

# Impact of covered warrant issuance on underlying stocks of listed companies in Vietnam

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## Abstract

Nowadays, covered warrants (CWs) have emerged as a popular financial instrument in the Vietnamese stock market, offering investors promising opportunities for profitable returns. However, these instruments also carry inherent risks, necessitating a thorough understanding of their characteristics. This research aims to evaluate the impact of CW issuance on the price and liquidity (measured by trading volume and bid-ask spread) of underlying stocks on the Vietnamese stock market. The study employs the event study methodology and Wilcoxon test to examine whether abnormal returns, trading volume, and bid-ask spreads change after CW issuance. The research uses secondary data of 113 active CWs, based on 20 underlying stocks listed on HNX and HOSE and are issued from April 2023 to January 2024. The findings reveal no significant change in abnormal returns; however, trading volume and bid-ask spreads exhibit noticeable alterations following CW issuance. These results provide valuable insights for investors to consider relevant factors when making informed investment decisions.

## 1. Introduction

Over the past 25 years, the global warrant market has experienced rapid development, witnessing the emergence of various types of warrants with different names in different countries such as Germany, the UK, Hong Kong, Thailand, Singapore, Malaysia, and Korea. Warrants have become one of the most notable options for individual investors around the world. In 2018, according to statistics from the World Federation of Stock Exchanges (WFE), the number of covered warrants (CWs) issued and listed on stock exchanges around the world was 2.3 million CWs

with a transaction value of about 937 billion USD. The Asian market only accounts for approximately 2% of the number of CWs issued in the world, but the transaction value is up to 87% of the global total.

CWs were officially listed on the HOSE exchange in Vietnam in 2019. The market initially launched with call CWs which allows investors to buy or sell the underlying security to the warrant issuer at a predetermined price. In addition, CWs offer appealing investment opportunities thanks to their leverage, low costs, straightforward trading and settlement processes. CWs in Vietnam are financial instruments issued by qualified securities companies (SCs)

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under the strict regulations of the Ministry of Finance (MoF). To ensure responsible issuance and management, SCs must demonstrate adequate financial resources, robust trading systems, and qualified personnel. The issuance process follows a four-step approach. First, SCs register a list of underlying securities with the MoF for approval as eligible assets for CW issuance. Second, SCs prepare a comprehensive issuance dossier containing detailed information about the CW itself (type, strike price, expiration, underlying security, etc.), trading conditions (hours, limits, settlement), and a thorough risk disclosure. Third, this dossier is submitted to the Stock Exchange (SX) for review and listing. Finally, upon SX approval, CWs are tradable on the stock market.

In most developed warrant markets in Asia, call warrants are often more popular than put warrants, accounting for more than 70% of the total number of warrants issued. In 1997, in order to suit Taiwan's market conditions at that time, quite similar to Vietnam's current conditions, Taiwan chose to deploy a call warrant product, and 6 years later it declared a put warrant implementation. Therefore, in the early days of deploying warrant products, in Taiwan there was a lack of tools to hedge risks for put warrants (options) or short-selling was not allowed. From Taiwan's experience, Vietnam has applied a similar roadmap to deploy warrants. In the early stages of implementing warrants, in order to attract the attention of investors as well as create easy access to new products, Vietnamese regulatory agencies only allow the deployment of call warrants with the underlying assets being stocks, exercising European-style rights.

At maturity, CW has three states. These are the profit state, the breakeven state and the loss state. If the mature CW is in a profitable state, the stock price at the maturity date is greater than the sum of the exercise price and CW fee, the investor will receive the difference in profit, and the securities company will pay the investor. In the breakeven state, the underlying security price at the maturity date is equal to the sum of the exercise price and CW fee, the investor does

not receive payment for the difference, the securities company pays back the initial purchase fee to the investor. In a loss state, in case of partial loss, the underlying securities price is greater than the exercise price and less than the total exercise price and CW fee, the investor is not entitled to receive payment for the difference, the securities company pays investors the remaining amount. In case of total loss, the underlying security price at the maturity date is less than or equal to the exercise price, the investor is not entitled to receive payment for the difference. Investors do not carry out any procedures. The status of CW is not an investor's profit or loss. To calculate profit or loss at maturity, investors use the amount received from the securities company minus the capital cost of purchasing CW. Investors must vigilantly monitor market conditions and make informed decisions to optimize potential profits while minimizing associated risks. Buyers of CWs are not required to deposit margin before trading, reducing capital utilization rates while also fixing the maximum loss for investors. Additionally, this product is not restricted to foreign investment, allowing foreign investors to participate in the market and enhance liquidity in the stock market. However, this financial product also carries high risks due to its high leverage effect, requiring investors to have a solid knowledge of CW before trading to mitigate potential risks.

