. Studies have been conducted on the influence of ownership structures on the degrees of risk taking (Moin et al., 2020). For instance, Jensen (1986) points out that ownership diversion results in low efficiency. Hence, ownership concentration and major shareholders can mitigate agency costs and resolve free-rider and low-efficiency problem (Korczak and Goldstein, 2009). Shleifer & Vishny (1986) contend that major shareholders have sufficient motivation and resources to collect information, control the personnel in the company, and perform contracts. This enhances firm values and reduces risks due to changes in management decisions. However, Demsetz & Lehn (1985) posit no relation between ownership concentration and efficien. It also incurs a lot of expenses. For example, when these shareholders control strategies and decisions, it may reduce investments in profitable projects (Demsetz and Lehn, 1985). In addition, the issuance of cash dividends may put shareholders into bearing the costs of other stakeholders (e.g., creditors) and increase risks.

In business management practice worldwide, major shareholders are a frequently seen type of investor (Morck, 1988). Significant shareholdings mean significant influence on a company's financial decisions. Major shareholders can dictate the nature of a company's degree of risk taking and thus influence its competitiveness and ultimate survival (Wright et al., 1996). The agency theory emphasizes that agency problems arise from the separation of ownership and management (Fama and Jensen, 1983a; Fama and jensen, 1983b). This has a material impact on the company's operations and decisions. The agency problem means managers deviate from the fiduciary duty of maximizing shareholders' profits. At this point, ownership structures become an important corporate governance mechanism to mitigate agency problems. Bos & Donker (2004) indicate that an increase in ownership concentration is an effective corporate governance mechanism to supervise management's financial decision. The presence of major shareholders may keep the management's discretion in check. This urges insiders to adopt profitable strategies and disclose relevant and reliable information (Fan

and Wong, 2002). Therefore, this paper examines the ownership structure (i.e., institutional shareholdings and insiders' shareholdings) of listed companies in Indonesia in order to understand how the existence of major shareholders affects the degrees of corporate risk taking in the Shariah-compliant world.

Different shareholder structures have different influences on corporate strategies and risk attitudes. Demsetz (1983) suggests that ownership structures are an endogenous outcome of company decisions. Ownership structures reflect the influence of shareholders and the trading status of the stocks, as well as the perspectives of different shareholders on the company. The agency theory also suggests that ownership structures affect the degrees of corporate risk taking (Jensen and Meckling, 1976). Major shareholders have access to the operating cash flows and control and, based on profit maximization, collect information and monitor managers (Shleifer and Vishny, 1986; Grossman and Hart, 1980, Amihud and Lev, (1981). An increase in ownership incentivizes shareholders to boost corporate profits by adding risky projects. Major shareholders have wealth concentrated on a single company than those with diversified wealth. This prompts shareholders to force the company to undertake risky projects for profit maximization. However, John et al. (2008) argue that due to the importance of personal interest, major shareholders adopt reliable projects to ensure the interest is materialized. The incentives for large shareholders to implement risky projects expose a single company to greater risks. In sum, a large body of empirical evidence still needs to support the net effect of ownership structures on the degrees of risk taking. It also depends on the interest of ownership and the tradeoff of costs.

Previous studies have shown that compared to non-institutional investors. Institutional investors can use the current information more and make better predictions of future earnings [14]. According to the Economist's Roundtable Statement on Institutional Investors and Corporate. Governance (1999), an increase in institutional ownership provides strong incentives to proactively monitor and influence insiders' policies. El-Gazzar (1998) and Bhattacharya (2001) also indicate that compared to non-institutional investors, institutional investors have more wealth and resources to collect information [43][44]. They tend to use more expensive and valuable information to set earnings expectations. Jiambalvo et al. (2002) obtained evidence to support that institutional investors use non-earnings information to predict future earnings [14]. Balsam et al. (2002) notice that the market reaction to the action taken by experienced investors (institutional investors) occurs earlier than that of non-experienced investors [45]. They mention that experienced investors obtain more timely information from other sources. They also have the capability to decompose earnings into disposable and non-disposable elements. [46] points out that institutional ownership serves the supervisory function and urges insiders not to take actions detrimental to companies over the long run. Mitra (2002), Koh (2003), and Midiastuty & Machfoedz (2003) sample the Indonesian data and find that high institutional ownership constraints corporate earnings management [47][48][49]. However, Darmawati (2003) does not identify any significant relationship between earnings management and institutional investors. In sum, institutional investors are highly influential in corporate supervision and insiders' risk taking degrees [50].

In the Islamic world, where Muslims follow the Koran, earnings management comes with

higher religious consciousness, the information collected is relatively valuable, and institutional ownership serves even greater supervisory functions. This means investors are more influential in corporate supervision and the degrees of risk taking by insiders. Hence, this paper infers that the oversight from institutional investors reduces the insiders' adherence to Islamic teachings in shariah-compliant companies. This drives investors into greater risk taking. Meanwhile, insiders' shareholdings determine the amount of personal interest and affect the judgment and choice of decision-making (Yang and Wang, 2002). All else being equal, insiders choose to use corporate resources to pursue personal gains. This includes the embezzlement of corporate resources for personal benefits and the spending of shareholders' money. As corporate insiders are able to shift resources around before the distribution of cash flows, they are like bondholders in terms of the priority of payments. If the cash flows are running low, management's resource exploitation is particularly obvious. At this juncture, insiders will play safe and avoid risky projects that may increase shareholders' wealth. Only when the high cash flows expected from the investment outcome are sufficient to compensate for the transfer of interest at low cash flows will insiders implement risky projects. Jensen & Meckling (1976) and Hughes (1988) also suggest that if insiders' shareholdings are high, they should assume a greater portion of the loss of corporate wealth as a result of their authority and spending [15][51]. Hence, they are unlikely to attempt any damage to firm values. This forms the convergence of interest. In the Islamic world, where Muslims follow the Koran, insiders take extra care of corporate cash flows because they assume corporate wealth. Hence, it is inferred that in Shariah-compliant companies, the higher the insiders' shareholdings, the lower the degree of risk taking.

3. DATA AND METHODS

This paper samples the data of listed companies in Indonesia from 2011-2019 for empirical analysis. A total of 3,583 observations are obtained from the Indonesia Stock Exchange (IDX), annual reports, and DataStream. As the IDX began classifying Shariah-compliant companies in 2011, this paper defines the starting year as 2011. Meanwhile, this paper eliminates the financial-related industry and incomplete sample data. The elimination of incomplete data includes the removal of outliers and data without complete variables.

The operational variables used in this research are described in the following. Risk-Taking can be the rolling five-year standard deviation of return on assets (RISK). Shariah (ISSI) is a dummy variable set to 1 if the firm has Shariah stock and zero otherwise. Ownership (OWN) consists of institutional ownership and insider ownership. Institutional ownership (INSTITUTIONAL_SHARES) is the number of institutional ownership shares. Insider ownership (INSIDER_SHARES) is the number of insider ownership shares. M/B ratio can be the ratio of the market value of equity divided by the book value of equity. Leverage (LEV) can be the ratio of the book value of debt divided by the book value of total assets. Size is the natural log of total assets. Working Capital (WC) can be the current assets less current liabilities divided by total assets.

4. RESULTS

This paper samples the listed companies in Indonesia from 2011-2019 for empirical analysis. A total of 3,583 observations are sourced. The mean (median) of the degrees of risk taking (RISK) is 0.075 (0.034), with a standard deviation of 0.268. This shows a large variance in the degrees of risk taking among listed companies in Indonesia. The mean (median) among the Shariah-compliant (ISSI) is 0.703 (1.000), indicating that 70% of the listed companies follow Islamic teachings. The mean (median) of institutional shareholdings (INSTITUTIONAL_SHARE) is 0.639 (0.678), indicating about as high as 63.9% institutional ownership among listed companies in Indonesia. This highlights the important role of institutional investors in Indonesian listed companies. The mean (median) of insiders' shareholdings (INSIDER_SHARE) is 0.022 (0.000), indicating only 2.2% insider ownership. The mean (median of market-to-book ratios (MB) is 1814.464 (551.884). The mean (median) of financial leverage ratios (LEV) is 0.467 (0.469), suggesting an average debt ratio of 46.7% among listed companies in Indonesia. The mean (median) of firm sizes (SIZE) is 6.365 (6.361); the mean (median) of working capital (WC) is -0.132 (0.115). In correlation tests , all the coefficients are within ±0.6. This means the issue of multi-collinearity can be ignored. However, this result is a univariate analysis. As the effects of all variables are not included, a regression analysis on all variables will be conducted.

To further understand whether Shariah compliance affects the attribute variables of companies, this paper conducts T-tests and median tests on two sample groups. The purpose is to analyze whether the influence of Islamic teachings on company characteristics is statistically significant. The test results are shown in Table 4-3. According to Table 1, the mean (median) of the degrees of risk taking (RISK) is 0.050 (0.032) among the Shariah-compliant and 0.130 (0.042) among the non-Shariah-compliant. The tests on the variance of means and medians suggest statistical significance. This suggests lower degrees of risk taking among the Sharia-compliant compared to the non-Sharia-compliant. The mean (median) of the institutional shareholdings (INSTITUTIONAL_SHARE) is 0.640 (0.678) among the Sharia-compliant and 0.640 (0.675) among the non-Sharia-compliant. The test on the variance of means suggests statistical significance, but the test on the variance of medians shows statistical insignificance. In other words, the institutional shareholdings are higher in the Shariah-compliant companies than in the non-Shariah-compliant companies. The mean (median) of the insiders' shareholdings (INSIDER_SHARE) is 0.020 (0.000) among the Sharia-compliant companies and 0.020 (0.000) among the non-Sharia-compliant companies. Neither the test on the variance of means nor the test on the variance of medians shows statistical significance.

Table 1. T-Test and median test

This paper conducts a regression analysis on the panel data of listed companies in Indonesia in order to examine the influence of Islamic teachings and ownership structures on the degrees of corporate risk taking. Ownership structures include institutional shareholdings and insiders' shareholdings. The first step is to look at the influence of Islam on the degrees of risk taking. The empirical results are summarized in Model 1 of Table 2. The coefficient of the Shariah-compliant (ISSI) in Model 1 is -0.040, reaching a 1% significance level. Hence, H1 is supported that Sharia-compliant companies have lower degrees of risk taking. In other words, the conservative thinking in the Islamic teachings refrains companies from risk taking. Model 3 shows the influence of institutional shareholdings in Shariah-compliant companies on the degrees of risk taking. The coefficient of ISSI*INSTITUTIONAL_SHARES is positive (0.161, p=0.01), statistically significant at a 1% level. This shows that the higher the institutional shareholdings, the greater the degrees of risk taking among the Sharia-compliant companies. Hence, H2 is supported that the higher the institutional shareholdings, the greater degrees of risk taking among the Shariah-compliant companies. In other words, institutional shareholdings neutralize Islamic conservatism in corporate risk taking and prompt greater risk taking. Model 5 is on the interaction between Islamic teachings and insiders' shareholdings (ISSI*INSIDER SHARE). The coefficient is positive (0.235, p=0.05) and statistically significant. This shows the influence of the interaction between Islamic teachings and insiders' shareholdings on the degrees of risk taking. The higher the insiders' shareholdings, the greater the degrees of risk taking. Hence, H3 is not supported that the higher the insiders' shareholdings, the lower degrees of risk taking among the Sharia-compliant companies. This study suggests that the degrees of risk-taking remain high even with high insiders' shareholdings because of not-yet-developed corporate governance and poor management in Indonesian listed companies.

Table 2. Empirical results

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
C	1.456*** (11.738)	0.389*** (8.879)	1.527*** (12.429)	1.519*** (12.232)	0.373*** (8.882)
ISSI	-0.040*** (-3.417)	-0.075*** (-7.428)	-0.142*** (-5.791)	-0.041*** (-3.471)	-0.081*** (-7.592)
INSTITUTIONAL_SHARES		-0.032** (-2.059)	-0.053** (-2.010)		
ISSI*INSTITUTIONAL_SHARES			0.161*** (4.791)		
INSIDER_SHARE				-0.237*** (-2.647)	-0.264** (-2.383)
ISSI*INSIDER_SHARE					0.235* (1.836)
Control variables	Y	Y	Y	Y	Y
Firm effects	Y	Y	Y	Y	Y
Year effects	Y	Y	Y	Y	Y
Adjusted R-squared	0.475	0.052	0.430	0.425	0.052
F-statistic	8.081	13.090	6.707	6.517	12.176
Obs	3214	3116	3116	3060	3060

5. CONCLUSION

This paper primarily examines the influence of Islamic teachings and ownership structures on the degrees of risk taking. The listed companies in Indonesia are sampled for the empirical analysis. This paper refers to the literature and develops three hypotheses as follows. H1: The Shariah-compliant companies have lower degrees of risk taking. H2: The higher the institutional shareholdings, the greater degrees of risk taking among the Shariah-compliant companies. H3: The higher the insiders' shareholdings, the lower degrees of risk taking among the Sharia-compliant companies. The empirical results of this paper indicate a negative and significant influence of Islam on the degrees of risk taking. Hence, H1 is supported. In other words, Shariah-compliant insiders tend to reduce the degrees of risk taking. The empirical results of this paper also support H2 regarding the influence of ownership structures. The higher the institutional shareholdings, the greater the degrees of risk taking among the Shariah-compliant companies. This suggests that the performance orientation of institutional investors

can regulate the conservatism of Islamic teachings. The empirical results do not support H3 that the higher the insiders' shareholdings, the lower degrees of risk taking among the Shariah-compliant companies. This indicates that the management practices in developed countries may not always be able to explain how the Islam-dominated business system functions.

Based on the research findings, this paper develops the following suggestions for academic studies and practical operations. As far as academic studies are concerned, ownership structures are an important corporate governance mechanism, particularly in relation to the motivation for shareholdings. For example, the passive or active nature of investments affects the influence on corporate decisions. It is suggested that follow-up researchers may further divide ownership structures according to shareholding motivations. It will enhance the understanding of the role served by ownership structures in a world dominated by Islamic teachings. In practice, Shariah-compliant companies show lower degrees of risk taking. It is even more necessary for investors to understand the risk tolerance and return expectations involved. If investors pursue lower risks, the investment in Sharia-compliant companies may be taken into consideration. Whilst the returns are relatively low, it is suitable for conservative investors. However, the higher the institutional shareholdings, the greater the degrees of risk taking. It will be more attractive to active investors. Moreover, the empirical results of this paper contribute to the understanding of how religions influence insiders' decision-making. In other words, religious thinking is internalized in management's decision-making. The corporate governance mechanism serves a regulating role to bring managers toward rational decision-making. This means the religious beliefs of managers or companies must be taken into account in the investment decision-making process.

