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The effects of earnings management on information asymmetry and stock price synchronicity

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Abstract: In this study, we test whether earnings management has a positive impact on information asymmetry as well as whether earnings management has a negative impact on stock return synchronicity to investigate how discretionary accrual earnings management affects the imbalance of information and the co-movement of stock prices in Vietnam. We utilise the Pooled OLS (OLS), Random Effects (RE), Fixed Effects (FE), and System GMM models to evaluate our dataset collected from 356 non-financial companies listed on the Hochiminh City Stock Exchange (HOSE) spanning from 2012 to 2021. We find that in Vietnamese market earnings manipulations through accrual based falsify the market and cause information asymmetry leading to adverse effects on market liquidity and stock price synchronicity. Additionally, our findings exhibit greater co-movements between stock prices and earnings management at the larger firms with long incorporation history and are audited by Big Four Audit firms due to their credibility. These findings are particularly useful for foreign investors in making investment decisions as we found that their influences on earnings management in Vietnamese market is limited.

Subjects: Corporate Finance; Investment & Securities

Keywords: earnings management; quality of information; information asymmetry; stock price synchronicity; audit quality

JEL classification: G14; G31; G32

1. Introduction

Corporate stakeholders, including shareholders, lenders, and especially outside investors, pay great attention to earnings management as it is widely considered an important input information to their decision-making process. In fact, earnings management can have real consequences on the stock market via information quality related to a firm. Specifically, although the adjustments of earnings can be informative, the intentions of misleading the company's stakeholders may erode the investor's trust. In certain instances, a high level of earnings management is recognised as a low level of earnings quality, implying a bad signal by the financial market (Abad et al., 2016). According to Du and Shen (2018), untransparent earnings management shatters the credibility of financial reporting, adversely impacts on stock prices. Furthermore, according to Durana et al. (2021), the growing risk of bankruptcy is associated with the earnings management. Moreover, the

earning manipulations cause information asymmetry as the firm's managers may either pursue their interests over the shareholder at the firm's expense (Arar et al., 2018; Jang et al., 2022; Kliestik et al., 2020) or mask firm financial information disclosure via altering accounting policy.

The mechanism of the relationship between earnings management and stock price is represented via firm performance, which significantly relates to corporate governance. In fact, for the purpose of earnings manipulation, the manager can employ two approaches: real-based earnings management and accruals-based earnings management. Specifically, they can reschedule the firm operation by reallocating resources, such as sacrificing investments in certain departments to achieve income targets (Roychowdhury, 2006). Alternatively, managers can utilise allowed accounting policies to impact accruals (Teoh et al., 1998). Furthermore, under manipulated circumstances, accruals could lead to biased results (Ha et al., 2022), while foreign investors are concerned about the quality of corporate financial disclosure to assess the quality of financial statements (Vo et al., 2019). However, in practice, weak corporate governance is frequently observed in developing countries due to poor management in reporting standards, for instance, in Vietnam (ADB, 2014), and this directly impacts the stock market performance. Indeed, the Vietnamese market is well-known for many scandals related to profit reporting due to insufficient control of reporting standards (Ta et al., 2018). Two of the biggest scandals are the fraudulent reporting of the KSS and JVC corporations in Vietnam, which hampered the firms' access to foreign capital channels and shattered investor trust (Trung et al., 2020).

Nevertheless, the Vietnamese market still offers an intriguing case to study earnings management's effects on information asymmetry and stock price synchronicity among markets. This is because the Vietnamese financial market offers fascinating traits for this study, such as the differences between Vietnamese Accounting Standards and IFRS (International Financial Reporting Standards) in the financial statements. Additionally, the Vietnamese economy has displayed impressive economic growth recently, and the stock market has dramatically increased in the last two decades (Vo, 2017). In addition to that, Vietnam has actively participated in various international organisations and agreements, such as the World Trade Organisation (WTO) and Trans-Pacific Partnership (TPP). Therefore, the market has now had the opportunity to approach various sources of international capital funds and vice versa, improving market performance. The evidence is that the newly registered capital of international investors has reached 13.43 billion USD, which is 95.7% year on year (Ministry of Planning and Investment Portal, 2023). Furthermore, participation in international organisation and agreements require changes in the systems to meet requirements in terms of finance. Therefore, the government constantly innovates the market restructuring program (Vo, 2017), which potentially shapes how companies in Vietnam conduct earnings management practices and changes the dynamic relationships in the market. However, the literature studying insightful earnings management and stock market synchronicity in the Vietnamese context is limited. Therefore, analysing the influences of earnings management on the stock market in Vietnam is necessary and will fill this gap.

This study aims to explore the impacts of earnings management on stock price, focusing on its role as an indicator of information environment quality in Vietnam. Our research objectives are designed as follows. Firstly, we investigate the relationship between earnings management and information asymmetry in Vietnam's financial environment by exploring how agency conflicts arise from incomplete and asymmetric information and how earnings management influences information asymmetry. While many studies investigate factors influencing earnings manipulation in Vietnam, most focus is on corporate governance, such as board size, composition, and ownership. Given that the studies on earnings management's impact on Vietnam's stock market is scarce, this research seeks to enhance our understanding of the complex interplay between earnings management practices, information asymmetry, and stock market dynamics, particularly in the unique context of Vietnam's frontier market. Secondly, the relationship between earnings management and stock price synchronicity is thoroughly examined. Because there are conflicting perspectives in the existing literature regarding stock price synchronicity, especially implications for information

quality within firms. Our result shows a negative association between earnings management and stock price synchronicity in Vietnam, where synchronicity is notably lower than in developed markets. This finding contributes new insights to the literature. Lastly, when building the models to test the link between earnings management, information asymmetry, and return synchronicity, we also pay attention to audit quality and foreign ownership variables. We argue that they play a critical role in monitoring and controlling the quality of earnings management. Hence, this paper also examines these two factors' moderating effects on the relationships between earnings management, information asymmetry, and stock price synchronicity.