Nowadays, the Vietnamese market is developing, and strengthening regulations on trading, offering, settlement, execution of CW, and providing relevant information to create a solid legal framework for investors to participate in the market. According to Vietstock statistics, in 2023, the number of primary issued CWs was increasing by approximately 60% compared to 2022, reaching over 2.5 billion CWs issued by 10 companies. Compared to 2019 when CWs were first traded on the Vietnamese market, this issuance rate has increased by nearly 11 times (more than 1,000%) (Chi Kien, 2024). Besides, the value of a CW is equal to the sum of its intrinsic value and its time value. In particular, intrinsic value is the difference between the price of the underlying security and

the exercise price of the warrant. This value is affected by changes in the price of the underlying security, and only CWs that are in-the-money (ITM) have intrinsic value. Time value is the difference between the price of a CW on the market and the intrinsic value of that CW. The closer to maturity, the time value of the CW will decrease and become zero on the maturity date. So, CWs and underlying stocks have a close relationship, and important influence on the financial market. The issuance of CWs can affect stock prices, trading volume, and cause market volatility. This relationship not only creates opportunities but also presents challenges for investors and financial institutions.

Therefore, the research article “The impact of covered warrant issuance on underlying Stocks of Listed Companies in Vietnam” aims to provide investors with market information, thereby increasing investment options, and enhancing the stability of the Vietnamese stock market.

## 2. Literature review

### 2.1. Worldwide studies

#### *The impact of issuing covered warrants on price factors*

Extensive research has examined the impact of CW issuance on underlying stock prices, with findings ranging from positive to negative effects. Numerous studies around the world have documented a positive association between options listing and underlying stock returns, specially: In Germany, Heer, Trede & Wahrenburg (1997) studied options for 15 stocks and examined the impact of options trading at DTB for the volatility of the underlying stock. The results show that stock return variance increases after DTB adoption. Chan & Wei (2001) further studied the impact of option issuance on 189 warrants issued on a total of 39 underlying stocks between 1994 and 1996 on the Stock Exchange of Hong Kong (SEHK) and came out with a result that an increase in underlying stock price both before and on the date of an-

nouncement of the derivative warrant issuance and there is no significant effect surrounding the warrants trading day. In Hong Kong, using a sample of 165 call warrants issued between 1989 and 1997 on the Stock Exchange of Hong Kong (SEHK), the results of Chen & Wu (2001) are consistent with other studies. Previously based on Western markets. The team also found that the listing of the warrants resulted in a significant positive and lasting price impact on the underlying stocks. In Taiwan, by using the EGARCH model, Chan & Jelic (2005) studied 222 CWs listed on the Taiwan Stock Exchange (TWSE) from July 1997 to February 2003 and their findings aligned with previous studies, indicating a positive effect of CW listing on underlying stock prices. In China, Luo, Luo, and Li (2008) examined a sample of 16 call and 11 put warrants (including both equity and covered warrants) between August 2005 and December 2006. They found a significantly positive price effect on the listing day but not around the introduction day for call warrants, and a significantly positive price effect around the announcement day but not on the listing day for put warrants. Shi (2008), using a large sample of thirty-eight warrants between August 2005 and June 2007, discovered a significant and positive price effect on the underlying stocks when issuing covered call and put warrants.

In contrast to the positive findings, some studies have reported negative price effects following options listing. In Australia, Aitken & Segera (2004) discovered the negative impact of a decline in the price of call warrants on the announcement date and the first trading day of call warrants when observing 83 call orders on the Australian Stock Exchange (ASX) from 1991 to 2000. They attributed this negative impact to a potential signaling effect that options issuance might convey negative information about the underlying firm's prospects (Yip & Lai, 2009). In addition, Apinya Klinpratoom (2010) conducted a study focusing on the effects of warrant introduction and expiration on the price, volume, and volatility of underlying securities. Analyzing 303 call-covered war-

rants issued and expired on the London Stock Exchange (LSE) between 2007 and 2008, the research revealed that the introduction, announcement, and listing of CWs initially exerted negative but temporary influences on underlying security prices. Notably, the announcement phase had a more pronounced impact compared to the listing phase.

