

# Asymmetric Information and Information Assimilation

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## Abstract

*The purpose of this research is to determine the impact of information assimilation on equity issuance in the banking sector. The data consists of 384 observations of banking and finance companies listed on the Indonesian Stock Exchange from 2020 to 2023. A univariate analysis was utilized to identify the differences in asymmetry between companies with seasoned equity offerings (SEOs) and non-SEOs to meet capital requirements in the banking sector. The research indicates that SEO and non-SEO banks exhibit significant differences in their spreads. Despite the banking sector's access to deposits and wholesale funding to finance capital shortages or prospective projects, equity issuance by the banking sector has increased. The presence of regulations on information disclosure does not produce asymmetric information; however, the increased spread among companies with SEOs is due to the more complex information assimilation process, which in turn results in a wider spread relative to the fundamental price.*

**Keywords:** *Asymmetric Information, Seasoned Equity Offering (SEO), Information Assimilation.*

## Introduction

The debate on equity issues within capital structure remains a complex research topic. Since the seminal paper by Modigliani & Miller (1958) explained the irrelevance of capital structure under the assumption of a perfect market, it suggested that firm value is indifferent to its capital structure. Subsequently, they developed the trade-off theory of capital structure based on tax benefits. According to this theory, a firm will increase debt in its capital structure up to the turning point where the cost of debt does not exceed its benefits (Li et al., 2022; Abbas et al., 2022). The presence of asymmetric information drives changes in financing decisions, leading to the pecking order theory (Myers & Majluf, 1984). Equity is sensitive to mispricing in the market, leading to a hierarchy of funding: internal funds (retained earnings) first, followed by riskless debt, and lastly equity. One challenge to the pecking order theory is the market timing theory (Baker & Wurgler, 2002), is that issuances and repurchases or retirements of equity depend on timing (Khan et al., 2018; 2019; Jamil et al., 2023).

Indonesia operates a bank-based system where investors have greater access to bank funds compared to the capital market (Warjiyo, 2015). As a result, the financial crisis of 1998 revealed that the balance sheets of many banks were filled with bad loans due to the crash of the rupiah. In the absence of government intervention, the direct way to increase bank capital is through equity issuance (He et al., 2024). The banking sector issues equity due to market forces and capital requirements. If a bank's capitalization level falls below regulatory requirements, the government mandates that they issue equity. Additionally, market discipline has driven banks with capital shortages to issue equity through seasoned equity offerings (SEOs) (Baron, 2018). In fact, the pecking order theory (POT) is not validated in this context because banks have more access to deposits and wholesale funding for capitalization or prospective projects, which is not found in other industrial sectors. Furthermore, banks continue to increase deposits when SEOs are overpriced (He et al., 2024).

The SEO by the banking sector remains an unresolved puzzle (Loughran & Ritter, 1995). The Pecking Order Theory (POT) explains that the issuance of equity, alongside the presence of asymmetric

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information, leads to market mispricing. Therefore, equity issuance is the last resort after debt issues and retained earnings. The Financial Services Authority's (OJK) mandate for information disclosure (Financial Services Authority No 13, 2015) through traditional and internet media has resulted in symmetric information, subsequently reducing the mispricing of issued equity. The paper by Drake et al. (2017) validated that the internet is an effective medium for disseminating information about listed firms to the market. They categorized information sources into two types and found that non-professional website information positively influences the capital market but impedes price formation. In contrast, information from professional websites supports price formation. The neutralizing function is performed by the presence of Investor Relations (IR) in the market, ensuring that companies and managers are not more informed than market investors (Chapman et al., 2019).

Asymmetric information decreases when information sources provide definitive information to market participants, thus improving the mispricing of equity during SEO. However, while investors and analysts may receive disclosures from the company (or other news sources) about the company, they often need assistance in assimilating the information to better understand its implications for the company's value. It is evident that more sources of information increase the complexity of information processing by investors (assimilation), which in turn causes delays in incorporating this information into stock prices. Therefore, it is crucial to investigate the market price response in interpreting the information assimilation process when the banking sector conducts SEO. Practically, this investigation is significantly beneficial for bank regulators and bank investors to understand the impact of SEO on equity prices.

## Literature Review

### *Assimilation in Capital Market*

The banking sector in Indonesia has experienced a growing need for working capital and investment financing, with year-over-year growth of 32.76 percent in 2022 and 19.93 percent in 2023. Consequently, the banking sector has grown significantly, and equity issuance has become an alternative for funding (The Indonesian Financial Services Authority, 2024). However, the capital market often proves inefficient in supporting the optimal economic function of a country. The separation of ownership and control functions within firms has led to asymmetric information (Jensen & Meckling, 1976). Managers who perform control functions are more informed than principals who execute ownership functions. Asymmetric information has induced adverse selection problems (Akerlof, 1970). A mechanism to minimize this is to provide market participants with information to accurately assess the firm's value. This idea has been validated and documented by Chapman et al. (2019), demonstrating that firms engaging in corporate information disclosure and disseminating news to the market have reduced asymmetric information and increased market efficiency.