The remaining of our paper is structured as follows: Section 2 discusses the literature review and hypothesis establishments. Section 3 describes the research methodology. Section 4 provides descriptive statistics, research outcomes, and discussion. Section 5 concludes.

2. Literature review

2.1. Earnings management and information asymmetry

Information asymmetry happens when one or more parties in the market have more or better information than the others. For example, the fact is that managers in charge of a company's day-to-day operations will have better knowledge and information about the firm compared to shareholders or outside investors. Information asymmetry exists between insiders (managers and shareholders) and outsiders (investors).

Based on the microstructure theory, literature often explains the link between earnings management and information asymmetry. According to Abad et al. (2016) and Cerqueira and Pereira (2015), when trading in the stock market, certain market participants can acquire superior information. This fact divides investors into the informed and uninformed. Informed investors can achieve their information advantages via two main ways. First, they may have access to valuable private information withheld by the insiders. Second, information advantages belong to traders with greater abilities in processing and interpreting public information to unveil an accurate picture of the firm's performance and value hidden behind manipulated figures (Kim & Verrecchia, 1994). The worse the quality of the information environment is, the more intense the information differentiation between informed and uninformed investors will be. Brown and Hillegeist (2007) claim that higher quality of information disclosed by firms can help to reduce information asymmetry by decreasing the possibility that investors can trade on private information (informed trading). So, it is not difficult to predict the positive relationship between earnings management and information asymmetry as the former is one featured characteristic, and the latter is one failure of an inefficient market.

Most prior studies agree on the positive associations between earnings management and information asymmetry. For example, Bhattacharya et al. (2013) observe the impact of earnings quality on information asymmetry. Their results reveal that information asymmetry is significantly and positively correlated to both two earnings quality components, including innate (non-discretionary) accruals and discretionary accrual (earnings management). Further, the research also adds that a low level of earnings quality contributes not only to an elevated information asymmetry but also to the increase in adverse selection risk around the earnings releasing time. Research by Easley and O'hara (2004) and Houqe et al. (2017) document that earnings accruals are a price-risk factor, creating informational advantages for informed traders. Uninformed investors are aware of the existence of information asymmetry as well as their informational disadvantages. They, therefore, will require a higher return to compensate for the adverse selection in trading, leading to a higher cost of capital.

Despite a large body of literature examining the effects of earnings management on information asymmetry, no study has been found to investigate this relation in the context of the Vietnamese market. Although the associations between earnings management and information asymmetry

are not directly investigated in some papers, similar opinions on this relationship are mentioned and shared among authors. For example, when studying the effects of earnings management on cash holdings, Hong and Linh (2020) explained that the discretionary production costs and selling expenses bring opportunities for managers to mask the genuine performance of the firm, thus increasing the intensity of information asymmetry. Khuong et al. (2020) tested the impact of earnings management on investor decisions and received a surprising result that investors tend to favour companies with higher levels of earnings management. The authors view this strategy as a bad investment and explain this ironic finding as a phenomenon of information asymmetry issue. Based on our review, we propose a hypothesis on the relationship between earnings management and information asymmetry as follows:

H1: Earnings management has a positive impact on information asymmetry.

2.2. Earnings management and stock price synchronicity

Roll (1988) is the first scholar to develop the term stock price (or stock return) synchronicity as well as its method of estimation. He divides stock return variation into systematic and firm-specific variations (including market and industry variations). Systematic variation causes the co-movements between stock and the market. Therefore, it is called stock price synchronicity. Roll (1988) also claims that a lower level of synchronicity may "imply the existence of either private information or else occasional frenzy unrelated to concrete information". In detail, he explains that the stock price's co-movement depends on the amount of firm-level and market-level information contained in the stock price. The asynchronous movement of a firm's stock price with the whole market is due to the private information (firm-level information) compounded in the stock price. After Roll's (1988) research, stock return synchronicity has been widely examined in a variety of studies, and many of them provide support for the view that a lower level of stock price synchronicity is associated with a higher amount of private information incorporated in stock price, which implies a more transparent information environment with substantial investor protection and vice versa (Hu & Liu, 2013; Jin & Myers, 2006; Morck et al., 2000).

Nevertheless, a growing body of literature reports on the opposite finding such as Dasgupta et al. (2010) considerd the impact of the disclosure of both time-variant and time-invariant firm fundamentals and come to the conclusion that the improvement in information transparency will increase stock return co-movement. This standpoint, especially, tends to be more dominant in emerging market studies (Nguyen et al., 2022). Piotroski and Roulstone (2004) and Chan and Hameed (2006) examined emerging markets and reported that the more analyst coverage interprets, the more information for investors and making stock prices more synchronous. Nguyen et al. (2022) studied the concept of stock price synchronicity in the Vietnamese market, and they synthesise two main reasons why stock prices should co-move more with the market in better corporate governance and environment. The first reason concerns "the intuitive implication of market efficiency" (Dasgupta et al., 2010), which implies trading stocks of outside investors incorporate their knowledge and anticipations into stock prices. A transparent information environment ensures a high quality of information disclosed and improves the accuracy of investor's forecasts (Jin & Myers, 2006). As a result, if the predicted events occur after, they will not create many surprises and shocks to the stock prices. More informative stock prices today should lead to less firm-specific information taken in stock prices and higher synchronicity in the future and vice versa. Farooq and Ahmed (2014) and Hu and Liu (2013) provided the second explanation for the positive connection between stock return synchronicity and the efficiency of corporate governance mechanisms. Foreign and institutional investors, as the most diversified investors in financial markets, are often interested more in stocks of companies with better management and disclosure because they expect to minimise firm-specific risk and experience only market-wide or industry risks (Farooq & Ahmed, 2014; Parrino et al., 2003). As a result, stock return variation can be mainly explained by the market or industry-level information, indicating a higher level of stock return synchronicity (Hasan et al., 2014; Hu & Liu, 2013).