REFERENCE

MEASURING THE EFFECT OF INNOVATION AND ORGANIZATIONAL LEARNING ON THE FINANCIAL PERFORMANCE OF MSMES IN SURABAYA DURING THE COVID-19 PANDEMIC

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ABSTRACT

This study aims to analyze the effect of the Covid-19 pandemic on MSMEs seen from the influence of innovation and organizational learning in Surabaya. The variables of innovation and organizational learning are independent, and the dependent is the financial performance variable. In this study, the author wants to focus on MSMEs because MSMEs are a small business sector scattered in Surabaya. This research helps MSMEs survive that the influence of innovation and organizational learning can impact their business. MSMEs here use samples from various types of MSMEs in food, clothing, and others. The test uses a questionnaire and SPPS as an analytical tool by setting the Validity Test, Reliability Test, R-Square Test, t-Test, and F Test. The sample of MSMEs is 156, and the results show that innovation and organizational learning affect financial performance, where innovation has a significant value positive. In contrast, organizational learning has a negative significance. Sari & Sukmasari (2018) state that innovation and organizational learning are closely related to financial performance.

Keywords: Financial Performance, Innovation, and Organizational Learning.

1. INTRODUCTION

The majority of past studies on religions focus on Protestantism, Christianity, or Buddhism. There is a lack of research on Islam, the world's third-largest religion. More than ¼ of the world's population is Muslim. Islamic finance has experienced rapid growth and evolution in the global financial market. The Covid-19 pandemic has affected all aspects, not only the tourism, mining, and small industrial sectors such as MSMEs (Micro, Small, and Medium Enterprises), which are most severely affected. According to data from the Ministry of Cooperatives and Small and Medium Enterprises (Kemenkop UKM) in March 2021, the number of MSMEs in the country is 64.2 million, with a contribution of 61.07% more than 50%. For this reason, the authors are interested in conducting research related to MSMEs because the authors want to analyze whether MSMEs, which until now, persist in innovating

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and organizational learning during the Covid-19 pandemic or not. Because the sustainability of MSMEs in Indonesia greatly determines the fate of the Indonesian economy, and the authors want to know whether innovation and organizational learning affect the financial performance of MSMEs, this study is limited to MSMEs located in Surabaya because Surabaya is the second largest city in Indonesia. The majority its residents do small businesses to support their lives, and Surabaya is also a densely populated area consisting of immigrants from eastern Indonesia. Not many studies related to innovation, organizational learning, and financial performance, like previous research by Sari & Sukmasari (2018), about influences innovation, organizational learning, and performance. Research Garrido & Camarero (2010) said economic performance relates to technology, product innovation, and organizational learning. Zuo et al. (2019) stated that the significance of improving a company's financial performance, when viewed individually or as a whole, highlights the need to treat novelty and relevance as another dimension of innovation that impacts business performance. While Yeung et al. (2007) stated that organizational learning occurs when it is assessed by senior management and supported by an appropriate learning infrastructure and culture, which leads to organizational efficiency. But for manufacturers pursuing low-cost strategies and those producing mature products, the link between learning, innovation, and performance is unlikely. This is also in line with research Škerlavaj et al. (2007) showed that organizational learning culture has a direct positive impact on the three non-financial performance dimensions included in the model (performance of employees, customers, and suppliers). The difference between previous and current research is that this study uses a sample of MSMEs located in Surabaya.

This research was conducted to be useful for MSME actors and academics so they can understand and be literate about the changes that have occurred during the Covid-19 pandemic because the Covid-19 pandemic, which limits the space for movement and the existence of government programs related to PPKM (Enforcement of Restrictions). Community Activities), where each region is divided based on certain level zones, greatly limits the operations of MSME actors. For this reason, MSMEs made several breakthroughs in improving the company's financial performance. Innovations were carried out by the MSME industry players, where they sold online or collaborated with other parties. From the background and brief understanding of innovation, organizational learning, and financial performance, it can be concluded that the formulation of the problem that interests the author is whether innovation and organizational learning affect the financial performance of SMEs in Surabaya during the Covid-19 pandemic.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

According to Leskovar-Spacapan & Bastic (2007), innovation is done to improve the company's financial performance, in this case, to increase profits; the way is by developing products and ideas that are out of the box. Whereas. Meanwhile, according to Rogers (1995) innovation is an idea that is closely related to updates in terms of systems, products, and business processes. Usually, this comes from a certain person or group. Heimonen (2012) and Rosenbusch et al. (2011), industry players who are change-oriented to increase company

turnover are usually closely related to innovation. Organizational learning is always tied to innovation because these two things cannot be separated; usually, business actors whose businesses always make positive changes surely these businesses never get tired of doing positive learning for their business. According to Lewis (2002), organizational learning is something where companies continue to make changes and are thirsty for learning in any case for the company's strategic development in achieving company goals. Meanwhile, Mezias et al. (2001) argued that organizational learning is every organization that wants to achieve its goals comes from a collection of individual knowledge within the company.

Then this research is related to the financial performance of MSMEs to see whether these MSMEs can still perform optimally, which can be measured through finance. According to Aterido & Hallward-Driemeier (2007) that financial performance covers all aspects of the business and plays an important role as an indicator of company performance. Meanwhile, according to Sutejo & Silalahi (2021), financial performance is related to increasing MSME sales and indicates that MSMEs can still survive during the Covid-19 pandemic. Based on the understanding of the theory above, it is found that the development of a hypothesis does innovation and organizational learning affect the financial performance of MSMEs in Surabaya during the Covid-19 Pandemic?

3. DATA AND METHODS

The research was conducted using the questionnaire method, where the sample used in this study was 156 MSMEs located in Surabaya, whose data was obtained through the Surabaya Chamber of Commerce and Industry, and the selection of MSMEs was chosen randomly and from various MSMEs whose businesses are in the fields of food, clothing, services, and other products. The flow of this research is first by conducting deep interviews with ten representatives of MSMEs in Surabaya, where we provide sample questions to them, and they provide suggestions and criticisms of the questionnaire questions. This is done so that the questionnaire questions are not biased and get questionnaire questions whose validity can be depended on. Then aft continued to the second stage, where we revised the questionnaire questions and obtained about 18 questions representing each variable. Then in the third stage, the 18 questionnaires were carried out to 30 MSMEs in Surabaya. This was done to test the normality of the questionnaire. If the questionnaire passed the normality test, it would proceed to the next stage, but vice versa. If the questionnaire results were not normal, the questionnaire would be revised again. Afterward, proceed to distribute questionnaires to MSMEs in Surabaya using google forms and through visits to several MSMEs in Surabaya. Of the 450 MSMEs that received the questionnaire, we received 156 questionnaire feedback. Then the next step is to do an analysis test using SPSS software. In this, SPSS will be carried out Validity Test, Reliability Test, R-Square Test, t-Test, and F Test.

4. RESULTS

Based on research using SPSS, where from 156 samples of MSMEs in Surabaya whose questionnaires were distributed via a google form, the results obtained were 54% MSMEs aged 1-3 years, 31% MSMEs aged 5-10 years, while the remaining 15% MSMEs aged over ten years. Then from 156 samples of SMEs, 100% of them made sales using technology such as GOJEK, GRAB, and others because this was the criteria and selection of the UMKM sample. Then about 91% of the sample MSMEs are businesses built by themselves, and the remaining 9% are partnerships.

The analysis method in this study uses SPSS software, where stage 1 begins with a validity test, which tests a questionnaire question of 18 questions, whether valid or not, using Pearson correlation by comparing the Q-table with R-table, R-table with 18 questions, the result is 0.468 and with a significance value of 5%. The questionnaire data is declared valid if the Q-table value > R-table. If the Q-table value < R-table, then the questionnaire data is declared invalid, and the results of the 18 questionnaire questions are declared valid, which means that all the questions in this study have been valid and can represent every variable in the study.

Table 1. Validity Test Results

Q	Correlations	Qtabel	r-table	Result
Q1	Pearson Correlation	0,781	0,468	Valid
Q2	Pearson Correlation	0,694	0,468	Valid
Q3	Pearson Correlation	0,577	0,468	Valid
Q4	Pearson Correlation	0,571	0,468	Valid
Q5	Pearson Correlation	0,697	0,468	Valid
Q6	Pearson Correlation	0,908	0,468	Valid
Q7	Pearson Correlation	0,569	0,468	Valid
Q8	Pearson Correlation	0,541	0,468	Valid
Q9	Pearson Correlation	0,682	0,468	Valid
Q10	Pearson Correlation	0,760	0,468	Valid
Q11	Pearson Correlation	0,633	0,468	Valid
Q12	Pearson Correlation	0,552	0,468	Valid
Q13	Pearson Correlation	0,570	0,468	Valid
Q14	Pearson Correlation	0,533	0,468	Valid
Q15	Pearson Correlation	0,688	0,468	Valid
Q16	Pearson Correlation	0,976	0,468	Valid
Q17	Pearson Correlation	0,755	0,468	Valid
Q18	Pearson Correlation	0,882	0,468	Valid

From the validity test, it is continued to the reliability test, whereby testing this, this research is considered to be a consistent and precise measuring tool.

Table 2. Reliability Test Results

	N	%
Valid	156	100
Excluded	0	0
Total	156	100

Cronbach's Alpha	N of Items
0,891	18

Source: SPSS 25 processing results, 2020

The reliability test is carried out by using Cronbach's alpha method. This method is by looking at Cronbach's alpha value > 0.60, which means the questionnaire is free (reliable), and from the analysis results, Cronbach's alpha value is above 0.60, which is 0.891. Then after the results of the questionnaire analysis are declared valid and reliable, each variable in this study can be carried out with a square test. In this study, the variables of innovation, organizational learning, and financial performance resulted in a square value of 0.762 or 76.2%, which means that the variable of innovation, organization learning, on financial performance can be explained by 76.2%. Then the rest in this linear regression model can be explained by other variables of 23.8%.

Table 3. R-Square Test Results

Model	R	R-Square
1	0,987	0,762

Source: SPSS 25 processing results, 2020

After that, we did the F test to see if the research model used in this study was correct; if the model did not fit, there would be a biased error in the results.

Table 4. F Test Results

F	Sig
77.815	.001

Source: SPSS 25 processing results, 2020

The F test results obtained a significant value of 0.001 < alpha 0.005, which means that the model in the study used is a fit model because it is below the alpha value. And the results used in the fit model are more accurate and precise. Then, we did a t-test on each variable because this study wanted to see the effect of innovation and organizational learning on the financial performance of MSMEs.

Table 5. t Test Results

	B	t	Sig.
Constant	15.438	4.213	.002
IN	.866	5.803	.015
OL	1.881	6.771	.003

Source: SPSS 25 processing results, 2020

Based on the results of the t-test, all research results obtained a significant value below 0.05, which means that the independent variable influences the dependent variable. In the study of the influence of innovation variables on the financial performance of SMEs in Surabaya, the results obtained a significant value of 0.015 < 0.05, which means that innovation influences SMEs' financial performance. This result is in line with Sari & Sukmasari (2018), Cania & Susdiani (2021), and Witjaksono & Amir (2022). They stated that innovation has a positive influence on financial performance, this is because innovation is a way to achieve targets the company wants to achieve, where companies usually make changes in the company's operational processes, especially here MSMEs due to the Covid-19 pandemic. 19, which resulted in their limited space for movement, so MSMEs made many changes in their operations, to stay afloat during this pandemic, by collaborating with online applications such as GOJEK, GRAB and making payment gateways using OVO, QRIS and others. Then in this study, the second variable is organization learning, where this variable also affects the financial performance of SMEs in Surabaya with a significant value of 0.003 < 0.005 where this value is below 0.005, which indicates that there is an influence of organizational learning on the financial performance of SMEs. This research is in line with the research of Hardi (2010), Pribadi et al. (2018), Pratiwi & Fanani (2019), Lewis (2002), and Mezias et al. (2001), where these studies state that innovation has a positive effect on financial performance, this is because during this pandemic MSMEs are forced by circumstances to learn something new, or their business operations are threatened, for that MSMEs try to learn something new such as making payments by e-payment; wallets such as OVO, GOPAY, QRIS, and others, in addition to increasing their turnover and financial performance, MSMEs are learning technology by selling online through e-commerce such as Shopee and Tokopedia, then collaborating with online applications such as GOJEK, GRAB and Shopee Food. For this reason, MSMEs must learn quickly because this pandemic is not clear in the end, and on average, MSMEs who carry out this learning affect their financial performance to increase and can survive during the Covid-19 pandemic. The following are the results of the model in this study,

KK = 15.438 + 0.866 IN + 1.881 OL + e

Information:

KK = Finance performance MSMEs in Surabaya

α = Constanta: 15,438 shows that the variables of innovation and organization learning, if the value is 0, then financial performance will increase by 15,438.

β1 – β2= Regression Coefficient: The value of the IN coefficient (β1) is 0.866 with a positive

value. This means that for every one-time increase in innovation, Financial Performance (KK) will increase by 0.866, assuming other variables are constant. The coefficient of OL ($\beta2$) is 1.881 with a positive value. This means that for every one-time increase in organizational learning, Financial Performance (KK) will increase by 1,881 assuming that other variables are constant.

5. CONCLUSION

Based on the research conducted, it was found that innovation and organizational learning have an influence on financial performance during the Covid-19 pandemic, especially for MSMEs in Surabaya. In addition, the influence of innovation and organizational learning has a positive effect, which means that the increasing innovation and organizational learning in MSMEs will positively impact the performance of MSMEs themselves. Vice versa, with the decline in innovation and organizational learning, the financial performance of MSMEs decreases. The innovations carried out by MSMEs here can be in various ways, namely making online sales through e-commerce such as Shopee or Tokopedia, collaborating with GOJEK, GRAB, and online transportation, making payments using electronic wallets such as Gopay, Ovo, Link Aja, Shopee Pay. While the organization learning itself can be in the form of training using online applications and payment gateways given to employees who work in MSMEs, especially in Surabaya. Then for the financial performance of MSMEs, it is proven by the increase in sales turnover, which is in line with the increase in sales transactions from time to time during the Covid-19 pandemic, or it can be measured that MSMEs can still operate during the Covid-19 pandemic. This study also still has limitations from the variables studied and the conditions and situations of the Covid-19 pandemic, so the questionnaires were distributed online.