However, when investors or analysts receive information disclosures about a company and other news about the company, they often require varying amounts of time to understand the implications for the firm's value or to assimilate the information. Even in dynamic external conditions, understanding the process of information disclosure assimilation needs to be viewed within a broader and more comprehensive context concerning the company's value (Chapman et al., 2019). Thus, information must not only be received from the firm to the market but must be comprehensively and contextually understood by investors to translate into company value (Cong et al., 2022). This understanding process is known as information assimilation.

Clearly, assimilation is a cognitive process of integrating new information with existing knowledge. Through assimilation, individuals discover, process, and understand new information by connecting it with what they already know. The longer the assimilation process, the more information is obtained.

The cognitive perspective explains that an individual's memory has capacity and cognitive composition, and information display determines how individuals comprehend the acquired information. There are several processes of information assimilation (Garvey et al., 2017). First is intrinsic load, which depends on an individual's prior knowledge about the information received. This load can be reduced by decreasing the

complexity of the material or information and the complexity of the individual's knowledge about the material. Second is extraneous load, related to how information is presented. To reduce this load, information should be simplified in a way that is easy for users to understand. Third is germane load, where users seek or acquire knowledge. This type explains the processing, construction, and storage of information in memory to facilitate understanding by organizing it into complex schemas.

Thus, when investors or analysts possess more knowledge about a firm or the external conditions affecting it, and the information is presented in an easily understandable and visually appealing format, they can make decisions more quickly with a shorter information assimilation process. This also demonstrates that the presentation of financial information (balance sheet, income statement, statement of cash flows, and statement of stockholders' equity) in an attractive format in the annual report enables more efficient decision-making.

The banking sector deals with complex information (Buch & Goldberg, 2022) related to the performance and risk of the banking system, which can hinder a more efficient information assimilation process. One aspect of this complexity is that the largest banks in a country tend to be more complex in terms of size and diversity. Second, over the past decade, banking organizations have tended to reduce complexity by limiting the number of affiliates both domestically and internationally. Third, regulatory changes can alter the complexity of banking organizations and the associated risk profiles. Fourth, the relationship between complexity and risk involves trade-offs: the benefits of diversification and liquidity risk reduction might outweigh agency problems, monitoring costs, and contributions to systemic risk that arise from higher complexity.

#### *Equity Issue in Pecking Order Theory and Information Assimilation*

Transactions in economics and finance often encounter situations of asymmetric information, where one party is more informed than the other. Since Modigliani and Miller (1963) explained the capital structure theory, the debate based on asymmetric information has developed more extensively than the tax-driven theory. They demonstrated that, in a perfect market, the value of equity is irrelevant to the capital structure. Conversely, it was found that capital structure is relevant when considering market frictions, including asymmetric information. Without considering bankruptcy costs in the context of asymmetric information, firms tend to issue risky debt followed by equity rather than more risky debt.

Asymmetric information was explained in the used-car market by Akerlof (1970), resulting in three conditions (Bloch & Caillaud, 2017). The assumption in the used-car market is that there are two qualities of cars: high-quality "plums" and low-quality "lemons." The first condition is symmetric and perfect information between buyers and sellers. If buyers can distinguish between plums and lemons and value cars of all qualities more than sellers do, the market is efficient. Sellers gain utility because the market price exceeds their value, and the market prices do not exceed the buyers' value.

The second condition is where buyers and sellers cannot distinguish between plums and lemons due to the inability to observe product quality (imperfect and symmetric information). Sellers do not know the quality of the used cars they offer, and buyers cannot observe the quality of used cars. Therefore, both buyers and sellers expect all used cars to be homogeneous. As a result, the market shifts from inefficient to efficient.

The third condition is where the presence of asymmetric information produces an adverse selection problem. Sellers are more informed than buyers, who are willing to pay based on their average expectation. Buyers are only willing to pay for used plums sold according to their average expectation, resulting in only lemons being offered in the market by sellers.

The presence of asymmetric information results in equity issues in new investments potentially facing adverse selection problems. Firms with fewer growth opportunities can issue equity similar to firms with more growth opportunities. Consequently, equity issued by firms with fewer growth opportunities becomes overpriced, while it is underpriced for firms with more growth opportunities (Myers & Majluf, 1984). Their model explains that managers, acting in the interests of existing shareholders and being more informed, will

pass up issuing equity for new investments when the market undervalues it. It has been suggested that this underinvestment problem can be reduced by following the Pecking Order Theory (POT), which prioritizes internal funding (riskless debt), then risky debt, and finally equity.