A limited amount of papers are found to be engaged in the relationship between earnings management and stock return synchronicity due to accessibility to essential data, but when discovered, the results are more prone to show a positive link between the two metrics. For instance, Hutton et al. (2009) examined the link between opacity and return synchronicity in the US market. They use earnings management as a proxy for opacity and report that earnings management is positively related to the stock price co-movement. This finding is supported by Das et al. (2016) and Johnston (2009). However, because the impacts of transparency and quality of information disclosure on stock price synchronicity remain controversial, we do not rush to assume the positive relationship between earnings management and stock return synchronicity. Nguyen et al. (2020) and Vo (2017) investigated stock price synchronicity in the Vietnamese market, and they concur with the opinion that "in emerging markets, stock prices move more together when corporate governances improve". High synchronicity signifies corporate transparency and an efficient information environment and vice versa. Therefore, we hypothesise a negative impact of earnings management on return synchronicity in the Vietnamese market.

H2: Earnings management has a negative impact on stock return synchronicity.

3. Test design

3.1. Measure for earnings management

Total accruals consist of two components: non-discretionary accruals and discretionary accruals. Non-discretionary accruals are accrual amounts that arise or vanish naturally over time or with changes in the business cycle, following established accounting principles. In contrast, discretionary accruals represent managerial choices to adjust cash flows intentionally. The utilisation of discretionary accrual models equating with earnings management is widespread. When scrutinising earnings adjustments, discretionary accruals indicate the quality of disclosed financial information (Kliestik et al., 2021).

In this research, we measure earnings management by discretionary accruals. We run different models to estimate this variable. In the end, we choose Dechow et al. (1995) method because its coefficient of determination (R-squared) is highest (R-squared = 61.85%). According to Valaskova et al. (2021), the modified model by Dechow et al. (1995) is one of the most important and widely applied and exhibits the most power in earnings management detection. By referring to the work done by Dechow et al. (1995), discretionary accruals or earnings management is calculated in three steps as follows:

Step 1: Estimate the values of parameters α_0, α1, α2 and α3 from Equation 1:

$$\frac{TAC_t}{TAA_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{TAA_{t-1}} + \alpha_2 \left(\frac{\Delta Sale_t - \Delta ACC_t}{TAA_{t-1}} \right) + \alpha_3 \frac{FA_t}{TAA_{t-1}} + \varepsilon_t \quad (1)$$

Step 2: Estimate non-discretionary accruals based on the above-estimated values of coefficients α, α1, α2, and α3 and Equation 2:

$$NDA_t = \alpha + \alpha_1 \frac{1}{TAA_{t-1}} + \alpha_2 \left(\frac{\Delta Sale_t - \Delta ACC_t}{TAA_{t-1}} \right) + \alpha_3 \frac{FA_t}{TAA_{t-1}} \quad (2)$$

Step 3: Discretionary accruals or earnings management can be achieved by Equation3:

$$EM = \frac{TAC_t}{TAA_{t-1}} - NDA_t \quad (3)$$

***Where**: t denotes year; EM is earnings management and also called the discretionary accruals; TAC is the total accrual, calculated as net income minus cash flow from operations; NDA is the non-discretionary accruals; TAA is the firm's total assets; □Sale is the total changes in sales; □ACC is the total changes in accounts receivables; FA is total fixed assets.*

3.2. Measure for information asymmetry

As discussed above, information asymmetry can exist between managers and shareholders, between insiders and outsiders, or among outsider investors. This paper focuses on the information imbalance between insiders and outside investors under the effects of earnings management.

Drobetz et al. (2010) and Fosu et al. (2016) developed a measure for information asymmetry based on analyst's forecasts of earnings per share (EPS). In detail, information asymmetry for one year is computed as the dispersion of analyst forecast, which is the standard deviation of forecasted EPS of all quarters in that year. For interpretation, a higher level of dispersion indicates greater information asymmetry (Drobetz et al., 2010). Equation 4 and Equation 5 specify the method to estimate information asymmetry.

$$ASYM_t = ln\left(1 + \frac{SD(Forecasted\ EPS_t^q)}{|Median\ of\ Forecasted\ EPS_t^q|}\right) \tag{4}$$

$$Forecasted\ EPS_t^q = EPS_t^{q-1}\left(1 + \left(ROE_t^{q-1} RRE_{t-1}\right)\right) \tag{5}$$

Where t and q denote year and quarter, respectively; ASYM is information asymmetry for each year; SD is the standard deviation; Forecasted EPS is the analyst's forecasts of earnings per share (for one quarter); ROE is the return on equity ratio (calculated for each quarter in a year); RRE is the rate of retained earnings (estimated for each year).

3.3. Measure for stock price synchronicity

Roll (1988) proposes that market-wide and industry variations cause a stock to co-move with the market while the firm fundamentals related to the price non-synchronicity. Based on this suggestion, he builds a traditional capital asset pricing model which employs the firm's stock return as a dependent variable and the market and industry returns as explanatory variables to estimate the level of synchronicity of the firm's stock price with the whole market. Synchronicity is presented by R-square, with R-square being the coefficient generated by the regression.

Yet, when examining this measure, Morck et al. (2000) suggest a modified version of Roll's (1988) model to resolve the issue of spurious results (which generally happens in emerging economies when few industries are more dominant than others) and the issue related to the naturally bounded values of R-square. Thus, we follow Morck et al. (2000) to compute stock price synchronicity.

The coefficient of determination (R-square) is calculated from the regression Equation 6:

$$r_{it} = \beta_{i0} + \beta_{im} r_{mt} + \varepsilon_{it} \tag{6}$$

Then, synchronicity can be defined as:

$$SYN = Log\frac{R^2}{1 - R^2} \tag{7}$$

Where: i and t denote firm and day, respectively; r_{it} is the return of firm i at day t; r_{mt} is the market return at day t; SYNCH is stock price synchronicity; R^2 is the coefficient of determination of the regression Equation 7.