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NEXUS BETWEEN CRYPTOCURRENCY AND SELECT MACROECONOMIC VARIABLES: AN EMPIRICAL EVIDENCE IN INDIAN CONTEXT AT COVID-19 ERA

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ABSTRACT

With the advent of the digitalization process, digital currencies usages are gaining momentum. Cryptocurrency is the one that has the edge over other digital currencies in terms of trading. Covid – 19 Pandemic has disturbed the Global Economy in general and the financial system in particular. In this context, it is much more helpful to empirically check the relationships between cryptocurrency and select macroeconomic variables to sort out the myths about cryptocurrency in the Indian context. The econometric tools such as Karl Pearson's Correlation, Unit Root Test (Augmented Dickey-Fuller), The Johansen Cointegration Test, and Granger Causality Test are used in both periods, Pre-Covid period (Feb 2018 to Feb 2020) and during the Covid period (March 2020 to March 2022). It is inferred from the results that long-term and short-term cointegration is stronger during – the Covid period. This reveals the close nexus between digital currencies and MEV.

Keywords: Cryptocurrencies, Bitcoin, NSE Nifty, BSE Sensex, Johansen Cointegration, Granger Causality.

1. INTRODUCTION

With the advent of the digitalization process, digital currencies usages are gaining momentum. Cryptocurrency is the one that has the edge over other digital currencies in terms of trading. However, the adoption of cryptocurrency by emerging economies, in general, and India, is highly debatable. In this context, it is much more useful to empirically check the relationships between cryptocurrency and select macroeconomic variables to sort out the myths about cryptocurrency in the Indian context. Cryptocurrency is one of the most burning topics in finance. Peoples are excited to know about different kinds of cryptocurrencies and their behavior, their association with one another, and macroeconomic variables of the economy such as stock indices, GDP, exchange rates, etc. The recent Covid-19 pandemic is still ongoing and has not left any area untouched & unaffected. Can anything be said about the behavior and relationships of Cryptocurrencies with macroeconomic variables in respect of Covid – 19?

Various research is conducted to know the best portfolio of cryptocurrencies that can be used for investment purposes for higher returns (Qarni and Gulzar, 2021; Makarov and Schoar, 2020); it signifies the profitability of these currencies. These profits are attracting people

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around the globe to invest in cryptocurrencies, the globally traded currency, and the rising prices of these currencies; it is important to develop more understanding of the crypto market (Liang et al., 2019). Researchers attempted to analyze the impact of changes in macroeconomic variables on cryptocurrencies and the similarities between them (Sam 2019; Dyhrberg 2016; Liang et al. 2019).

This paper has attempted to test the Long Term and Short-Term relationships in pre and during Covid – 19 Periods with the help of empirical testing of data. Due to changes in the pattern of thinking while investing, the standard of living, employment level, and rise in expenditure in the pre-Covid period. During the Covid period, the need arises to know the relationship of cryptocurrencies with macroeconomic variables in the long and short term. For this purpose, in the paper, the authors have taken four cryptocurrencies and two Indian indices, NSE Nifty & BSE Sensex, and Foreign Exchange Rate (INR to USD) as macroeconomic variables. The weekly closing prices of the top 4 cryptocurrencies (Bitcoin INR, Ethereum INR, Tether INR & Binance INR), weekly closing prices of NSE Nifty & BSE Sensex, and weekly data Foreign Exchange Reserve (INR To USD) for two periods divided as pre-Covid period (Feb 2018 to Feb 2020) and during Covid period (March 2020 to March 2022). Econometric tools such as Karl Pearson's Correlation, Unit Root Test (Augmented Dickey-Fuller), The Johansen Cointegration Test, and Granger Causality Test will be used in this empirical analysis.

The Further study is arranged in the Review of Literature, Research Methodology, Analysis, Interpretation and Conclusion.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The study focuses on the relationship of selected cryptocurrencies with Indian macroeconomic variables in the pre-Covid and during the Covid period after referring to the number of studies focused on the dynamics of cryptocurrencies, the relationship between bitcoin with ether (Katsiampa 2019), trends and predictability of CCs (Cheah et al. 2022), relationships of CCs with macroeconomic variables, physical currencies & physical assets are also studied by (Dyhrberg 2016; Sam 2019; Liang et al. 2019).

Some studies have also focused on the returns of the CCs in respect of the diversification of their portfolios to earn more returns (Qarni and Gulzar 2021; Dastgir et al. 2019). Qarni and Gulzar (2021) suggested in their study that the bitcoin market, with the integration of the Forex market, can lead to diversification & provide benefits of risk minimization. They analyzed with the spillover index method & spillover asymmetry measures. (Dastgir et al. 2019) in their study worked on finding the causal relationship between the bitcoin's attention on search engines and the returns provided by bitcoin. The Copula-based Granger Causality in Distribution (CGCD) test makes this more interesting, revealing a bidirectional relation at both poor & good performance.

This study's methodology consists of tools such as Karl Pearson's Correlation, Unit Root Test (Augmented Dickey-Fuller), The Johansen Cointegration Test, and Granger Causality Test. Similar tools are used to analyze the relationships of variables in the normal study and

studies consisting of two periods. (Sam 2019) Their study found the long-term and short-term causal relation between bitcoin and macroeconomic variables using similar tools. Liang et al., 2019 also used correlation while doing a comparative analysis of CCs, Stocks & and For-Ex and suggested CCs market is similar to the stock market but with higher risks.

The pattern followed in the current study by dividing the time period into two series, and the tests used are also found in other studies. Patel (2021) finds the cointegration of the ASEAN – 5 and Indian Stock exchanges during Pre & Post global financial crises, used similar patterns and tools to find Cointegration. (Aysan, Khan, and Topuz 2021). At the same time, checking the interdependency and interrelationships between CCs in pre-pandemic and post-pandemic by using similar tests.

As per our best knowledge and in light of available resources, there are very few studies of Relationships between Selected Cryptocurrencies and selected macroeconomic variables regarding Pre – Covid and During the Covid period. A review of the literature has helped authors identify the research gaps. The empirical evidence provided by the study will help the Investors, Analysts, Academicians, and all other associated persons.

Objectives of the Study: Based on the above arguments and the gaps identified, the study's specific objectives have been framed below.
1. To explore the Long term relationship between select cryptocurrencies and MEV.
2. To ascertain the cause-and-effect relationship by using the Granger Causality test.

Hypothesis:

To study the formulated objectives, the following Null Hypothesis was framed and tested: -

H_{01} = There is no significant difference in the integration of cryptocurrency and macro-economic variables between Pre Covid – 19 and During Covid – 19 period.

H_{02} = There is no significant difference in the causal relationship of cryptocurrency and macro-economic variables between Pre Covid – 19 and During Covid – 19 period.

3. DATA AND METHODS

This research attempts to check the Long-Term Cointegration & Casual Relationship between the top 4 cryptocurrencies (according to market capitalization), i.e., Bitcoin, Ethereum, Tether, and Binance Coin, and variables showing the condition of the Indian economy, i.e., Stock Indices of NSE & BSE & Foreign Exchange Rate (INR to USD). Quantitative Data have been used for the analysis and fulfillment of objectives.

Data Source and Study Period
The research is based on secondary data from Yahoo Finance (www.finance.yahoo.com). Weekly closing prices of all four cryptocurrencies, NSE, BSE & Foreign Exchange Rate, are

taken. The total period of study is divided into two periods starting February 2018 to February 2020 & March 2020 to March 2022. The periods are divided based on the lockdown in India, which means one period before the lockdown and the second after the implementation of the lockdown. This study refers to these periods as pre-Covid and during the Covid periods. Overall, 109 weeks of data have been taken for each period. The variable description is given below.

Table 1. Variable Description

Variables	Description	Data Frequency
BTC	Bitcoin	Weekly
ETM	Ethereum	Weekly
TTR	Tether	Weekly
BNC	Binance	Weekly
NFT	National Stock Exchange NIFTY	Weekly
SNX	Bombay Stock Exchange SENSEX	Weekly
EXR	Foreign Exchange Rate (INR to USD)	Weekly

Source: Authors' Compilation

Techniques Used

Data analysis is done using Inferential Statistics techniques such as The Unit Root Test (Augmented Dickey-Fuller), The Johansen Cointegration, and the Granger Causality Test. Presentation of results in tabular format provides a clear view of understanding. The comparison with the help of tables shows the changes in both periods. With the help of the first technique, stationarity is checked, long-term cointegration is checked between cryptocurrencies and NSE, BSE & EXR, and lastly, with the help of The Granger Causality Test, the causal relationship is investigated between the variables. All the tools are applied with the help of EViews 12, and for the descriptive statistics, SPSS is used.

4. RESULTS

This section is comprised of the application of various tools of statistics which helps in analyzing the relationship between cryptocurrencies and NFT, SNX & EXR in pre-Covid and during the Covid period. All the data is summed up in Tables and Charts. Descriptive statistics are also used in the analyses.

A. Descriptive Statistics: - Table 1., showing the Descriptive statistics of all the variables from both periods. Overall, data from 109 weeks have been taken for the calculations for each period. This table shows the massive increase in the average weekly prices of cryptocurrencies during the Covid period compared to the pre-Covid period, except for Tether, as it is based on prices of US dollars. It is observed from the table that the median has also been raised. The weekly returns are positively skewed for both periods except BTC, TTR & EXR in Pre – Covid and BTC, NFT & SNX during the Covid period. It is also showing more symmetrical data during the Covid period.

Table 1 –Descriptive Statistics

	BTC	ETM	TTR	BNC	NFT	SNX	EXR
Pre-Covid period (Feb, 2018 to Feb, 2020)							
Mean	514211.4	19971.73	69.93067	1114.679	11186.95	37305.41	69.78874
Median	523082.3	15062.17	70.84657	983.7320	11075.90	37336.85	70.27500
Maximum	818692.7	59352.69	73.63979	2583.831	12352.35	41945.37	74.16000
Minimum	233947.0	6132.125	64.29181	334.0910	9998.050	32596.54	64.13250
SD	152846.8	13117.19	2.315333	536.9429	597.3250	2350.472	2.281580
Skewness	-0.176595	1.452441	-0.909679	0.787089	0.130578	0.137719	-0.806505
Kurtosis	2.174514	4.097797	2.946635	2.821276	1.988368	2.133700	3.185307
During the Covid period (March 2020 to March 2022)							
Mean	2410451	136060.1	74.46465	17956.06	14151.44	47681.11	74.40123
Median	2631792	134809.0	74.44487	19236.54	14744.00	49099.99	74.34700
Maximum	4867364	343963.0	77.15987	48535.09	18338.55	61305.95	77.14000
Minimum	398630.2	9256.545	72.39832	771.4891	8083.800	27590.95	72.44180
SD	1389289	106053.6	1.108590	16038.89	2935.559	9615.517	1.082764
Skewness	-0.045455	0.289397	0.237322	0.267312	-0.361955	-0.370528	0.228565
Kurtosis	1.566403	1.707555	2.362341	1.568247	1.838807	1.868309	2.290299

Source: Authors' Calculation

B. Karl Pearson's Correlation Test: - The results of the correlation test of all the variables are summarized in Table 2. For the pre-Covid period, there is a significant correlation found at 0.01 level except in the case of BTC & TTR, BTC & EXR, ETM & BNC, TTR & BNC, BNC & EXR. It is noted that different cryptocurrencies behave differently with variables such as NFT, SNX & EXR. On one side, TTR has a correlation of .971 with EXR; on the other, ETM has a negative correlation of – 0.785. in between these values correlation of other values lies. ETM has a negative correlation with all cryptocurrencies and other variables except BTC.

For the period during Covid, it is found that ETM & TTR, ETM & EXR, TTR & BNC, BNC & EXR, and NFT & EXR have no significant correlation. ETM & BNC have a positive correlation of 0.963, and BTC & TTR have a negative correlation of - 0.249. The correlation between all others lies in between. During the Covid period, the correlation of BTC with other variables has risen compared to the pre-Covid period. The correlation of ETM with NFT & SNX turns positive from negative, and TTR with NFT & SNX turns negative from positive during the Covid period.

Table 2 *Result of Karl Pearson's Correlation Test among Variables*

Pre-Covid period (Feb, 2018 to Feb, 2020)							
Variables	**BTC**	**ETM**	**TTR**	**BNC**	**NFT**	**SNX**	**EXR**
BTC	1	.312**	-0.155	.642**	.254**	.274**	-0.093
ETM	.312**	1	-.819**	-0.168	-.453**	-.522**	-.785**
TTR	-0.155	-.819**	1	0.085	.396**	.483**	.971**
BNC	.642**	-0.168	0.085	1	.551**	.559**	0.115
NFT	.254**	-.453**	.396**	.551**	1	.990**	.377**
SNX	.274**	-.522**	.483**	.559**	.990**	1	.462**
EXR	-0.093	-.785**	.971**	0.115	.377**	.462**	1
During the Covid period (March 2020 to March 2022)							
Variables	**BTC**	**ETM**	**TTR**	**BNC**	**NFT**	**SNX**	**EXR**
BTC	1	.898**	-.249**	.888**	.882**	.880**	-.216*
ETM	.898**	1	-0.051	.963**	.915**	.910**	-0.013
TTR	-.249**	-0.051	1	-0.010	-.225*	-.232*	.980**
BNC	.888**	.963**	-0.010	1	.852**	.841**	0.030
NFT	.882**	.915**	-.225*	.852**	1	1.000**	-0.184
SNX	.880**	.910**	-.232*	.841**	1.000**	1	-.192*
EXR	-.216*	-0.013	.980**	0.030	-0.184	-.192*	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Authors' Calculation

C. The Unit Root Test (Augmented Dickey-Fuller Test) – The weekly data of all the selected variables is taken for this test to check the stationarity of the data. The results must show Non – Stationarity at the level and stationarity at the first difference. If this condition is satisfied, we can apply the Johansen Cointegration Test. The results while applying the test show the data is Non – Stationary at level and Stationary at first difference and condition is satisfied.

D. Johansen Cointegration Test – To check the Long – Run Cointegration of selected cryptocurrencies and the macroeconomic variables of the Indian economy, i.e., NFT, SNX, EXR, this test is applied with 1 to 4 lags & Unrestricted Cointegration Rank Test on both methods. The results are shown in Table 3, with the first column consisting of the name of the test, the second consisting null hypothesis demonstration, the third column consisting of results of the pre-Covid period, and the fourth during the Covid Period results. Results of the pre-Covid period show one cointegrating equation at 0.05 level of significance in both tests, which means that there is long-term cointegration between the variables. However, the results during the Covid period show different results as they show two cointegrating equations. In the previous part of the analysis, the correlation was also found, indicating that there could be more relation between variables.