This paper is based on Lang et al. (1996), who explain that asymmetric information is inherent in growth opportunities and assets in place (Myers, 1984). Companies are more informed about their growth opportunities and assets in place compared to other parties, thus facing adverse selection problems when issuing securities. High-quality companies may be perceived as underpriced, while low-quality companies are overpriced.

In fact, the issue of asymmetric information has been mitigated by the presence of regulations on information disclosure (Financial Services Authority Regulation No. 13, 2015) and the development of information technology. The faster and more efficiently the market disseminates information, the quicker the market will respond by adjusting prices to reflect fundamental values. However, the speed of information dissemination in achieving market efficiency requires support from the information assimilation process.

Understanding how analysts gather and process various types of value-relevant information available to them is the focus of much research in finance and accounting. Recently, there has been a growing body of research investigating the media as an alternative information channel. The paper by Jiraporn et al. (2006) in the field of finance found that the media plays a strategic role in the flow of information in capital markets. The media acts as an agent that provides new and useful information to others, especially investors and analysts.

The paper by Bessembinder and Venkataraman (2010) documents support for the process of information assimilation. When investors have information symmetry with other parties, more information about complex firms causes delays in responding to price changes quickly, ultimately increasing the quoted spread. The spread can be negative when the information is responded to late by the market; conversely, when the market responds quickly, it results in a positive spread.

#### *Data and Method*

The collected data consists of 384 observations of bank and finance companies listed on the Indonesian Stock Exchange from 2020 to 2023. The sub-categories of bank and finance include banks, financing services, investment services, insurance, holding and investment companies. Quoted Spread (QS) is the ratio (percentage) of the difference between the best quoted bid and ask-price to the midpoint of the bid and ask-price (Bessembinder & Venkataraman, 2010). A quoted spread is computed using the following equation:

$$\text{Quoted\%spread}_i = (\text{askprice}_i - \text{bidprice}_i) / \text{Midpoint}_i$$

Where  $\text{quated\%spread}_i$  is the quoted percentage spread,  $\text{askprice}_i$  is the best quoted ask price,  $\text{bidprice}_i$  is the best quoted bid price. Where  $i$  is the stock being observed, and  $t$  is time observed. Mid point is the mid-quote at the time. The data is divided into two groups: firms with SEO, where the time is defined as during the SEO, and firms without SEO, where the time is defined as the end of the year. When one party responds to information (the process of information assimilation) more than the other, it results in a higher quoted percentage spread of the midpoint, and consequently, trading costs increase. Median and mean difference tests are used for robustness analysis (Ang et al., 2000).

## **Results and Findings**

When banks face funding limitations for capitalization and expansion, they often attempt to increase the margin between deposits and financing for operations and asset enhancement, rather than issuing equity. This study is consistent with He et al. (2024), which indicates that the banking sector often avoids mispricing

by not issuing equity. Table 1 documents that the banking sector is preferred over other sectors. The number of banks issuing equity increased by 100 percent, from 11 to 22 observations. The need for capitalization and financing prospective projects through SEO increased from 12.573 billion to 143.828 billion Rupiahs. Regulations from the Financial Services Authority (OJK) require the banking sector to have a minimum capitalization of 3 billion Rupiahs, which had to be met by the end of 2022 (CNBC News, 2022). The total number of issuers that issued equity was 34, with 14 of them being from the banking sector.

From the perspective of the Pecking Order Theory (POT), the increase in the number of issuers choosing equity over debt or retained earnings for funding indicates a reduction in asymmetric information. The presence of regulations on information disclosure and the use of Information Communication Technology (ICT) by investors have contributed to the reduction of asymmetric information. Investors can utilize various information sources to learn more about the firm beyond the official information from investor relations. In fact, firms do not issue equity only when overvalued (Baker & Wurgler, 2002; Loughry & Elms, 2006), but also issued equity in series in 2020 and 2021, complemented by an increase in deposits. Consequently, equity issuance involves asymmetric information in the presence of adverse selection problems, which are produced by information assimilation (Chang & Wang, 2015).