3.4. Research models

To test the impact of earnings management on information asymmetry and stock price synchronicity, we build two econometric models which both take earnings management as the

independent variable. We also control for the effects of audit quality (AUDIT), foreign ownership (FOWN), firm size (SIZE), managerial ownership (MOWN), firm age (AGE), and firm leverage (LEV) as they are documented in other research to have impacts on information asymmetry and stock price synchronicity. Nguyen et al. (2020), Ntow-Gyamfi et al. (2015), and Vo et al. (2019) found the critical role of audit and foreign investors on corporate mechanisms and disclosure quality improvement. Their research also provides evidence that firm leverage, size, and age are relevant in determining stock price synchronicity.

Recent literature recognises the moderating role of audit quality and foreign investors in enhancing and improving earnings quality and the quality of financial reports in general. Therefore, our models also include the interaction terms between earnings management and the above variables. We also control for the effect of industry dummies and year dummies in the models. As proposed to our hypotheses, we expect that α_1 will receive a positive value while α_2 will show a negative value.

$$ASYM_{i,t} = \alpha_0 + \alpha_1 EM_{i,t} + \alpha_2 AUDIT_{i,t} + \alpha_3 FOWN_{i,t} + \alpha_4 EM_{i,t} AUDIT_{i,t} + \alpha_5 EM_{i,t} FOWN_{i,t} + \alpha_6 CONTROL_{i,t} + +\alpha_7 IND_{i,t} + \alpha_8 YEAR_{i,t} + \mu_{i,t} \quad (8)$$

$$SYN_{i,t} = \alpha_0 + \alpha_1 EM_{i,t} + \alpha_2 AUDIT_{i,t} + \alpha_3 FOWN_{i,t} + \alpha_4 EM_{i,t} AUDIT_{i,t} + \alpha_5 EM_{i,t} FOWN_{i,t} + \alpha_6 CONTROL_{i,t} + +\alpha_7 IND_{i,t} + \alpha_8 YEAR_{i,t} + \mu_{i,t} \quad (9)$$

Where i and t denote firm and year, respectively. SYN is the stock price synchronicity, measured by Roll's (1988) modified model (see Equation 6 and Equation 7); ASYM is the information asymmetry, estimated by Equation 4 and Equation 5. EM stands for earnings management and is calculated through the model by Dechow et al. (1995) (see Equation 1, Equation 2, and (3)). AUDIT represents a firm's audit quality, which receives a value of 1 if the firm is audited by a Big4, and a value of 0 if the firm is audited by other audit companies. FOWN is foreign ownership, measured as the rate of shares held by foreign investors. CONTROL represents other control variables, including firm size (SIZE), managerial ownership (MOWN), firm age (AGE), and firm leverage (LEV). SIZE is calculated as the natural logarithm of the firm total assets' market value. MOWN is the proportion of shares held by the company directors, their spouses, and children. AGE is the number of the year from the time of the first operation. LEV is the total debt-to-equity ratio.

4. Descriptive statistic, results and discussion

4.1. Statistic description

Our data is collected from the Hochiminh City Stock Exchange (HOSE), the major Exchange in Vietnam with more than 400 listed companies. To be included in the sampled data, a company must satisfy the following criteria: 1) to be a non-financial company (which means that banks, insurance companies, and securities companies are not eligible); 2) because the calculation of analyst's forecast EPS is based on the value for previous year's real EPS, we require that a sampled company should be listed for at least two years so it will have data of at least one year available for research. In the end, from ten years from 2012 to 2021, we received a sample with 356 listed firms and 3,683 observations.

Table 1 illustrates the descriptive statistics of all dependent, explanatory, and control variables employed in our research. Earnings management (EM) can receive a negative or positive value. The maximum and minimum value is 1.908 and −2.255, respectively. The mean and median of EM are 0.132 and 0.019, respectively, indicating that more than half of the research observations have positive discretionary accruals or earnings management.[1] R-square is the coefficient determination of Roll's (1988) modified market model. The R-square value indicates the degree to which a firm's stock price co-moves with the market. SYN is the normalised form of R-square. As seen in Table 1,

Table 1. Statistic description

	EM	ASYM	R-square	SYN	AUDIT	FOWN	MOWN	LEV	SIZE	AGE
Max	1.908	6.492	0.960	1.391	1.000	77.525	74.738	1.429	45.882	94.000
Min	−2.255	0.000	0.000	−3.000	0.000	0.000	0.000	0.001	13.015	9.000
Mean	0.134	1.015	0.078	−1.726	0.364	13.820	17.105	0.452	20.968	25.610
SD	0.427	0.862	0.085	0.743	0.327	13.346	12.459	0.261	5.707	145.828
Median	0.019	0.737	0.063	−0.952	0.000	12.051	14.607	0.376	11.024	18.337
Obs.	3,683	3,683	3,683	3,683	3,683	3,683	3,683	3,683	3,683	3,683

Note: The coefficient of determination (R-square) is calculated from the regression Equation 4 SYN is the stock price synchronicity, measured by Roll's (1988) modified model (see Equation 6 and Equation 7); ASYM is the information asymmetry, estimated by Equation 4 and Equation 5. AUDIT represents a firm's audit quality, which receives a value of 1 if the firm is audited by a Big4 and a value of 0 if the firm is audited by other audit companies. FOWN is foreign ownership, measured as the rate of shares held by foreign investors. SIZE is calculated as the natural logarithm of the firm total assets' market value. MOWN is the proportion of shares held by the company directors, their spouses, and children. AGE is the number of the year from the time of the first operation. LEV is the total debt-to-equity ratio. In Table A2 of the Appendix, we divide our data sample into two groups based on the whole sample's FOWN median, and thus, these two groups have equal numbers of observations. According to Table 3, the R-square of group 1 (with FOWN > 12.051) has a higher mean than that of group 2 (with FOWN <12.051). This result may signal the relevance of our assumption that a higher level of stock return synchronicity means a higher level of information efficiency.