This test clears that during the Covid period, the cryptocurrencies and macroeconomic variables such as NFT, SNX, and EXR became highly cointegrated. The possible reason is that the pandemic similarly hit all the Cryptocurrencies, Indices & Economies.

Table 3. Results of Johansen Cointegration Test

Test	Null Hypothesis	Pre-Covid period	During the Covid period
Trace Test	R = 0	0.0057*	0.0001*
	R = 1	0.1020	0.0038*
	R = 2	0.3482	0.0640
	R = 3	0.4534	0.1233
	R = 4	0.5093	0.1776
	R = 5	0.5651	0.0922
	R = 6	0.9238	0.0148*
Maximum Eigne Value	R = 0	0.0299*	0.0236*
	R = 1	0.1973	0.0356*
	R = 2	0.6187	0.3814
	R = 3	0.6551	0.4281
	R = 4	0.5810	0.6586
	R = 5	0.4775	0.4058
	R = 6	0.9238	0.0148*

* Denotes rejection of the hypothesis at the 0.05 level
***Source:** Authors' Calculation*

E. Granger Causality Test – Table 4., shows the result of the Granger Causality Test, which is used to know the causal relationship between the variables in the pre-Covid period and during the Covid period. It can be looked at in Table 4., that if no causal relationship & no short-run cointegration are found, then no arrows can be looked at. In the case it is found, then the arrows show it. Such as, in the pre-Covid period, only two Unidirectional Cointegration relations are found, i.e., TTR – ETM & TTR – EXR. Both of the relations are within the cryptocurrency only. However, during the Covid period, the status of causal relationships has changed and increased between variables, as seen in Correlation & Johansen Cointegration. One Bidirectional association is found within cryptocurrency, i.e., BTC & BNC, and unidirectional associations are also found between the MEV and cryptocurrency, i.e., NFT – ETM, SNX – ETM, TTR – EXR, NFT – BNC, SNX – BNC this relationship was not present in the pre covid period. This suggests that change in the relationship is possible in the event of covid – 19. The relationship between BTC – ETM is also found where BTC is the cause and ETM is the effect.

Table 4. Results of the Granger Causality Test

Sr. No.	Pre-Covid period		During the Covid period	
1	BTC	ETM	BTC ➝	ETM
2	BTC	TTR	BTC	TTR
3	BTC	BNC	BTC ⟷	BNC
4	BTC	NFT	BTC	NFT
5	BTC	SNX	BTC	SNX
6	BTC	EXR	BTC	EXR
7	ETM ⟵	TTR	ETM	TTR
8	ETM	BNC	ETM	BNC
9	ETM	NFT	ETM ⟵	NFT
10	ETM	SNX	ETM ⟵	SNX
11	ETM	EXR	ETM	EXR
12	TTR	BNC	TTR	BNC
13	TTR	NFT	TTR	NFT
14	TTR	SNX	TTR	SNX
15	TTR ➝	EXR	TTR ➝	EXR
16	BNC	NFT	BNC ⟵	NFT
17	BNC	SNX	BNC ⟵	SNX
18	BNC	EXR	BNC	EXR
19	NFT	SNX	NFT	SNX
20	NFT	EXR	NFT	EXR
21	SNX	EXR	SNX	EXR

Source: Authors' Compilation

5. CONCLUSION

In this paper, we have worked to find the Long Run relationship and Short Run relationship in Bitcoin INR, Ethereum INR, Tether INR, Binance Coin INR, and variables showing the condition of the Indian economy, i.e., Stock Indices of NSE (Nifty) & BSE Sensex & Foreign Exchange Rate (INR to USD). Many researchers worked empirically to find the relationships between CCs and macroeconomic variables. However, in this paper, we have worked by considering the Covid -19 pandemic. Here we have taken two periods, pre-Covid and during the Covid period. The tools are applied separately in both periods to find the exact results. By descriptive statistics, we have analyzed the prices of Bitcoins INR, Ethereum INR, Tether INR & Binance INR have raised much. Karl Pearson's Correlation examines the correlation of Bitcoin INR, Ethereum INR, and Binance Coin INR with NSE Nifty and BSE Sensex, which is raised during the Covid period compared to the pre-Covid period. The exception in this is Tether INR. It can be due to it being based on the USD.

The Johansen Cointegration Test indicates the long Run Cointegration between the variables in the pre-Covid period. Still, it has risen during the Covid period, and 2 Cointegrating equations were found during the Covid period compared with 1 in the pre-Covid period. For testing the causality relationship, Granger Causality Test is applied to find the association in the short run. Pre-Covid period results show only 2 Unidirectional associations, and that too in between Cryptocurrencies. However, during the Covid period, 1 Bidirectional association was found between CCs, 1 Unidirectional in CCs & 5 Unidirectional associations between CCs and

macroeconomic variables. Granger causality shows Benchmark indices NFT and SNX causing effects on ETM and BNC. So, it can be concluded that relationships became more integrated and stronger during the Covid period than in the pre-Covid period. One can infer that when any similar event like Covid happens, the behavior of cryptocurrencies will fall in line with NFT and SNX more than the EXR in the short term. Hence, the existence of nexus between cryptocurrencies and MEV has been proved. This will help investors to make reasonable investment decisions on cryptocurrency.

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THE ACCELERATION OF THE FINANCIAL TRANSFORMATION OF SMALL BUSINESS PERFORMANCE THROUGH DIGITAL TECHNOLOGY AFTERMATH COVID-19

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ABSTRACT

This study aims to examine the influence of using digital technology applications in accelerating the financial performance of small businesses. This research was conducted on small business respondents in the South Java Region.

This study uses statistical analysis with the result that digital technology contributes to the acceleration of financial transformation for small businesses. However, managerially, there is still a need for internal changes to fully use digital financial technology in running their business. Especially for conditions after covid-19, where there are skills that small businesses have after adopting digital financial technology during the pandemic.

Keywords: Acceleration of Financial Transformation, Small Business, Digital Financial Technology.

1. INTRODUCTION

The COVID-19 pandemic has had an impact on the Indonesian economy. At the beginning of the onset of Covid-19, Indonesia's economic conditions deteriorated, which applies to almost all sectors. There have been a lot of adaptations for business people to survive in conditions that continue to worsen because health priorities must be carried out, such as restrictions on community interaction. So, the economic activity will be reduced.

The situation is quite difficult for businesses to provide adaptive creativity and renewal. Many businesses are then looking for and getting opportunities in business. In addition, the impact of other sectors also provides opportunities for businesses, especially small businesses, to be active in the economic sector, such as convenience in terms of transactions carried out by the community with support from the banking sector and other financial institutions carrying technology.

Technological developments adopted by many sectors provide opportunities for small businesses to survive during the COVID-19 period. Financial technology (fintech) has developed rapidly worldwide and changing consumer behavior and firms' financing activity (Ding, 2022).

The situation where all are forced and required to use an online-based system causes the

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need to learn to adapt quickly to be higher. In a forced state, small businesses can move with the capital of several helpful devices such as mobile phones, computers, laptops, and the internet network. Thus, online-based economic activities are increasingly widespread.

The start of small business sales growth from a slump gave a new spirit, and creative ideas began to emerge. Where a condition will be said to improve if the financial measurement is better, the financial condition of a business venture can start to give good results along with the increasing sales conditions. Supported by technology that carries digital, small business finances have also improved.

Improvements in the finances of small businesses are shown by the benefits they get. Small businesses are starting to use technology not only for marketing and promotion but also for their financial transactions or payment systems, increasing their level with digital technology. These gains can be recognized utilizing a financial calculation.

Small businesses are becoming increasingly financial and technology literate. This, of course, has a positive impact on small businesses, which previously only used manual systems for recording, transactions, and payments, but now switch to a technology base and are done quickly to adapt to conditions. Digital technologies are developments regarding smartphones, cloud computing, big data, artificial intelligence, robotics systems, internet of things, 3D printing, virtualization, cyber security, sensor technologies, advanced robotics systems, automation, etc., which all are intensely used in many fields of economic and social life (Ulas, 2022).

Digital transformation is a functional web used in design, manufacturing, marketing, selling, and promotion and is a data-oriented management model. Therefore, capabilities (Review, 2022).

Therefore, the acceleration of the financial transformation of small businesses through digital technology is extraordinary in shaping the current economic activity; where it has been approximately three years of the Covid-19 condition, and now the situation has been restored after the Covid-19 pandemic in Indonesia.

The transformation carried out by small businesses has had a good impact and has provided separate progress for small businesses that were previously considered incapable due to technological costs and limited human resources. With the previous condition, circumstances forced adaptation; it showed good wisdom where many other sectors and other resources helped human resources for small businesses to use technology, be technologically literate, and have new ideas. This innovation came from the creativity of small business people who wanted to learn and were willing to try to overcome difficult economic conditions.

Many new ideas are emerging from old business actors and young people. This collaboration is extraordinary in accelerating financial improvements for small businesses as small businesses become more confident and up-to-date in using digital technology.

Using gadgets such as mobile phones, laptops, and computers is now a means of communication and supports the achievement of business profits. Many applications seem to help financially for people who do not know the circles and sectors. Such as financial literacy, which is increasingly widespread to socialize so that the use of digital systems is safer and can be used by anyone.

This study promotes the acceleration of the financial transformation of small businesses because the payment system from consumers to producers uses more digital. And many supporting applications facilitate the calculation of business profits by simply downloading the application to relate to business information such as sales, costs, and profit for each period. This is very useful for small businesses that previously only used hand notes and manuals.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Financial performance refers to the financial condition of a company. Performance can be measured based on some indicators. Financial development can promote technological innovation (Ding, 2022). As an emerging dimension of financial development, fintech developments must also influence innovation. However, rigorous studies linking fintech development and technological innovation are still rare (Ding, 2022).

Digital financial technology is an innovative financial technology that impacts the payment system and uses public consumption (Luo, 2022). The role of financial technology is to provide transitional facilities for a sustainable business model for SMEs (Pizzi, 2021).

The application of financial records includes how a company carries out the mechanism in carrying out its administrative system. The results of Ulas' research (2022) state that SMEs can perform a cost-benefit analysis of digital technologies, and being aware of that technology is significant. This is supported by similar studies that state the use of mechanisms for SMEs and fully digital transactions (Karim, 2021). Batistti's research (2022) states that the easy use of working with remote systems provides a net benefit. Selimovic's research (2021) showed that digital workplaces positively affect small business performance. Other research reveals the role of fintech as a facilitator in the transition toward sustainable business models for small and medium enterprises (SMEs) (Pizzi, 2021).

Then the hypothesis is as follows:

H1: The use of digital financial technology positively accelerates the financial performance of small businesses.

H2: The use of financial recording applications has a positive effect on the financial performance of small businesses.

3. DATA AND METHODS

Research conducted in June 2022. This research uses financial performance, digital financial technology, and the use of financial. The sample of thirty small businesses in the South Java Region was used for the statistical analysis.

4. RESULTS

The transformation of the workplace in a digital way goes beyond the adoption or non-adoption of technology. This influence makes the digital work of the future very fast. It changes the tools used in work activities and often changes the nature of work activities and processes. Many important employee needs, such as autonomy, competence, and relatedness, affect employee motivation to accept the future workplace. Moreover, if the digital environment enables them to achieve better performance, greater satisfaction, and personal well-being more easily, they will be more motivated to support digital transformation.

The research uses the statistical method. Here is the profile of the sample used.

Table 2. Respondents Profile

No.	Gender	Total	Percentage	Age	Total	Percentage
1.	Male	17	57%	<21	2	7%
2.	Female	13	47%	21-30	10	33%
3.				31-40	12	40%
4.				41-50	5	17%
5.				>50	1	3%
	Total	**30**	**100%**	**Total**	**30**	**100%**

The variables used in this study come from phenomena in previous studies, where the current state of technology is very close and widely used. Therefore, a mechanism for small business performance is seen not only in sales results but also in how digital technology's role accelerates small businesses' performance during the COVID-19 pandemic and beyond. Adaptation is a big result of a small business. And technology in finance helps business results or performance. Therefore, how the attitude in dealing with the pandemic affects the conditions after the pandemic? The conditions after the pandemic make the skills and insight into the use of digital technology finance good. After the pandemic, it is expected to be more advanced in terms of digital financial technology, especially for transactions carried out by small businesses.

The result of the analysis is shown below.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.904a	.817	.803	.63953

Predictors: (Constant), X2, X1
Dependent Variable: Y

Table 4. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.360	.578		2.350	.026		
	X1	.495	.060	.870	8.206	.000	.603	1.658
	X2	.051	.104	.052	.488	.630	.603	1.658

a. Dependent Variable: Y

From the data processing results, it can be seen that R Adj is 81.7%, which means that the variables used in the study make a good contribution. Other factors outside the research variables determine the rest.

The results of further testing show that the significant effect is only shown in hypothesis 1. So, hypothesis 1 is accepted, and hypothesis 2 is rejected. Given this, this research contributes insight that the use of digital financial technology influences the performance of small businesses. This is relevant to several previous studies by Ulas (2022) and Karim (2022).

The transformation carried out has yielded results for small businesses. FinTech is a synthesis of financial facilities, and advanced technology refers to any business that uses technology to improve financial services and developments through automation (Karim, 2022). Technology in finance that is used digitally is growing rapidly, which benefits consumers and businesses in several ways because the market is quite dominant for using technology with many marketplaces. This provides opportunities for small businesses.

Innovation leads to financial development. Directly from Ding (2022) and Robinson (1952), who finds that "where enterprise leads, finance follows", some studies argue that an innovative economy can promote financial markets to provide the necessary capital. As a new dimension of financial development, fintech development can also be driven by technological innovation. The benefits of implementing Fintech solutions for SMEs wishing to accelerate the transition to more equitable and sustainable business models (Pizzi, 2022). In addition, companies that pay more attention to innovation, especially in the field of communication technology, will make fintech more developed.

However, it turns out that it is still not fully accompanied by application software. Because a supporting application requires a special knowledge of finance, although, in some applications and financial software, it is quite easy to use. The use is still limited to a connected system of payments and recording in accounts and devices used. However, it is not entirely for using financial records in applications and software. In the future, it is hoped that it will provide maximum results from the two variables in this study.