**Tabel 1.** Equity Issue in Banking Sectors

	2020		2021	
	N-Obs	Equity Raised (Billion IDR)	N-Obs	Equity Raised (Billion IDR)
BASIC MATERIALS	1	1,310.7	5	22,076.4
CONSUMER CYCLICALS	1	676.0	2	339.8
CONSUMER NON-CYCLICALS	0	0.0	2	991.0
ENERGY	0	0.0	2	1,967.6
FINANCIALS	11	12,573.6	22	143,828.0
HEALTHCARE	0	0.0	2	3,699.8
INDUSTRIAL	0	0.0	2	3,631.2
INFRASTRUCTURES	1	1,394.0	2	12,661.0
PROPERTIES & REAL ESTATE	1	956.8	1	1,498.9
TECHNOLOGY	0	0.0	1	45.9
TRANSPORTATION & LOGISTIC	0	0.0	2	759.0

Table 2 describes the significant differences in asymmetric information between banks that issue equity (101.87%) compared to those that do not (65.84%). Clearly, the ask price exceeds the bid price relative to the midpoint more significantly for equity-issuing firms. Investors receive more information from firms with SEO, requiring more complex processes such as clarification and detailed explanations to help integrate specific information and synchronize it with stock prices. Consequently, the information assimilation process is slower for firms with SEO compared to those without SEO.

The presence of Financial Services Authority Regulation No. 13 (2015) on information disclosure has led to a reduction in asymmetric information, resulting in the spread becoming indifferent between SEO and non-SEO banks. Investors gather more information for SEO firms compared to non-SEO firms, leading to greater complexity in information processing and, consequently, delays in incorporating information into stock prices post-SEO.

Information assimilation has become a more prominent issue in recent years. Advances in information technology have allowed much information to be more openly presented to investors, which can easily overwhelm their processing capabilities. On the other hand, technology enables market participants to seek

clarification and explanations of corporate disclosures through online forums, social media, and investor relations management platforms. These clarifications and explanations, typically provided by investor relations (IR) staff, can quickly disseminate among investors, shaping their understanding of the information disclosed by companies (Cong et al., 2022).

**Tabel 2.** Statistic Descriptive

	Non-Equity Issue	Equity Issue	All Firm
N-Obs	333	51	384
Asymmetric Information (%)			
Q1	40.00	70.95	42.05
Q2	57.44	95.02	61.64
p-value		0.000	
Median difference (sig)		37.58*	
Mean	65.84	101.87	70.63
Mean Difference (sig)		36.02*	
p-value		0.000	
Q3	85.53	131.49	92.54
Std Dev	36.25	42.34	39.03

Robustness tests reveal that equity issuance produces a greater spread percentage compared to non-equity issuance. Firms that issue equity have a spread of about 30% from the midpoint. McInish and Wood (1992) explain that information is a key determinant of the spread in NYSE-listed stocks, alongside trading activity and competition. They found that the spread is positively related to asymmetric information and risk. Fender and Lewrick (2015) concluded that an increase in the presence of informed buyers compared to other buyers significantly affects the spread.

Individuals often base their judgments and decisions on assimilable or accessible information (Tversky & Kahneman, 1979). Assimilation can create cognitive biases that distort individuals' perceptions of an object or event when compared with others, potentially resulting in costly outcomes (Fich & Xu, 2023). The advent of information and communication technology (ICT) has led investors and analysts to use various information sources, giving them more time to compare one piece of information with another.

Differences occur between the highest price buyers are willing to pay and the lowest price sellers are willing to accept. The presence of regulations on information disclosure should not result in a lack of information or transparency regarding a security. Asymmetric information issues do not arise if the bank is more informed than the market. Information acquisition costs (extraction) play a central role in explaining overreaction and underreaction by investors to specific sets of information. Extraction costs refer to the expenses incurred in seeking, gathering, and integrating information, while cognitive costs are the mental efforts involved in acquiring, evaluating, and making decisions based on that information. These findings are relevant when equity issuers and investors have symmetric and perfect information but may have differing views, necessitating more time to assimilate financial reports, market trends, and any available news or reports. The information obtained by investors is public information available from various sources to reflect actual value. The form of information affects investors' and analysts' evaluations and decisions if the information is perceived as useful. Thus, stock prices in the banking sector, characterized by a greater quoted spread, are produced by a longer information assimilation process.

## Conclusion

The aim of this paper is to examine the impact of seasoned equity offerings on stock price variation. We provide evidence that investors and analysts collect more information about the company, including its

website and communication channels (such as investor relations), resulting in information overload. On the other hand, the ease of access to costless information for investors and analysts contributes to this overload. Research has highlighted the importance of information assimilation in the processing of information by investors or analysts. The presence of information disclosure requirements and ICT has led them to gather more information about the firm to be processed and integrated in the context of the firm's dynamic external conditions. Practically, these results offer insights into the information assimilation process for investors under uncertainty. Consequently, there is a slower adjustment of this information to the stock price following an SEO. Our empirical design provides a reasonable basis for examining the impact of information assimilation. This paper demonstrates that investors and analysts pay close attention to all public and private information surrounding equity issuance. As a result, there is an overload of information originating from financial media and official announcements.

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