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although the max value of R-square is 0.96, its mean value is only 0.078. In addition, the median of the R-square for the Hochiminh City Stock Exchange is just 0.063, showing that the majority of companies have R-square values smaller than 0.1 which is relatively low compared to other markets, for example, the Chinese market (0.434), the Canadian market (0.24), United Kingdom (0.27) (Jin & Myers, 2006). This result is also consistent with prior research by Nguyen et al. (2022) and Vo (2017) conducted for the Vietnamese market.

Table 2 presents the correlations for each pair of the research's independent variables and VIF values. Overall, it can be concluded that there are no severe collinearity matters.

4.2. Regression results

We perform pooled OLS, Fixed Effects, and Random effects for the main models (see Equation 8 and Equation 9). To choose among the above regression methods, we check the results of the F and Hausman tests shown in Table 3. For the ASYM and SYN models, the F test has values of 89.23 and 106.47, respectively, with both *P* values = 0.000, meaning that the Fixed Effects model is more suitable than the pooled OLS for both models. Then, the Hausman test is run to decide between the Fixed Effects and the Random Effect regression. In the ASYM model, the Chi-square is 201.58 with p-value = 0.000, so we reject the null hypothesis H_0 and accept hypothesis H_1 of the Hausman test, indicating that the Fixed Effects is the best fit for the dataset of our study. Results of the Hausman test for the SYN model lead to a similar conclusion.

We continue to test for heteroscedasticity and autocorrelation issues. Looking at Table 4, the p-values of heteroscedasticity = 0 for both models. The hypotheses of heteroscedasticity are accepted. Nevertheless, there is no suspicion of the existence of the autocorrelation issue. To deal with heteroscedasticity, we run the robust test for the Fixed Effects. The outcomes for the Fixed Effects and Robust Fixed Effects are presented in Table 4 for both ASYM and SYN models.

Endogeneity is one main concern in the models of earnings management (Greene, 2005). To deal with this issue, we use the system generalised method of moments (GMM) estimators (also called dynamic panel data models) by Arellano and Bond (1991). The level-one lag of information asymmetry and stock synchronicity (LagASYM_L1 and LagSYN_L1) are added in each model to make sure that ASYM and SYN models do not suffer from unobservable variables driving dependent variables. We apply the strategy of An et al. (2016), choosing exogenous (instrumental) variables that "determine the earnings management of an individual firm but is not (directly) correlated with the residual". Table 5 shows the results of the Sargan and Hansen tests used to check the overall validity of the instruments. As the P-values of both tests are more significant than 0.1, we do not reject a null hypothesis that the models are overidentification and the instruments are valid. Additionally, the AR(2) test outcome has a p-value more significant than 0.1, meaning that endogeneity exists and the System GMM is the most suitable model.

4.2.1. ASYM Model

In the ASYM model, System GMM results in Table 6 show that earnings management (EM) positively and significantly impacts information asymmetry (ASYM) at a significant level of 5%. We accept hypothesis H1 on the positive relationship between earnings management and information asymmetry. A higher level of earnings manipulation exaggerates the degree of information asymmetry in the market. This outcome confirms our prediction and aligns with previous studies on the association between the two factors (Bhattacharya et al., 2013; Easley & O'hara, 2004).

Previous studies document that high audit quality (AUDIT) and foreign ownership (FOWN) can be effective mechanisms to enhance the quality of corporate reporting, leading to the decrease of information imbalances among market participants, especially between outsiders and insiders (Contractor et al., 2021; Houqe et al., 2017). Consistent with this argument, we find that audit quality and foreign ownership negatively correlate to information asymmetry in the Vietnamese market. We also explore the interaction effects between audit quality, foreign ownership, and

Table 2. Correlation matrix

	EM	AUDIT	AUDIT*EM	FOWN	FOWN*EM	MOWN	LEV	SIZE	AGE	VIF
EM	1									
AUDIT	−.422***	1								2.284
EM*AUDIT	−.150*	−.338*	1							1.906
FOWN	−.129***	.274*	.313*	1						1.811
EM*FOWN	−.016**	.029*	−.016*	.208**	1					1.245
MOWN	.307*	−.105	−.187	−.351**	.194	1				2.074
LEV	−.064	−.214*	−.008	−.172**	−.008	.241***	1			1.173
SIZE	−.124*	.071**	.325*	.229***	.163*	.168	.205**	1		1.839
AGE	−.003	.095	.044	.066*	.017	−.013	−.171**	.199***	1	1.102

Note: EM stands for earnings management and is calculated through the model by Dechow et al. (1995) (see Equation 1, Equation 2, and (3)). AUDIT represents a firm's audit quality, which receives a value of 1 if the firm is audited by a Big4 and a value of 0 if the firm is audited by other audit companies. FOWN is foreign ownership, measured as the rate of shares held by foreign investors. SIZE is calculated as the natural logarithm of the firm total assets' market value. MOWN is the proportion of shares held by the company directors, their spouses, and children. AGE is the number of the year from the time of the first operation. LEV is the total debt-to-equity ratio.

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earnings management by adding interaction terms (EM*AUDIT) and (EM*FOWN) to the regression. The GMM outcomes indicate a positive and significant association of variable EM*AUDIT with the ASYM model. This outcome provides evidence of an incremental joint effect of audit quality on the relation between information asymmetry and earnings management. In other words, audit quality not only directly influences information asymmetry but also plays a moderating role in the relationship between earnings management and information asymmetry. Therefore, it also supports our hypothesis H1. However, the ASYM model rejects the effect of the term EM *FOWN. The combined effect of foreign investors and earnings management on information asymmetry is statistically insignificant.

ASYM model also recognises the adverse and significant effects of firm size (SIZE) and firm age (AGE) on information asymmetry. The larger and older firms often release more transparent information to the public, which helps to reduce information asymmetry in the market. On the contrary, managerial ownership (MOWN) hinders and harms the degree of asymmetry as the two metrics are revealed to be positively and significantly associated. Firm leverage (LEV) has no significant impact on information asymmetry.