5. CONCLUSION

This research provides insight that the bad conditions during the COVID-19 pandemic provided a good stimulus for financial transformation in achieving small business performance. Previously, technology was considered very expensive, but the conditions that forced everything to run digitally for economic activities positively impacted the era after the pandemic. However, there is still a need for literacy to fully make small businesses able to use financial technology not only for transactions but also for financial records.

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THE INFLUENCE OF BANK SOUNDNESS LEVEL AND INFLATION RATE ON POTENTIAL BANKRUPTCY
(EMPIRICAL STUDY ON IDX LISTED BANKING COMPANIES 2016-2020)

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ABSTRACT

This study examines the effect of RGEC-based bank soundness and inflation rate on the potential for bankruptcy. The samples in this study are the banking sector companies listed on the Indonesia Stock Exchange (IDX) during 2016-2020. Using several proxies of the RGEC-based bank soundness and inflation rate, the results of this study indicate that the loan-to-deposit ratio (LDR), self-assessment of good corporate governance, and capital adequacy ratio (CAR) affect the potential of bankruptcy negatively and significantly. Furthermore, non-performing loans (NPL), return on assets (ROA), and inflation rate do not affect the potential for bankruptcy. These results suggest that if banking management wants to predict and anticipate bankruptcy based on the bank's soundness, it can be considered to see and maintain the LDR and self-assessment of GCG and CAR.

Keywords: Bankruptcy, RGEC, NPL, LDR, GCG, ROA, CAR, Inflation Rate.

1. INTRODUCTION

Banking is an industry engaged in finance and plays a vital role in the economic growth of a country. A bank is a company that collects funds from the citizens and distributes them to the citizens through savings and loans. In carrying out its role as an intermediary institution, it takes the community as its customer distrust of banks is natural because customers will always be concerned that the bank cannot fulfill its obligations to return their money. If this happens, it can be said that the bank failed to maintain customer trust due to poor management.

A bank that is not managed correctly will eventually face a disaster: bankruptcy. Corporate failures and bankruptcy filings result from financial and economic distress (Altman, Hotchkiss, and Wang 2019). Bankruptcy occurs when the company is no longer able to maintain its existence. Companies are declared bankrupt when they are unable to meet their financial obligations. A Bank that goes bankrupt will be very detrimental to all stakeholders. Bankruptcy that occurs on a large scale in a country's banking system can cause a financial crisis that has the potential to become an economic crisis. An analysis to forecast bankruptcy is the Altman Z-score.

Altman's Z-score can determine the company's probability of going bankrupt in the next

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two years. Altman's Z score model shows an accuracy rate of 90-95% to predict the company will go bankrupt in one year. Furthermore, the model's accuracy is 70-80, indicating the company will go bankrupt in the next two years (Jawabreh and Alsinglawi 2017). This model also proved to be a reliable predictor of bank bankruptcy (Manousaridis 2017; Chieng 2013).

One risk management that can be applied is the assessment of the bank's soundness. Assessing the health of banks is very important to decide whether a bank is in a healthy condition or not. The soundness of a bank can be analyzed using a method called RGEC. RGEC is a method of assessing the level of soundness due to changes in the complexity and risk profile faced (Financial Services Authority 2016).

RGEC soundness rating is a risk-based approach to assess the bank soundness level, which consists of a risk profile, good corporate governance (GCG), earnings, and capital. In this study, the risk profile factor is proxied using the non-performing loan (credit risk) and loan-to-deposit ratio (liquidity risk and the GCG factor is proxied by the result of the GCG self-assessment. Furthermore, the return on assets is used as the proxy for the earnings factor, and the capital adequacy ratio is used as the proxy for the capital factor.

Another factor that can be used to see the potential for bankruptcy apart from the soundness of the bank is macroeconomic factors in a country. Macroeconomic factors are external factors that can also affect the health of banks; one of these factors is the inflation rate. Inflation shows an increase in the price of goods and services as a whole and continuously within a certain period. Inflation is not something that can be completed. Therefore, inflation can only be controlled at a certain level so that it does not hurt a country's macro economy.

When the inflation rate is high, which causes the overall price of goods and services to increase, Bank Indonesia will make a policy to raise interest rates. The increase in interest rates aims to control the rise in inflation that occurs so that the inflation rate decreases. However, an increase in interest rates will impact loan interest rates. This condition will result in a reduction in public demand for credit.

Based on the problems and conditions described before, this study was conducted to find out (1) whether the proxies for each component of the RGEC-based bank soundness level can be used to predict bankruptcy and its effects, (2) whether inflation rate can be used to predict bankruptcy of banking sector.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

This section reviews the theoretical literature on bankruptcy, bank soundness, and inflation. Furthermore, this section also provides developed hypotheses so that research is more focused.

2.1. Bankruptcy

The decline in the company's continuous financial condition will cause the company to face a major disaster. This disaster is known as bankruptcy. Bankruptcy companies are indicated by their failure to meet their financial obligations. Four general terms are commonly found in the literature (Altman, Hotchkiss, and Wang 2019). The four general terms are as

follows:
1. Failure means that the realized rate of return on the invested capital is lower than the interest rate of the investment.
2. Insolvency is depicting negative firm performance and occurs when a firm is unable to fulfill its debts.
3. Default occurs when the borrower violates the agreement with the creditor, as specified in the contract.
4. Bankrupt occurs when its liabilities is higher than the value of its assets.

Bankruptcy prediction is significant for getting information about the condition of the company. This information can lead to managerial action to prevent problems before they occur and can be an early warning about possible bankruptcy.

2.2. Bank Soundness

Banks must organize the bank soundness assessment using a risk approach known as Risk Based Bank Rating, according to the Financial Services Authority Regulation No. 4/POJK.03/2016 concerning Commercial Bank Soundness Level. Assessments are carried out either individually or on a consolidated basis. The maintenance and monitoring of the bank's soundness level are carried out as a responsibility for the continuity of the Bank's business. Bank soundness is the ability of a bank to perform its operations well and fulfill all its obligations.

The soundness of a bank can be analyzed using a method, namely RGEC. This method is regulated in the Financial Services Authority Regulation Number 4/POJK.03/2016 concerning the Soundness of Commercial Banks as an improvement due to changes in the complexity and risk profile. The RGEC method is a model for assessing the soundness of banks with a risk approach to 4 factors:
1. Risk profile factor.
2. Good corporate governance factor.
3. Earnings factor.
4. Capital factor.

2.3. Inflation

In macroeconomic concepts, inflation is defined as a general and continuous increase in the price of goods and services (Utari, Cristina, and Pambudi 2015). Inflation is a significant indicator because it affects the value of money so that the public directly feels the impact. Inflation can have a positive impact if it is at a relatively low and stable level. High inflation rates will increase interest rates and are generally followed by high loan interest rates. When credit interest is high, the cost of saving in a bank is relatively expensive, so public demand for credit will decrease. If the bank cannot deal with inflation, there will be a potential for bankruptcy. With this impact, it is necessary to monitor and maintain the inflation rate by the Government so that the inflation rate is at a low and stable level.

2.4. Hypotheses Development

Non-Performing Loan is one of the proxies for measuring the soundness of banks for credit risk assessment factors that compare the number of non-performing loans and total loans. Bank Indonesia sets the criteria for a net NPL ratio below 5%. The higher the value of the NPL ratio indicates that the number of non-performing loans is getting bigger. This condition will affect the financial condition and soundness of the bank.

Several studies conducted by Labita and Yudowati (2020), Kuncoro and Agustina (2017), Andari and Wiksuana (2017) have found that NPL does not have a statistical influence on the potential for bankruptcy in the banking sector. These results contrast with the findings of other studies conducted by Habbi and Harto (2019), Ismawati and Istria (2015), which state that NPL has a statistically positive effect on the potential for bankruptcy in the banking sector. Based on this framework, the following hypothesis can be formulated:

H_1: NPL ratio positively affects the banking sector's potential bankruptcy.

Loan-to-deposit ratio is a proxy for assessing the soundness of a bank for a liquidity risk factor that measures a bank's ability to repay withdrawals by depositors. The minimum LDR limit allowed by BI is 78%, and the maximum permitted LDR by BI is 92%. The higher the LDR ratio value, the lower the bank's liquidity ability; on the contrary, the lower the LDR ratio value indicates the bank's lack of effectiveness in obtaining income through lending.

Some research conducted by Theodorus and Artini (2018), Andari and Wiksuana (2017), and Kuncoro and Agustina (2017) show that LDR has no statistically significant effect on the potential for bankruptcy in banking companies. However, the results of other studies were conducted by Habbi and Harto (2019) claim that LDR has a statistically negative effect on the potential for bankruptcy in the banking sector. Based on this framework, the following hypothesis can be stated:

H_2: LDR negatively affects the banking sector's potential bankruptcy.

A company must realize that implementing good corporate governance is essential. GCG principles that are correctly applied will regulate the relationship between stakeholders in a balanced way. GCG is the foundation for creating sustainable added value for stakeholders to help the company achieve its goals and ideals. The better the value of self-assessment of governance, the more the company will focus on improving the company's performance, both financially and non-financially. The worse the governance self-assessment score, the more vulnerable the company is to bankruptcy. This is due to the lack of alignment of stakeholder relations, which impacts the company's performance and hinders it from achieving its goals.

Some studies conducted by Wijayanti, Sari, and Indriasih (2018) and Wandari (2017) found that the self-assessment of GCG has no statistically significant influence on the potential for bankruptcy in the banking sector. However, the results of other studies by Mahmud, Lilik Handajani, and Waskito (2021), Rosiana, Irawati, and Prasaja (2020) show that self-assessment of GCG has a statistically negative effect. Based on this framework, the following hypothesis

can be stated:

H₃: Self-assessment good corporate governance negatively affects the banking sector's potential bankruptcy.

Return on assets is one of the proxies for measuring bank soundness for the earnings factor. ROA measures the company's ability to generate net income based on a certain level of assets (Hanafi and Halim 2016). ROA shows the financial performance and soundness of the bank. A high ratio indicates that the bank uses its assets to earn profits effectively. If the ROA value is low, there will be a decrease in its financial performance and health which has the potential to cause bankruptcy.

Some studies by Labita and Yudowati (2020) and Anggraini (2017) found that ROA has a statistically significant positive effect on the potential for bankruptcy in the banking sector. Another research by Rahmania and Hermanto (2014) found that ROA does not influence the potential for bankruptcy in the banking sector. However, studies by Kisman dan Krisandi (2019), Habbi Harto (2019) and Kuncoro and Agustina (2017) found that ROA has a statistically significant negative effect on the potential for bankruptcy in the banking sector. Based on this framework, the following hypothesis can be stated:

H₄: ROA negatively affects the banking sector's potential bankruptcy.

The capital Adequacy Ratio is a proxy for measuring bank soundness for the capital factor. The capital adequacy ratio can absorb the risk of loss that banks might experience from risky assets. According to the Circular Letter of the Financial Services Authority Number 7/SEOJK.03/2020 concerning the Minimum Capital Adequacy Requirement for Commercial Banks, banks must provide a minimum capital of at least 8% of Risk Weighted Assets. The greater the CAR value, the better the bank can face the risk of loss. In contrast, the smaller the CAR value, the bank's ability to face risks will decrease, and the potential for bankruptcy will decrease.

Some studies conducted by Habbi and Harto (2019), Theodorus and Artini (2018), Andari and Wiksuana (2017) found that CAR has no statistically significant effect on t h e potential for bankruptcy in the banking sector. However, other studies conducted by Maisarah, Zamzami, and Arum (2018), Khadapi (2017), and Kuncoro and Agustina (2017) show that CAR statistically influences a negative and significant effect on the probability of bankruptcy. Based on this framework, the following hypothesis can be stated:

H₅: CAR negatively affects the banking sector's potential bankruptcy.

Controlling the inflation rate is very important to maintain economic stability. When the inflation rate is high, people's purchasing power will decrease. A high inflation rate will raise interest rates and is generally accompanied by an increase in loan interest rates. When credit interest is high, the cost of saving in a bank is relatively expensive so that public demand for

credit will decrease while reducing bank income.

Some studies conducted by Wafi, Mardani, and Wahono (2021), Nilasari and Ismunawan (2021), Julio (2020) found that the inflation rate does not affect statistically toward potential for bankruptcy in banking sector. In contrast, some researches conducted by Naufal (2020), Rohiman and Damayanti (2019), Irwandi and Rahayu (2018) found that the inflation rate has a significant positive influence statistically toward potential for bankruptcy in banking sector. Based on this framework, the following hypothesis can be stated:

H_6: Inflation rate positively affects the banking sector's potential bankruptcy.

3. DATA AND METHODS

3.1. Data and Sample

Information from the banks' annual reports is used in this study to find their ratios, such as non- performing loans, loan-to-deposit ratios, self-assessment of GCG, return on assets, and capital adequacy ratio. This study also used Indonesia's inflation rate data obtained from the official website of Bank Indonesia at www.bi.go.id. Companies in the banking sector listed on the Indonesia Stock Exchange (IDX) for the 2016-2020 period are the population in this study. Moreover, the purposive sampling method is used in this study. Table 1 provides the determination of the sample used in this study.

Table 1. Research Sampling Criteria

Criteria	Total
Companies in banking sector listed on the Indonesia Stock Exchange for the 2016-2020 period.	43
Companies in banking sector that do not publish annual reports in the company website or the Indonesia Stock Exchange (IDX) website for the 2016-2020 period.	0
Companies that do not disclose data related to research variables and are available in full in publications during the 2016-2020 period.	0
Delisting from the Indonesia Stock Exchange during the 2016-2020 period.	0
Number of companies that can be used as samples.	43
Number of research samples (43 companies x 5 years).	215

3.2. Variable and Definitions of Variables

The dependent variable used in this study is bankruptcy which is proxied using the Z''-Score Model (modification for non-manufacture companies). This study identifies the potential for bankruptcy in banking sector companies using the Z"-Score Model. Z"-Score will show whether the company is in the safe zone, gray zone, or distress zone. The criteria used to assess the Z"-score are as follows (Catherin and Purwanto 2016):

    1) The company will be classified as a healthy company or is in the safe zone if the Z''-score > 2.60.

2) The company is classified as a company that has the potential to go bankrupt or is in a distress zone if the Z''-score <1.1.

3) The company is classified as a gray area company or is in the gray zone if the Z''-score is between 1.1 – 2.60

On the other hand, the independent variables include: NPL, LDR, GCG self-assessment, ROA, CAR, and inflation rate. The overall variables measurements are described in Table 2.