4.2.2. SYN Model

We find that earnings management (EM) negatively affects stock price synchronicity (SYN) since earnings manipulation makes the stock price of a firm to be likely stationary with the market (see Table 6). In other words, better earnings quality can lead to higher stock return synchronicity. This finding contradicts some previous papers claiming a positive relationship between the two variables. However, our outcome is consistent with the findings of Nguyen et al. (2022) and Vo (2017), who also examine the Vietnamese market and report that a higher level of return synchronicity signifies an efficient information environment and corporate mechanism. We confirm our second hypothesis H2.

Results for variable audit quality (AUDIT) also support our above argument. In detail, audit quality shows its positive influence on the stock price co-movement, and according to our results in Table 6, stock prices of firms audited by a Big Four audit company are more synchronous with the market indexes. Under GMM regression, the moderating role of AUDIT is also recognised. Variable EM*AUDIT poses a negative joint effect on return synchronicity with a coefficient of −7.9025 at a significance of 5%. Earnings management demonstrates its essential impact on stock synchronicity under the effect of audit quality.

Based on the results of the FOWN variable in Table 6, we find that in the Vietnamese market, stock prices move together more under the effect of more significant foreign investors who are generally interested more in stocks of firms with better corporate governance and have a crucial role in improving the quality of the information environment. This fact is documented by the positive and significant coefficient of variable foreign ownership FOWN. However, similar to the ASYM model, we do not find evidence for the moderating role of FOWM on the relationship between earnings management and stock price synchronicity.

While manifesting the negative influences on information asymmetry, firm size (SIZE) and age (AGE) affect stock return synchronicity positively. Both managerial ownership (MOWN) and firm leverage (LEV) show no significant association with stock price synchronicity.

Table 3. Results for the F and Hausman test

	ASYM Model		**SYN Model**	
F test	F-test = 89.23	Prob. > *P* = 0.000	F-test = 106.47	Prob. > *P* =0.000
Hausman Test	Chi-square = 201.58	Prob. = 0.000	Chi-square = 135.94	Prob. = 0.000

Table 4. Regression results for the Fixed effects and Robust Fixed effects

	ASYM Model		SYN Model	
	FM	**FM (Robust)**	**FM**	**FM (Robust)**
_Constant	1.2940	1.2940	0.3221	0.3221
EM	0.8825	0.8825	−0.3573*	−0.3573*
	(0.5160)	(0.7434)	(0.2608)	(0.3301)
AUDIT	−1.3018*	−1.3018*	3.0544	3.0544
	(1.4226)	(0.9527)	(0.8216)	(0.5390)
EM*AUDIT	3.7258	3.7258	−7.9025	−7.9025
	(0.9141)	(2.2753)	(2.6403)	(4.6056)
FOWN	−0.3947*	−0.3947*	1.0058**	1.0058**
	(0.5686)	(0.4802)	(1.1042)	(0.0553)
EM*FOWN	6.0137*	6.0137*	−8.0316*	−8.0316*
	(0.9529)	(2.1065)	(2.5393)	(3.0274)
MOWN	0.8335*	0.8335*	2.0147	2.0147
	(0.4176)	(0.6341)	(0.8065)	(1.0038)
LEV	−0.6130	−0.6130	−1.7027	−1.7027
	(0.3182)	(0.5084)	(0.8359)	(1.6311)
SIZE	−0.0305**	−0.0305**	0.1341**	0.1341**
	−0.0248	−0.0091	−0.0207	−0.0584
AGE	−0.0062*	−0.0062*	0.3693*	0.3693*
	−0.0059	−0.0044	−0.0785	−0.0524
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
R_square	0.1635	0.1635	0.1963	0.1963
Heteroskedasticity	1.03***		1.26***	
Autocorrelation	1.72E+05		3.09E+05	
Observations	3,683		3,683	

Note: *, **, and *** indicate p <0.1, 0.05, and 0.01, respectively. SYN is the stock price synchronicity, measured by Roll's (1988) modified model (see Equation 6 and Equation 7); ASYM is the information asymmetry, estimated by Equation 4 and Equation 5. EM stands for earnings management and is calculated through the model by Dechow et al. (1995) (see Equation 1, Equation 2, and (3)). AUDIT represents a firm's audit quality, which receives a value of 1 if the firm is audited by a Big4 and a value of 0 if the firm is audited by other audit companies. FOWN is foreign ownership, measured as the rate of shares held by foreign investors. SIZE is calculated as the natural logarithm of the firm total assets' market value. MOWN is the proportion of shares held by the company directors, their spouses, and children. AGE is the number of the year from the time of the first operation. LEV is the total debt-to-equity ratio.

Table 5. AR and Sargan tests

	SYN Model	ASYM Model
Arellano-Bond test for AR(1)	0.000	0.000
Arellano-Bond test for AR(2)	0.600	0.805
Sargan test	0.326	0.470
Hansen test	0.158	0.122

4.3. Discussion

Both of the research hypotheses are confirmed as our outcomes indicate that earnings management activity increases information asymmetry among market participants and decreases the level of price synchronicity with the market. These findings align with what we predicted and have

Table 6. System GMM estimates

	ASYM Model	SYN Model
LagASYM_L1	0.5602***	
	(0.1118)	
LagSYN_L1		0.7039**
		(0.0425)
EM	0.8825**	−0.3573*
	(0.7434)	(0.2608)
AUDIT	−1.3018*	1.0544**
	(0.9527)	(0.8216)
EM*AUDIT	3.7258**	−7.9025**
	(2.2753)	(2.6403)
FOWN	−1.9347*	1.0058*
	(1.4802)	(1.1042)
EM*FOWN	6.0137	8.0316
	(2.1065)	(2.5393)
MOWN	0.8335*	−2.0147**
	(0.6341)	(0.8065)
LEV	0.6130	1.7027
	(0.5084)	(0.8359)
SIZE	0.0305***	0.1441**
	(0.0091)	(0.0207)
AGE	0.0062**	0.6163**
	(0.0044)	(0.7085)
No. of Instruments	113	113