Table 2. Definitions of dependent and independent variables

Variable	Definiton	Measurement
Dependent		
Z''-score	Altman Z''-score	6,56 (working capital/total assets) + 3,26 (retained earnings/total assets) +6,72 (EBIT/total asset) + 1,05 (book value of equity/total liabilites)
Independent		
NPL	Non-performing loan	Non-performing loan/total loans
LDR	Loan-to-deposit ratio	Credit/third party fund
GCG	GCG self-assessment	GCG self-assessment composite chart of the annual report
ROA	Return on assets	Net profit/total assets
CAR	Capital Adequacy Ratio	Total capital/risk weighted assets
INF	Inflation rate	Annual inflation data from Bank Indonesia website

3.3. Analysis Method

As the dependent variable is a categorical variable, the determination of the banks' potential for bankruptcy will be measured using a dummy variable. If the independent variable is categorical or dichotomous, then in the regression model, the variable must be declared as a dummy variable (Ghozali 2018). The determination is as follows:

1. If the company is in the distress zone, it will be given a score of 2.
2. If the company is in the gray zone, it will be given a score of 1.
3. If the company is in the safe zone, it will be given a score of 0.

The multinomial logistic regression analysis model is used in this study. According to Ghozali (2018), logistic regression analysis is a test to analyze whether the probability of the presence of the dependent variable can be predicted using the independent variable. The logistic regression model examines the influence of the independent variable on the dependent variable with ordinal or nominal data scales.

Logistic regression analysis does not require the assumption of normality of the data on the independent variables, so this analysis is generally used if the assumption of the multivariate normal distribution is not met. Multinomial logistic regression analysis is an extension of binary (two categories) logistic regression and is used only if the dependent variable has more than two categories. Its equation in this study can be expressed in the following two equations:

$$Ln \frac{P(Yi=\text{safe zone})}{P(Yi=\text{distress zone})} = a + b1NPL + b2LDR + b3GCG + b4ROA$$
$$+ b5\ CAR + b6\ Inflasi + e$$

$$Ln \frac{P(Yi=\text{gray zone})}{P(Yi=\text{distress zone})} = a + b1NPL + b2LDR + b3GCG + b4ROA$$
$$+ b5\ CAR + b6\ Inflasi + e$$

4. RESULTS

Descriptive statistics used in this study aim to describe research data in tabulated form so that it is easy to interpret. Descriptive statistical analysis used in this study is the maximum value, minimum value, mean, and standard deviation of each variable. The data analysis carried out in this study consisted of three stages: descriptive statistic analysis, multinomial logistic regression analysis and hypothesis testing.

4.1. Descriptive Statistic Analysis

The results of the descriptive statistic analysis of the dependent variable and independent variable can be seen in Table 3 below.

Table 3. Descriptive Statistic Analysis

	N	Minimum	Maximum	Mean	Sd Deviation
NPL	215	0.00%	22.27%	3.69%	2.71%
LDR	215	39.33%	466.78%	90.42%	37.76%
GCG	215	1	4	2.13	0.49
ROA	215	-15.89%	13.58%	0.80%	3.15%
CAR	215	9.01%	148.28%	25.38%	16.06%
Inflasi	215	2.04%	3.81%	3.12%	0.61%
Z''-Score	215	0	1	0.23	0.42

Based on Table 3, it can be concluded that the NPL variable has an average value of 3.69%, which indicates that most banks in Indonesia can maintain the level of bad loans below 5%, according to the limit set by Bank Indonesia. The LDR variable has an average value of 90.42%, which shows that most banks in Indonesia can maintain a loan-to-deposit ratio above 78% and below 92%, according to the limits set by Bank Indonesia. The GCG variable has an average of 2.13, showing that most banks in Indonesia have implemented good corporate governance well. The ROA variable has an average value of 0.80%, which shows that most banks in Indonesia do not yet have a good profitability performance measured by return on assets. The CAR variable has an average value of 25.38%, which shows that most banks in Indonesia can maintain a capital adequacy ratio above 8%, according to the limit set by the Financial Services Authority. Finally, the average value of the inflation rate variable is 3.12%, which indicates that the inflation rate during the observed period is still classified as mild inflation.

4.2. Multinomial Logistic Regression Analysis

Multinomial logistic regression is conducted to determine whether the independent variables in this study can contribute to the probability of a company having the potential to go bankrupt, divided into three categories: distress zone, gray zone, and safe zone. The steps for testing the multinomial logistic regression model are the Overall Model Fit Test, Goodness of Fit Test, the Determination Coefficient Test (Pseudo R-Square), and the Prediction Accuracy Test (Classification Table).

Table 4. Overall Model Fit Test Result

Model	Model Fitting Criteria	Likelihood Ratio Test		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	395.568			
Final	279.427	116.142	12	0.000

The overall model fit test result is shown in Table 4. This result shows that the value of -2 log likelihood only with an intercept of 395,568, and by including the independent variable, the value decreases to 279,427 and the significance is at p=0.00. This means that inputting the independent variable provides better accuracy for predicting the potential for bankruptcy.

Table 5. Goodness of Fit Test Result

	Chi-Square	df	Sig.
Pearson	18003.278	416	0.000
Deviance	279.427	416	1.000

The goodness of fit test result is shown in Table 5. This result shows that the results of the goodness of fit test. This study uses the Deviance Sig value of 1.00, which means the model is fit (feasible to use) with a chi-square of 279.427. This is because the P-value > 0.05 means the H0 which state the model fits with the data, is accepted.

Table 6. Coefficient of Determination Test Result (Pseudo R-Square)

Cox and Snell	0.417
Nagelkerke	0.496
McFadden	0.294

Pseudo R-Square (R2) is interpreted in the same way as R2 in multiple linear regression. In multinomial logistic regression, it can be seen in the Nagelkerke value. The test results in Table 6 show that the Nagelkerke value is 0.496. This result indicates that the independent variables have a predictive power of 49.6% for bankruptcy, while other variables outside the model explain 50.4%.

Table 7. Prediction Accuracy Test Result (Classification Table)

Observed	Predicted			
	Safe Zone	Gray Zone	Distress Zone	Percent Correct
Safe Zone	10	7	2	52.60%
Gray Zone	1	100	12	88.50%
Distress Zone	0	28	55	66.30%
Percent Correct	5.10%	62.80%	32.10%	76.70%

The prediction accuracy is used to determine the correct and incorrect estimated values. In a perfect model, all cases will be on the diagonal with a forecasting accuracy of 100% (Ghozali 2018). The determination of prediction accuracy is seen through the classification table. Based on the prediction accuracy test result shown in Table 7, it can be concluded that:

1. The prediction of observations of companies in the safe zone is 19. At the same time, the actual result shows ten observations of companies that are in the safe zone (no potential for bankruptcy) with an accuracy percentage of 52.6%.
2. The prediction observations of companies in the gray zone are 113 companies. At the same time, the actual result shows 100 observations of companies in the gray zone (cannot be concluded) with an accuracy of 88.5%.
3. The prediction of observations of companies in the distress zone is 83. At the same time, the actual result shows 55 observations of companies that are in the distress zone (potentially bankruptcy) with an accuracy of 66.3%.
4. The accuracy of the overall model in predicting a company's bankruptcy is 76.7%.

4.3. Hypothesis test

Hypothesis testing were carried out to obtain valid analysis results and support this study's hypotheses. This section provides the results of hypothesis testing consisting of the significant simultaneous test (likelihood ratio tests) and significant partial test (parameter estimates).

In multinomial logistic regression, the significance of the simultaneous regression coefficient is tested using the Likelihood Ratio Tests. Likelihood Ratio Tests show the contribution of each independent variable to the model. The sig value used in this study is 0.05. The sig value is also called the p-value (probability value). The simultaneous significant test result is shown in the Table 8.

Table 8. Simultaneous Significant Test Result (Likelihood Ratio Test)

Effect	Model Fitting Criteria -2 Log Likelihood of Reduced Model	Likelihood Ratio Test		
		Chi-Square	df	Sig.
Intercept	304.087	24.661	2	0.000
NPL	280.524	1.097	2	0.578
LDR	289.568	10.141	2	0.006
GCG	286.855	7.429	2	0.024
ROA	285.250	5.823	2	0.054
CAR	345.140	65.714	2	0.000
Inflasi	280.135	0.708	2	0.702

Table 8 shows that the variables influencing the model are LDR, GCG, and CAR ($p < 0.05$). Other variables, NPL, ROA, and inflation rates, do not affect the model because they have no significant value ($p > 0.05$).

In multinomial logistic regression, the significance of the partial regression coefficient can be tested using the parameter estimates test. Parameter estimates test is used to analyze how the independent variables affect the probability of occurrence of the dependent variable. The results of this test will determine the probability of the presence of the dependent variable by the predetermined category. In this study, the independent variable will show how much influence it has on the probability that the bank is in the distress zone, gray zone, and safe zone. The partial significant test result is shown in the Table 9.

Table 9. Partial Significant Test Result (Likelihood Ratio Test)

Z''-score		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Safe Zone	Intercept	-19.247	5.074	14.39	1	0.000			
	NPL	0.069	0.147	0.221	1	0.638	1.072	0.803	1.429
	LDR	0.047	0.018	6.92	1	0.009	1.048	1.012	1.086
	GCG	1.761	0.868	4.114	1	0.043	5.82	1.061	31.917
	ROA	0.348	0.151	5.315	1	0.021	1.416	1.053	1.903
	CAR	0.216	0.037	33.56	1	0.000	1.241	1.153	1.334
	Inflation	0.134	0.563	0.056	1	0.812	1.143	0.379	3.444
Gray Zone	Intercept	-10.306	2.763	13.917	1	0.000			
	NPL	-0.061	0.092	0.438	1	0.508	0.941	0.785	1.127
	LDR	0.03	0.012	6.444	1	0.011	1.031	1.007	1.055
	GCG	1.137	0.479	5.631	1	0.018	3.118	1.219	7.975
	ROA	0.204	0.126	2.639	1	0.104	1.226	0.959	1.569
	CAR	0.133	0.031	18.594	1	0.000	1.142	1.075	1.214
	Inflation	0.246	0.297	0.685	1	0.408	1.279	0.714	2.29

Based on the Table 9, it can be concluded that two multinomial logistic regression equations are as follows:

$$\text{Ln} \frac{P(Yi=\textit{safe zone})}{P(Yi=\textit{distress zone})} = -19{,}247 + 0{,}069NPL + 0{,}047LDR + 1{,}761GCG + 0{,}348ROA$$
$$+ 0{,}216\,CAR + 0{,}134\,\text{Inflasi}$$

$$\text{Ln} \frac{P(Yi=\textit{gray zone})}{P(Yi=\textit{distress zone})} = -10{,}306 - 0{,}061NPL + 0{,}030LDR + 1{,}137GCG + 0{,}204ROA$$
$$+ 0{,}133\,CAR + 0{,}246\,\text{Inflasi}$$

Table 9 shows that in the safe zone category, only the LDR, GCG, ROA and CAR variables hav a significant effect statistically toward the potential for bankruptcy in the banking sector with a significance level of 5%, while the non-performing loan variables and the level of inflation do not affect bankruptcy in the banking sector. Table 8 also shows that in the gray zone category, only LDR, GCG, and CAR have a statistically significant effect on the potential for bankruptcy in the banking sector with a level of 5%. In contrast, the NPL, ROA, and inflation variables do not affect the potential for bankruptcy in the banking sector.

The first hypothesis in this study is that NPL positively affects the potential for bankruptcy in the banking sector. This statistical test result shows that, in the safe zone category, the significance value of NPL is 0.638>0.05. In addition, in the gray zone category, the significance value of NPL is 0.508>0.05. Thus, H1 is rejected because the NPL has no

significant effect statistically on the potential for bankruptcy in the banking sector. This result is in line with some research by Labita and Yudowati (2020), Kuncoro and Agustina (2017), Andari and Wiksuana (2017) that the NPL variable does not affect the potential for bankruptcy in the banking sector statistically. This result also indicates that the NPL does not indicate potential bankruptcy. The low NPL ratio suggests that many non-performing loans show the bank's declining soundness. However, NPL cannot be used as a proxy to predict the potential for bankruptcy. Other productive assets can be a source of bank income apart from credit. Thus, even though the NPL ratio increases and other earning assets continue to increase, the bank will remain safe to a certain extent.

The second hypothesis in this analysis is that LDR has a statistically negative effect on the potential for bankruptcy in the banking sector. This statistical test result shows that the LDR variable in the safe zone category affects the probability that the bank is in the safe zone is higher than the distress zone (significance value of 0.009<0.05). In the gray zone category, the LDR affects the probability that the bank in the gray zone is higher than the distress zone (significance value of 0.011<0.05). Thus, H2 is accepted because the LDR has a statistically negative effect on the potential for bankruptcy in the banking sector. This result is in line with the result of Habbi and Harto (2019) research shows that the LDR variable has a statistically negative effect on the potential for bankruptcy in the banking sector. This result also indicates that LDR can be used as a proxy to predict bankruptcy. LDR represents the bank's ability to its liquidity and its ability to earn income through lending. The smaller the LDR ratio will show the bank's low effectiveness in obtaining income through lending so that more money is unemployed. This condition is one of the signs of a low level of bank soundness. If the bank can not overcome the problem, then the possibility of the bank going bankrupt will increase.

The third hypothesis in this research is that GCG has a statistically negative effect on the potential for bankruptcy in the banking sector. This statistical test result shows that the self-assessment good corporate governance variable in the safe zone category affects the probability that the bank is in the safe zone is lower than the distress zone (significance value of 0.043<0.05). In the gray zone category, the GCG self-assessment variable affects the probability that the bank is in the gray zone is lower than the distress zone (significance value of 0.018<0.05). Thus, H3 is accepted because the variable of self-assessment of GCG has a statistically negative effect on the potential for bankruptcy in the banking sector. This result is in line with the outcome of research from Mahmud, Lilik Handajani, and Waskito (2021), Rosiana, Irawati, and Prasaja (2020) that GCG has a statistically negative effect on the potential for bankruptcy in the banking sector. These results also indicate that the self-assessment of GCG can be used as a proxy to predict bankruptcy. This follows the theory that the better the implementation of GCG, the more focused the bank will be on achieving the bank's goals. Companies with good management governance show a good relationship between stakeholders. This conducive condition will improve the bank's performance.