Note: *, **, and *** indicate p <0.1, 0.05, and 0.01, respectively. SYN is the stock price synchronicity, measured by Roll's (1988) modified model (see Equation 6 and Equation 7); ASYM is the information asymmetry, estimated by Equation 4 and Equation 5. EM stands for earnings management and is calculated through the model by Dechow et al. (1995) (see Equation 1, Equation 2, and (3)). LagASYM_L1 and LagSYN_L1 are the level-one lag of information asymmetry and stock synchronicity, respectively. AUDIT represents a firm's audit quality, which receives a value of 1 if the firm is audited by a Big4 and a value of 0 if the firm is audited by other audit companies. FOWN is foreign ownership, measured as the rate of shares held by foreign investors. SIZE is calculated as the natural logarithm of the firm total assets' market value. MOWN is the proportion of shares held by the company directors, their spouses, and children. AGE is the number of the year from the time of the first operation. LEV is the total debt-to-equity ratio.

some implications. First, it suggests that financial statements, including high discretionary accruals, are less informative to market participants, aggravating the divergence among investors because of asymmetric information. A high level of earnings manipulation means more informational advantage for informed investors because of the private information they own or their superior abilities to process public information (Cerqueira & Pereira, 2015). In a less transparent trading environment, uninformed traders will require a return premium to compensate for the problem of adverse selection arising from trading with informed investors. Prior literature also suggests that higher earnings management lowers earnings quality, reducing market liquidity and increasing the cost of capital (Hong et al., 2019; Houqe et al., 2017). Following agency theory, information asymmetry is fundamental to agency conflicts (Jensen & Meckling, 1976). Our findings indicate that the manipulation of earnings or the use of discretionary accruals can distort the market and intensify the issue of information asymmetry, consequently exacerbating the conflict. Therefore, earnings manipulation is an unavoidable practice, yet excessive use by managers to achieve their objectives can backfire, leading to a loss of trust from external stakeholders and resulting in a higher cost of capital, as investors may perceive an elevated risk of financial instability for companies engaged in earnings manipulation through an increase in discretionary

accruals (Thu, 2023). Incentives to manage earnings through discretionary accruals vary, but they come with the exact costs (Cheng & Warfield, 2005).

Literature on price synchronicity in the context of the Vietnamese market is limited, however, studies found in this regard support the positive link between stock co-movement and corporate governance. Specifically, Nguyen et al. (2022) and Vo (2017) reported that stock price synchronicity in the Vietnamese market and emerging markets has different inferences compared to developed countries. The lower level of price co-movement implies inefficient corporate governance and vice versa. Our research is distinguished from the two above papers as we investigate the effect of the earnings quality metric on synchronicity. However, our main findings strengthen Nguyen et al. (2022) and Vo (2017) interesting viewpoint that the Vietnamese market behaves differently from the conventional thought of price synchronicity. Earnings management creates more private or less market-wide and industry information incorporated in the share prices, which can harm the price co-movement and signify a low informational environment quality. For investors, stock price synchronicity is considered an indicator to evaluate the informativeness of the stock price and the quality of accounting information. This finding implies that when considering stock price synchronicity, market participants, especially outside investors, should look at the market context they are researching (Kelly, 2014; Li et al., 2014). It might be a big mistake to extrapolate the results of developed markets to developing ones, which can result in heavy financial losses due to differences in market characteristics and governance environment.

Results for variables AUDIT and FOWN are relevant to the literature and our analysis. A Big Four is expected to be better at detecting and reporting discretionary earnings management activities as they have more financial resources to invest in staff training and developing methods and techniques of audit (Le et al., 2021). Therefore, it helps to mitigate earnings manipulations and increases the transparency and the quality of corporate reporting in general. So, the managerial decision to choose a Big Four audit service can positively impact the market, giving investors more confidence to trade the company's stock. Previous studies also show that companies audited by more prominent audit firms can enjoy lower costs of capital (Hong et al., 2019; Houqe et al., 2017). Similarly, foreign investors' appearance can improve the Vietnamese market's informational environment because foreign ownership is essential in supplying market capital to a developing market like Vietnam. This finding is consistent with the conclusions of the majority of studies in literature on the positive and essential role of foreign investors in emerging markets that the presence of foreign investment in the market can help with more efficient start-up regulations, enhancing protection of minority investment, improving firm's information environments, and demonstrating an overall positive influence of capital market liberalisation (Contractor et al., 2021; Zhang et al., 2023). Our results also align with agency theory, suggesting that audits, specifically external audits conducted by independent auditors and foreign ownership (FOWN), can effectively resolve agency problems, which then can help to enhance the quality of corporate reporting and decrease information imbalances among market participants and, hence, agency conflicts.

Nevertheless, we received opposite outcomes for the moderating role of AUDIT and FOWN, although they were expected to be similar under both ASYM and SYN models. While the two models yield significant coefficients for interaction terms EM*AUDIT, they reject the effect of EM*FOWN on both dependent variables ASYM and SYN. The insignificant impact of EM*FOWN is unexpected, but it is also not inexplicable. It can be explained that foreign investors are essential participants in any market, especially in developing countries, as they contribute to the development of a market by improving the quality of the information environment and enhancing market liquidity (Vo, 2017). According to Vo et al. (2019), it is more difficult for foreign shareholders to manage earnings as "they face information disadvantages due to geographic distance, language barriers, and cultural differences". However, the above limits are no longer significant obstacles thanks to technological improvements and globalisation. Foreign investors can effectively participate in company management, and eventually, they will act in their interest. As a result, foreign ownership can still use earnings management as an accounting tool and managerial strategy,

leading to a more complicated relationship among EM, AUDIT, and SYM or SYN. Based on the study's outcome, we argue that foreign investors can behave differently depending on their role and the number of shares they hold in the company. The story may be completely different if they hold a controlling or relatively large stake and participate in running the company. They can act as a manager and involve earnings management in pursuing their interests.

Besides the main findings, our outcome also shows that firm age (AGE) and firm size (FSIZE) are relevant predictors of information asymmetry and stock synchronicity. These findings are significant and relevant as they imply that more extensive and older companies should have more efficient corporate mechanisms, reporting, and disclosure, which can ensure maintaining public information transparency. Thus, it can reduce information asymmetry in the market and make the stocks more synchronous with the whole market's movement. On the contrary, managerial ownership (MOWN) can hinder and harm transparency. Managers with significant ownership stakes may prioritise personal financial interests over shareholders, potentially leading to reluctance to disclose adverse information or engage in practices that manipulate financial performance. This lack of transparency can also be exacerbated by reduced external oversight, as independent board members and auditors may be less influenced or be less willing to challenge managerial decisions (Jensen & Meckling, 1976). Moreover, high managerial ownership can diminish manager's accountability to external shareholders, further eroding transparency in their actions and reporting.

5. Conclusion

This study centres around the effects of earnings management on the secondary financial market in Vietnam. We examine how accrual-based earnings management impacts the distribution of information among entities in the stock market and the synchronicity of stock prices with the whole Vietnamese market context.

On the one hand, the main body of literature strongly agrees that high quality of information disclosed by firms in general and high quality of earnings, in particular, are "critical for the functioning of capital markets as an efficient allocator of scarce investment resources, reducing the extent of principal-agent information asymmetry and thereby improving firm liquidity whilst lowering the cost of financing" (Healy & Palepu, 2001). Due to its accounting nature, earnings management is considered a negative signal by the stock market. Based on these arguments, we proposed a hypothesis on the positive association between earnings management and information asymmetry. On the other hand, different viewpoints exist on the relationship between earnings management and stock price synchronicity. This is because there are two contrasting views on the stock return synchronicity's content and implication related to the quality of the information environment in/or surrounding a firm. We, therefore, hypothesised and predicted a negative link between this variable and earnings management. Following model of Dechow et al. (1995) to estimate earnings management, we test our hypotheses by performing different regression models and considering extensive variables such as AUDIT FOWN.

Our findings confirm the two proposed hypotheses and are consistent with previous findings that earnings manipulations through accrual bases can distort the market and exacerbate the problem of information asymmetry. There are differences in outside investor's abilities to process and analyse earnings-related information. So, low quality of earnings can divide investors into the informed and uninformed and exacerbate the information asymmetry in the stock market. In addition, to a further extent, poor earnings quality, which represents a weak information environment at both the firm level (corporate governance) and market level (such as property rights protections and government index), can discourage investors from searching for and acquiring new information about firm-specific, reducing market liquidity and making stock price less informative. This supports our anticipation of a negative relationship between price co-movement and earnings manipulation. Additionally, we find that the size, age and audit quality of the firms

significantly and positively impact price synchronicity as these factors display the credibility of the firms, while the role of foreigner ownership is insignificant in terms of earnings management.

Our paper has several managerial implications for businesses operating in the Vietnamese financial market and potentially for those in other emerging markets. First, given the positive association between earnings management and information asymmetry, managers should prioritise transparent and high-quality financial reporting, enhancing investor trust and reducing information gaps between the company and its shareholders. Managers should shift their focus from short-term earnings manipulation to long-term value creation to attract long-term investors and reduce market skepticism by maintaining a commitment to sustainable growth and long-term profitability. Secondly, since the size, age and quality of audit play an important role in the stock price in Vietnam, investors should prioritise investments into the reputable companies with long history of incorporations, which are audited by Big Four audit firms to mitigate the market risks. This is especially important to foreign investors as based on our findings, the foreigner ownership has limited control on earnings management. Additionally, It is important to note that the specific managerial implications may vary depending on the industry, the company's unique circumstances, and the regulatory environment. Managers should interpret these implications in the context of their own business and market dynamics and take appropriate actions to align their financial practices with long-term value creation and stakeholder interests.

Besides, the research also has some limitations. First, our analysis focuses on the period from 2012 to 2021, in which the global and Vietnamese markets have been strongly affected by the COVID-19 pandemic. Therefore, extreme events such as lockdowns can affect the implications of the results for this period. Second, regarding variable measurements, earnings management and information asymmetry are complex concepts, and measuring them accurately can be challenging. Therefore, future studies might explore different measures and definitions of these variables, leading to varying results. In addition, the study's findings are specific to the Vietnamese market, and it may not be appropriate to generalise them to other markets with different economic, regulatory, and cultural contexts. Therefore, future research is to employ different measures for research variables or examine the relationships in different emerging markets. Additionally, future research can group foreign investors according to the number of shares they hold to understand more insights into foreign investor's behaviours towards earnings management and their role in the organisations.

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Note

1. We provide more statistical details for the negative EM group and positive EM group in Table A1 of the Appendix.

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Appendix

Table A1. Descriptive statistics for negative and positive EM

	EM	EM <0	EM >0
Max	1.908	0.000	1.908
Min	−2.255	−2.255	0.000
Mean	0.134	−0.084	0.326
SD	0.427	0.117	0.141
No. of Observations	3,683	1,729	1,954

Note: EM stands for earnings management and is calculated through the model by Dechow et al. (1995) (see Equation 1, Equation 2, and (3)).

Table A2. Descriptive statistics for FOWN and R-square of small groups

	Group 1 (FOWN >12.051)		Group 2 (FOWN <12.051)	
	FOWN	R-square	FOWN	R-square
Max	77.525	0.960	12.014	0.872
Min	0.000	0.000	0.000	0.000
Mean	19.703	0.089	7.937	0.066
SD	27.211	0.115	6.258	0.074
No. of Observations	1,841		1,841	

Note: R-square is the coefficient of determination calculated from the regression Equation 4 FOWN is foreign ownership, measured as the rate of shares held by foreign investors.