The fourth hypothesis in this research is that ROA has a statistically negative effect on the potential for bankruptcy in the banking sector. This statistical test result shows that the ROA variable in the safe zone category affects the probability that the bank is in the safe zone is higher than the distress zone (significance value of 0.021<0.05). In the gray zone category,

the significance value of ROA is 0.104>0.05. There are differences in results in the two types, which can be interpreted that ROA may not necessarily be used as a predictor of potential bankruptcy. Thus, H4 is rejected because the ROA has no statistically significant effect on the potential for bankruptcy. This study's results align with Rahmania and Hermanto (2014) research that ROA has no statistical impact on the potential for bankruptcy in the banking sector. This result also indicates that ROA cannot be used as a proxy to predict bankruptcy. ROA measures the bank's ability to gain profits using its assets. The better the ROA value, the better its performance to achieve profits using its assets. ROA also shows that the lower its ability to earn profits through its assets, the bank's health will decrease. However, suppose the bank still has good capital adequacy to handle the risk of its risky assets. In that case, ROA will not have a significant effect statistically on the potential for bankruptcy in the banking sector.

The fifth hypothesis in this analysis is that CAR has a statistically negative effect on the potential for bankruptcy in the banking sector. This statistical test result shows that, in the safe zone category, the CAR variable affects the probability that the bank is in the safe zone is higher than the distress zone (significance value of 0.000<0.05). In the gray zone category, the CAR affects the probability that the bank is in the gray zone is higher than the distress zone (significance value of 0.000<0.05). Therefore, H5 is accepted because the CAR variable negatively affects the potential for bankruptcy in the banking sector. This outcome is in line with the results of research from Maisarah, Zamzami, and Arum (2018), Khadapi (2017), Kuncoro and Agustina (2017) that CAR has a statistically negative effect on the potential for bankruptcy in the banking sector. This result also indicates that CAR can be used as a proxy to predict bankruptcy. This is because CAR shows the strength of a bank through its capital adequacy to absorb possible losses from risky assets. The higher the CAR value, the better the bank's ability to bear the risk of each asset. Banks will be more protected from bankruptcy if the bank can cover losses from risky assets. On the other hand, a bank with a low CAR value that cannot cover losses due to its risky assets has the potential to experience bankruptcy.

The sixth hypothesis in this research is that the inflation rate has a statistically positive effect on the potential for bankruptcy in the banking sector. This statistical test result shows that, in the safe zone category, the significance value of the inflation rate is 0.812>0.05. In addition, in the gray zone category, the significance value of the inflation rate is 0.408>0.05. This result shows that the inflation rate variable does not statistically affect the potential for bankruptcy in the banking sector. Thus, H6 is rejected because the inflation rate variable does not statistically affect the potential for bankruptcy in the banking sector. This outcome is in line with the results of research from Wafi, Mardani, and Wahono (2021), Nilasari and Ismunawan (2021), and Julio (2020) that the inflation rate does not affect the potential for bankruptcy in the banking sector statistically. This result also indicates that the inflation rate can not be used as a proxy to predict bankruptcy. This is because the inflation rate during the 2016-2020 period was 1-3%, so it was still mild (less than 10%/year). In addition, a country with an inflation rate of 1-3% indicates that the country has a healthy economy and its people have strong purchasing power. If the inflation rate is stable and low, the Bank Indonesia will maintain a low benchmark interest rate, which high demand for credit should follow. Thus, the inflation rate during the 2016- 2020 period did not cause the bank to go bankrupt.

5. CONCLUSION

This study examines the influence of RGEC-based bank soundness and inflation rate on the potential for bankruptcy in the banking sector during 2016-2020. RGEC-based bank soundness consists of 4 assessment factors: risk profile, good corporate governance, earnings, and capital. The variables in this study are non-performing loans (NPL) and loan to deposit ratio (LDR) as proxies for risk profile factors assessment, the results of self-assessment of corporate governance as a proxy for good corporate governance factor assessment, return on assets (ROA) as a proxy for earnings factor assessment, and capital adequacy ratio (CAR) as a proxy for capital factor assessment, as well as the annual inflation rate for the 2016-2020 period. Based on the results of this study that has been carried out through multinomial logistic regression tests, it can be concluded that the variables that can affect the potential for bankruptcy of the banking sector are LDR, GCG, and CAR. Other variables, which are NPL, ROA, and inflation rate, do not affect the potential for bankruptcy in the banking sector. This study contributes to the bankruptcy literature and risk management policy. These results recommend that if banking management wants to predict and anticipate bankruptcy based on the bank's soundness, it can be considered to see and maintain the LDR, self-assessment of good corporate governance, and CAR.

REFERENCE

THE INFLUENCE OF CORPORATE SOCIAL RESPONSIBILITY (CSR) DISCLOSURE ON DISPOSITION EFFECT BEHAVIOR ON THE INDONESIA STOCK EXCHANGE MEDIATED BY FINANCIAL PERFORMANCE

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ABSTRACT

The research aims to determine the influence of CSR Disclosure on Disposition Effect Behavior with Financial Performance as an Intervening Variable. The CSR Disclosure measurement was done using the Corporate Social Responsibility Disclosure Index, based on the GRI G-4 standard. The Disposition Effect measurement used stock return and trading volume, and the Financial Performance measurement used ROE EPS and PBV. The population in this study is LQ45 companies that are listed on the Indonesia Stock Exchange for the period 2016-2020. Therefore, the sample in this study is 29 companies (145 observations). The data analysis method used in this study was done with a simple - multiple regression analysis with the help of the Eviews application.

The results of the study prove that information about CSR Disclosure is not any information that can trigger investors to behave disposition effect. Otherwise, CSR disclosure information can reduce the disposition effect behavior, and financial performance cannot mediate the relationship between CSR Disclosure and disposition effect behavior. Therefore, this study implies that the results of this study can be a source of new knowledge about behavioral finance and that non-financial information such as CSR Disclosure can reduce investor behavior bias and disposition effect in a capital market.

Keywords: CSR Disclosure, Disposition Effect Behavior, Financial Performance, LQ45 Companies.

1. INTRODUCTION

Investor behavior in making investment decisions varies depending on what information investors have. One of the behaviors of investors in making decisions in the public equity market is disposition effect behavior. All factors that influence disposition effect, such as internal and external factors. External factors that can affect disposition effect behavior include information obtained by investors. Corporate CSR and financial performance are also some of the external factors that have a probability of influencing disposition affect behavior in the capital market.

CSR is a corporate business activity that is socially responsible to all stakeholders, including the community, to improve welfare and positively impact social and environmental.

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The CSR disclosure of an entity is also a factor that investors consider in making decisions. In general, in the eyes of the public and stakeholders, entities that report their CSR and have good CSR performance have a good reputation. It can increase the entity's value and attract investors to invest, affecting the entity's financial performance. Jinhua (2015) revealed that several studies have examined various aspects of the benefits of CSR and found evidence that CSR is generally beneficial to companies. Higher analyst followings favor analyst recommendations, more effective corporate governance, lower equity costs and debt costs, lower earnings management, and higher corporate value to attract investors, affecting the company's financial performance. In addition, Ioannis (2010) also revealed that CSR could affect value creation in the public equity market through analyst recommendations. It can make investors interested in investing and affect the company's financial performance.

The CSR disclosure has some benefits that can influence the company's financial performance. Rahayu (2014) revealed that CSR disclosure affects ROE. Citraningrum (2014) also revealed that CSR affects ROE and EPS. In addition, Cokorda (2011) revealed that CSR influences Price to Book Value (PBV). However, on the other hand, Radiman (2019) revealed that CSR does not affect ROE. Iin (2020) revealed that CSR does not affect Earnings per Share (EPS), and Monang (2020) revealed that CSR does not affect PBV.

Rohmad (2018), in his research, revealed that financial performance positively influences the disposition effect on the Indonesia Stock Exchange. In addition, Adithia (2019) revealed that financial performance affects trading volume activities, which is one of the disposition effect gauges. Then Bachtiar (2021) revealed in his research that financial performance (profitability) affects stock return, which is also one of the disposition effect gauges. Furthermore, in his research, Baiq (2011) also revealed that EPS and Price to Book Value (PBV) influence trading volume and return. However, on the other hand, Lilis (2017) stated that ROE does not affect stock return, which is one of the disposition effect gauges. Then Ardyan (2015) stated that ROE does not influence trading volume, which is one of the disposition effect gauges. Also, Elizar (2013) stated that EPS does not affect stock return, which is one of the disposition effect gauges. Then Siska (2022) stated that partially EPS does not influence trading volume, which is one of the disposition effect gauges. Also, Najmiyah (2014) stated that partially PBV does not affect stock return, which is one of the disposition effect gauges, and Siska (2022) stated that partially PBV does not influence trading volume, which is one of the disposition effect gauges.

Because CSR is closely related to the company's financial performance and there is a positive relationship between CSR and the company's financial performance, CSR becomes an aspect that can influence investor behavior, one of which is the disposition effect behavior. Furthermore, because financial performance is one of the external factors that can influence disposition and affect behavior in the capital market, therefore, mediated by financial performance, CSR can affect the disposition effect behavior on the Indonesia Stock Exchange. The research aims to determine the influence of CSR Disclosure on Disposition Effect Behavior with Financial Performance as an Intervening Variable. The CSR Disclosure measurement was done using the Corporate Social Responsibility Disclosure Index, using the GRI G-4. The Disposition Effect measurement used stock return and trading volume, and the

Financial Performance measurement used ROE, EPS, and PBV. The population in this study is LQ45 companies that are listed on the Indonesia Stock Exchange for the period 2016-2020. Therefore, the sample in this study is 29 companies (145 observations). The data analysis method used in this study was done with a simple - multiple regression analysis with the help of the Eviews application.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Prospect Theory

Prospect theory can be defined as explaining how a person makes decisions in uncertain conditions or situations. Kahneman and Tversky (1979) explained that prospect theory discusses someone who will look for sources of information and then make several decision concepts in the decision-making process. Disposition effect behavior is one of the concepts of prospect theory after looking for sources of information. Someone will make several decisions that show that a person tends to be more reluctant to risk profits than losses because the disposition effect is when investors tend to hold on to losing stocks for too long and tend to sell the profitable stocks immediately. If a person is in a profit situation, the person will tend to avoid risks, while in a loss situation, the person tends to dare to face risks.

2.2. Stakeholder Theory

Stakeholder theory provides an understanding of how the entity's management manages and meets the expectations of stakeholders and explains that the entity not only operates for the benefit of the entity itself but also for the benefit of stakeholders and provides benefits for its stakeholders. CSR disclosure is one of the voluntary disclosure forms that can meet stakeholders' expectations. The company can disclose complete information about its activities, behavior, and responsibilities and how it affects the community's social conditions and the environment through CSR disclosure.

2.3. Disposition Effect Behavior

The disposition effect is a situation when investors tend to hold on to losing stocks for too long and the tendency to sell the profitable stocks immediately. There are several ways to measure disposition effect behavior. One is disposition effect measurement by Goeztman & Mazza (2008) and Ervina (2015) by looking at the relationship between trading volume and stock return.

2.4. Corporate Social Responsibility (CSR)

Corporate Social Responsibility is a corporate business activity that is socially responsible to all stakeholders, including the community, to improve welfare and positively impact social and environmental.

2.5. Financial Performance

Financial performance is the achievement achieved by the entity in a given period regarding how the entity's condition, situation, and financial state describe the entity's level of financial health. In this study, the financial performance will be measured by using Return on Equity (ROE), Earnings per Share (EPS), and Price to Book Value (PBV).

2.6. Hypothesis Development

Goeztman & Mazza (2008) and Ervina (2015) stated that the disposition effect could be observed through return and trading volume. If stock return decreases, the trading volume should increase, but the trading volume decreases because of the disposition effect behavior. Conversely, if the stock return rises, the trading volume should decrease, but because the disposition effect behavior, the trading volume will rise quickly. This condition indicates that the capital market has not been efficient because there is a bias in the market, namely investor behavior bias called disposition effect. In addition, Goeztman & Mazza (2008) also proves in their research that when there are many disposition effects, returns, trading volume, and volatility decrease. Ervina (2015) stated that the positive relationship between trading volume and return could indicate a disposition effect behavior in the capital market. Rani (2020) stated that there is a positive relationship between trading volume and stock return on the Indonesia Stock Exchange, which means that there is a disposition effect on the Indonesia Stock Exchange.

H$_1$: There is Disposition Effect Behavior on the Indonesia Stock Exchange

Many factors can cause investors to behave disposition effect in the capital market. External factors can also influence investors to behave disposition effect, namely information received by investors. CSR disclosure is one of the external factors that can influence investor behavior bias, especially disposition effect behavior. CSR disclosure as information that can meet the expectations of stakeholders or investors will affect investor behavior in making investment decisions. One of them is irrational behavior like disposition effect behavior. CSR disclosure is also a factor that investors consider in investment decision-making. Annavianti (2011) stated that CSR affects investor reaction and makes CSR disclosure one of the sources in making investment decisions. If CSR can affect investor reaction, and if CSR can affect investor behavior in decision-making, then CSR has a probability of influence on disposition affect behavior because disposition effect behavior is one of the investor reactions. It is one of investor behavior biases that most often occur when investors are faced with profits or losses when investing in the capital market. Arrin (2018) revealed that CSR affects stock return, which is one of the disposition effect gauges. In addition, Alexis (2016) revealed that CSR disclosure also affects trading volume, which is one of the disposition effect gauges.

H$_2$: CSR Disclosure positively influences Disposition Effect Behavior on The Indonesia Stock Exchange

The CSR disclosure has some benefits that can influence the company's financial performance. The CSR disclosure of a company is also a factor that investors consider in making decisions. In general, in the eyes of the public and stakeholders, companies that report their CSR and have good CSR performance have a good reputation. It can increase the value of the company and can make investors interested in investing, affecting the company's financial performance. Rahayu (2014) revealed in her research that CSR disclosure affects

financial performance, especially ROE. Citraningrum (2014) also revealed that CSR affects financial performance, especially ROE and EPS. In addition, Cokorda (2011) revealed that CSR influences Price to Book Value (PBV).

H_3: CSR Disclosure positively influences financial performance (ROE, EPS, PBV)

Many benefits can be generated when companies disclose Corporate Social Responsibility, and the resulting benefits are closely related to improving the company's financial performance. With CSR, which is closely related to the entity's financial performance and a positive relationship between CSR and the entity's financial performance, CSR becomes an aspect that can influence investor behavior, one of which is the disposition effect behavior. Because financial performance is one of the external factors that can influence disposition effect behavior in the capital market. Therefore, mediated by financial performance, CSR can affect the disposition effect behavior on the Indonesia Stock Exchange. Rahayu (2014) revealed that CSR disclosure affects ROE. Citraningrum (2014) also revealed that CSR affects ROE and EPS. In addition, Cokorda (2011) revealed that CSR has an influence on Price to Book Value (PBV). Rohmad (2018) revealed that financial performance affects disposition effect behavior. In addition, Adithia (2019) revealed that financial performance affects trading volume activities, which is one of the disposition effect gauges. Then Bachtiar (2021) revealed in his research that financial performance (profitability) affects stock return, which is also one of the disposition effect gauges. In addition, Baiq (2011) revealed that EPS and Price to Book Value (PBV) influence the trading volume and stock return.

H_4: CSR disclosure positively influences disposition affect behavior on the Indonesia Stock Exchange mediated by financial performance (ROE, EPS, PBV)

3. DATA AND METHODS

The sample is companies listed in the LQ45 stock group on the Indonesia Stock Exchange from 2016 to 2020. The sample selection in this study is based on the purposive sampling method.

The study used secondary data from LQ45 companies listed on the Indonesia Stock Exchange (IDX). The data used in this study include the financial statements of the companies from 2016 to 2020 obtained through the Indonesia Stock Exchange website www.IDX.co.id and the investing website www.investing.com. In addition, data is also obtained from the official website of companies that are the object of the research.

The variables for this research are explained below.

a. Disposition Effect

In this study, the disposition effect will be measured by using trading volume and stock return.

Trading Volume:

$$W\,Trading = \frac{Traded\;Shares}{Number\;of\;Outstanding\;Shares}$$

Stock Return:

$$R = \frac{P_t - P_{t-1}}{P_{t-1}}$$

b. Corporate Social Responsibility

In this study, CSR calculation used the Corporate Social Responsibility Disclosure Index (CSRDI). The Corporate Social Responsibility Disclosure Index is the index of companies' CSR Disclosure based on the Global Reporting Initiative G-4 indicators standard (91 items of disclosures). CSRDI calculation is done using dummy variables using a dichotomous approach.

$$CSRDIj = \frac{\sum Xij}{nj}$$

c. Financial Performance

In this study, the financial performance is measured by Return on Equity (ROE), Earnings per Share (EPS), and Price to Book Value (PBV).

Return on Equity (ROE):

$$ROE = \frac{Net\;Profit}{Shareholders\;\;Equity}$$

Earnings per Share (EPS):

$$EPS = \frac{Net\;Income - Preferred\;Dividend}{Average\;of\;Common\;Shares\;Outstanding}$$

Price to Book Value (PBV):

$$PBV = \frac{Stock\;Price}{Book\;Value}$$

4. RESULTS

Descriptive Statistical Analysis.

Descriptive statistics in this study can be seen in table 1.

Table 1. Descriptive Statistical Analysis

Variable	N	Minimum	Maximum	Mean	Std. Deviation
CSRDI	145	0.400000	0.790000	0.595517	0.106542
TV	145	0.035923	5.832050	0.605233	0.766642
RM	145	-0.463035	2.291262	0.080140	0.416143
ROE	145	-0.073007	1.450882	0.178919	0.239118
EPS	145	-157.7200	5655.000	496.5720	855.2360
PBV	145	0.554747	82.45061	4.585475	11.33999

Source: Data process results using E-Views 11

Multicollinearity Test.

Multicollinearity test results are presented in Table 2.

Table 2. Multicollinearity Test

	RM	CSRRM	CSRDI	RO OM	EPSOM	PBVRM
RM	1.000000	0.925969	0.027249	0.669440	0.420200	0.326876
CSRRM	0.925969	1.000000	0.033810	0.655148	0.445535	0.338502
CSRDI	0.027249	0.033810	1.000000	0.037603	-0.020607	0.070871
ROOM	0.669440	0.655148	0.037603	1.000000	0.423006	0.835042
EPSOM	0.420200	0.445535	-0.020607	0.423006	1.000000	0.238928
PBVRM	0.326876	0.338502	0.070871	0.835042	0.238928	1.000000
Result	**There are no symptoms of multicollinearity**					

Source: Data process results using E-Views 11

Autocorrelation Test

The autocorrelation test is a test that is done to see and test whether there is a correlation between the variables present in the prediction model. Therefore, research that uses cross-section or panel data does not need to perform autocorrelation tests.

Heteroscedasticity Test

The heteroskedasticity test is a test that is done to see if there is a variant inequality from residual observation to another observation on regression models. For all models in this study, no need to do a heteroscedasticity test because those models are REM models (Random Effect Model) using Generalized Least Squares (GLS) as its estimation technique. The GLS approach is used to cure heteroscedasticity.

Table 3. F Test Result

N	Model	F	Significant	Explanation
145	Model 1	**4.331512**	0.039196	Fit Regression Model
145	Model 2	**4.826221**	0.009379	Fit Regression Model
145	Model 3.1	**12.49054**	0.000551	Fit Regression Model
145	Model 3.2	**3.162249**	0.009804	Fit Regression Model
145	Model 3.3	**2.706003**	0.022924	Fit Regression Model
145	Model 4.1	**3.256481**	0.023555	Fit Regression Model
145	Model 4.2	**3.292459**	0.022492	Fit Regression Model
145	Model 4.3	**3.239428**	0.024076	Fit Regression Model

Source: Data process results using E-Views 11

Table 4. Coefficient of Determination Test Result

N	Model	Adjusted R Square
145	Model 1	0.022612
145	Model 2	0.050460
145	Model 3.1	0.073899
145	Model 3.2	0.069835
145	Model 3.3	0.055924
145	Model 4.1	0.044899
145	Model 4.2	0.045583
145	Model 4.3	0.044575

Source: Data process results using E-Views 11

Model 1: $TV = \alpha + \beta_1 RM + \varepsilon$

Table 5. T Test Result for Hypothesis 1

Variable	Coefficient	t-Statistik	Prob	Result
RM	0.220213	2.076554	0.0396	**H1 is accepted**

Source: Data process results using E-Views 11

Based on Table 5, the coefficient value is 0.220213, and the p-value is smaller than 0.05, which means a positive relationship exists between stock return and trading volume. It indicates a disposition effect behavior on the Indonesia Stock Exchange from 2016 to 2020. Therefore, it can be concluded that the H1 is accepted.

Model 2: TV = α + β1RM + β2CSR. RM

Table 6. T Test Result for Hypothesis 2

Variable	Coefficient	t-Statistik	Prob	Result
RM	1.598491	2.611611	0.0100	
CSRRM	-2.343792	-2.285835	0.0237	**H2 is rejected**

Source: Data process results using E-Views 11

Based on Table 6, the coefficient value of CSR interactions with disposition effect (measured by trading volume and stock return) is at -2.343792 and the p-value is 0.0237 (p-value < 0.05).

Model 3.1: ROE = α + β1CSR + ε

Table 7. T Test Result for Hypothesis Model 3.1.

Variable	Coefficient	t-Statistik	Prob	Result
CSRDI	-0.404806	-3.591740	0.0005	**H3.1 is rejected**

Source: Data process results using E-Views 11

Model 3.2: EPS = α + β1CSR + ε

Table 8. T Test Result for Hypothesis Model 3.2.

Variable	Coefficient	t-Statistik	Prob	Result
CSRDI	1406.895	1.667364	0.0977	**H3.2 is rejected**

Source: Data process results using E-Views 11

Model 3.3: PBV = α + β1CSR + ε

Table 9. T Test Result for Hypothesis Model 3.3.

Variable	Coefficient	t-Statistik	Prob	Result
CSRDI	16.32924	1.668462	0.0975	**H3.3 is rejected**

Source: Data process results using E-Views 11

Hypothesis 3 tests whether CSR disclosure positively influences financial performance (ROE, EPS, PBV). Based on the tables, CSR disclosure negatively influences ROE, CSR disclosure does not influence EPS, and CSR disclosure does not influence PBV. Therefore, it can be concluded that the H3 is rejected.

Model 4.1: TV = α + β1RM + β2CSR. RM + β3ROE. RM + ε

Table 10. T Test Result for Hypothesis 4

Variable	Coefficient	t-Statistik	Prob	Result
RM	1.559247	2.507221	0.0133	
CSRRM	-2.340127	-2.273367	0.0245	**H4.1 is rejected**
ROOM	0.266885	0.392740	0.6951	

Source: Data process results using E-Views 11

Model 4.2: TV = α + β1RM + β2CSR. RM + β3EPS. RM + ε

Table 11. T Test Result for Hypothesis 4

Variable	Coefficient	t-Statistik	Prob	Result
RM	1.549954	2.495204	0.0137	
CSRRM	-2.219300	-2.098791	0.0376	**H4.2 is rejected**
EPSOM	-7.940005	-0.484539	0.6288	

Source: Data process results using E-Views 11

Model 4.3: TV = α + β1RM + β2CSR. RM + β3PBV. RM + ε

Table 12. T Test Result for Hypothesis 4

Variable	Coefficient	t-Statistik	Prob	Result
RM	1.608126	2.611694	0.0100	
CSRRM	-2.379704	-2.294145	0.0233	**H4.3 is rejected**
PBVRM	0.004126	0.316572	0.7520	

Source: Data process results using E-Views 11

The results above show that CSR Disclosure negatively influences disposition effect behavior, and ROE, EPS, and PBV do not influence disposition affect behavior and cannot mediate the relationship between CSR Disclosure and disposition effect behavior. Therefore, hypothesis 4, which affirms CSR Disclosure influences the disposition effect by being mediated by financial performance (ROE, EPS, PBV), is rejected. So, it can be concluded that H4 is rejected.

Disposition Effect Behavior on The Indonesia Stock Exchange

The hypothesis 1 test result shows that the higher the stock return, the higher the trading volume, which means the relationship between those variables can measure the disposition effect behavior on the Indonesia Stock Exchange. If the stock return is high and the trading volume is high, disposition affects behavior on the Indonesia Stock Exchange. So, the hypothesis 1 test result shows a disposition effect behavior on the Indonesia Stock Exchange, especially in the LQ45 group. The result supports prospect theory about disposition effect behavior. The disposition effect is one of the concepts of prospect theory. After looking for sources of information, someone will make several decision concepts in the decision-making process that show that a person tends to be more reluctant to risk profits than losses. The result also confirmed the research conducted by Rani (2020) that stated there is a positive relationship between trading volume and stock return on the Indonesia Stock Exchange, which means that a disposition affects behavior on the Indonesia Stock Exchange.

The Influence of CSR Disclosure on Disposition Effect Behavior on The Indonesia Stock Exchange

The result shows that the higher the companies' CSR Disclosure Index, the lower the disposition effect behavior. So the CSR Disclosure does not positively influence the disposition effect. However, CSR Disclosure negatively influences the disposition effect because investors may trust companies with a high CSR Disclosure Index. The high rate of CSR disclosures is a sign of an excellent reputation and high value based on the analyst recommendations. That I why investors trust to do long-term invest in those companies and not behaving disposition effect (sell the profitable stocks immediately).

The result supports stakeholder theory about how information about companies' CSR is something to fulfill stakeholders/investors' expectations. The company not only operates for the benefit of the company itself but also for stakeholders through CSR Disclosures, which can affect how investors/stakeholders behave in making decisions. The result also supports the prospect theory explained by Kahneman and Tversky (1979) that after looking for sources of information (CSR Disclosure), someone will make several decision concepts in the decision-making process (not behaving disposition effect). The result of this study contradicts the result of Arrin's research (2018) which stated that CSR Disclosure positively influences stock return, which is one of the disposition effect gauges. The result of this study also contradicts the result of Alexis' research (2016) which stated that CSR Disclosure positively influences trading volume, which is one of the disposition effect gauges.

The Influence of CSR Disclosure on Financial Performance

The result shows that CSR Disclosure does not affect financial performance (ROE, EPS, PBV). The result of this study contradicts the result of Citraningrum's research (2014) which stated that CSR Disclosure positively influences ROE and EPS, and the result of this study also contradicts the result of Cokorda's research (2011) which stated that CSR Disclosure positively influences Price to Book Value (PBV).

The Influence of CSR Disclosure on Disposition Effect Behavior on The Indonesia Stock Exchange Mediated by Financial Performance

The result shows that the higher the CSR Disclosures, the lower the disposition effect. Financial performance such as ROE, EPS, and PBV does not affect the disposition effect. The mediator variables such as ROE, EPS, and PBV cannot mediate the CSR Disclosure and disposition effect behavior. The CSR Disclosure negatively influences the disposition effect. However, financial performance cannot mediate the relationship between CSR Disclosure and disposition effect because the companies with high CSR Disclosure indexes, like LQ45 companies, are companies that investors trust to invest in a long-term and not behave disposition effect. (sell the profitable stocks immediately). Therefore, the financial performance (ROE, EPS, PBV) does not affect the disposition effect. Financial performance cannot be an intervening variable between CSR Disclosure and disposition affect behavior too. However, variables that directly relate to the market performance can affect the disposition effect significantly.

The result confirmed the research conducted by Gilang (2016) that CSR negatively influences stock return, which is one of the disposition effect gauges. The result also confirmed

the research conducted by Demy (2009) that CSR Disclosure negatively influences trading volume, which is one of the disposition effect gauges. The result also confirmed the research conducted by Lilis (2017) that ROE does not positively influence stock return, which is one of the disposition effect gauges. Then the result also confirmed the research conducted by Ardyan (2015) that ROE does not positively influence trading volume, which is one of the disposition effect gauges. The result also confirmed the research by Elizar (2013) that EPS does not influence stock return, which is one of the disposition effect gauges. The result also confirmed the research conducted by Siska (2022) that partially, EPS does not influence trading volume, which is one of the disposition effect gauges. The result also confirmed the research conducted by Najmiyah (2014) that, partially, PBV does not influence stock return, which is one of the disposition effect gauges. Finally, the result also confirmed the result of research conducted by Siska (2022) that partially, PBV does not influence trading volume, which is one of the disposition effect gauges.

5. CONCLUSION

This research aims to test whether CSR Disclosure positively influences Disposition Effect Behavior on the Indonesia Stock Exchange by being mediated by Financial Performance (ROE, EPS, and PBV). The research is done using a simple – multiple linear regression. The conclusion is that CSR Disclosure, mediated by financial performance, negatively influences disposition effect behavior. Financial performance such as ROE, EPS, and PBV does not positively influence disposition effect behavior. The financial performance such as ROE, EPS, and PBV cannot be a mediator variable or intervening variable between CSR Disclosure and disposition effect behavior.

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