Besides, there are also some researches have found that there is no change in stock price before and after CW issuance. Long, Schinski & Officer (1994) examine the impact of initial options listing on price volatility of the underlying OTC stock. This study compares the price movements of the underlying stocks over a 250-day period before and after options trading for 111 companies. Data companies were obtained from the Center for Research in Securities Prices (CRSP) of the University of Chicago OTC Row. The results show no evidence of a change in option price volatility. Similarly, Kaivolahti (2008) examined a time period between the years 1998 and 2005. During this period new executive stock options were listed for a total number of 59 Finnish stocks and 45 companies. The study found no change in how much the stock price fluctuated (volatility).

### *The impact of issuing covered warrants on liquidity*

In addition to the price effect, the impact of issuing CWs on the liquidity of the underlying stock is widely studied around the world through changes in trading volume and bid-ask spread before and after the issuing event. Research by Chan and Jelic (2005) reported the positive effect of issuing CWs on trading volume, which means when issuing CWs, the trading volume of underlying stocks increases. This study also found that subsequent CW issuances have a positive effect on trading volume, but the impact level is lower than the first time. In the research of Chan and Wei (2001) in the Hong Kong market, an abnormal trading volume of the underlying stock was reported in the last 5 minutes of the first day of warrant issuance. An extensive study conducted

by Tommi Lindholm (2009) investigated the effect of issuing CWs on the liquidity of the underlying stock through the bid-ask spread and trading volume. Based on the results of the Wilcoxon ranking with 3 data samples: 30, 60, 90 days before and after CWs were listed, the study found the differences in the impact level of CW issuance on liquidity with different time periods; however, research did not show whether issued CWs increase or decrease the volume of shares traded. Additionally, the research by Kaivolahti (2008) show a significant increase in the number of shares traded (trading volume) following the listings. Similarly, Long, Schinski & Officer (1994) reported that the trading volume of OTC firms increases significantly with the introduction of options. Besides, Sahlstrom (2001) examined the impact of stock option introduction on the return and risk characteristics of underlying stocks in Finland. The results suggest that volatility and bid-ask spread levels are lower after the option listing.

On the other hand, research by Trevor W. Chamberlain (1993) in the Canadian market reported the little impact of listing options on the price and liquidity of the underlying stock. Research by Li Jiming (2010) in the Chinese market also showed similar results. Based on the event study method with a 20-day period: 10 days before and 10 days after listing, the study found that the CW issuance event has no significant impact on the trading volume of the underlying stock on the Shanghai Stock Exchange.

### **2.2. Viet Nam studies**

According to Financial Journal 08/2018 on “Impact of Covered Warrants on the Stock Market”, the issuance of CWs opens up a new trading channel in the market. CWs also help to solve the “room” problem for investors, by not limiting the ownership ratio and underlying assets, increasing liquidity, and promoting trading activities on the stock market through risk prevention measures. The price of CWs can depend on a number of factors of the underly-

ing stocks. The price of the underlying stocks is the most impactful factor due to the leverage of the product. A small movement in the price of the underlying stocks can lead to a large movement in the price of the CW. However, most studies in Vietnam were not in-depth regarding the impact of CWs on the underlying stock and only stopped at clarifying issues such as concepts and classification of CWs. For example, Nguyen Thi An (2013) provided a comprehensive analysis of the concept and characteristics of covered warrants (CW). She drew lessons from other countries to help Vietnam address the limitations of this financial tool and offered recommendations for developing Vietnam's warrant market. Thang Long (2017) analyzed highlighting its significant advantages in terms of account balance, attack properties, limited loss potential, and low costs. However, it also pointed out the product's complexity compared to existing bases in Vietnam, which could introduce risks, thereby suggesting solid development strategies for the Vietnamese stock market. Nguyen Thi Anh Tram (2020) gathered data from HOSE, SSC, securities companies (SSI), and Ho Chi Minh City Securities Joint Stock Company (HSC). Using statistical methods and general analysis, she found that Vietnam's CW market has achieved remarkable results, including a sharp increase in the number of warrants, trading volume, transaction value, and attraction of foreign capital. However, there are still some restrictive regimes that need addressing, leading to recommendations for the further development of CW in Vietnam. By evaluating previous empirical studies in foreign markets, it can be seen that the price effect and liquidity effect of issuing CWs on underlying stocks are not consistent across studies. Therefore, further research is crucial to comprehensively clarify the multifaceted relationship between CW issuance and underlying stock price and liquidity dynamics.

### 2.3. Research gap

In general, there have been relatively many

studies on the impact of CW issuance on stock prices, trading volume, and bid-ask spreads. However, there were few studies that delved into analyzing different regions with different market segments. Most previous studies examining exchange-traded options and exchange-traded derivatives have focused primarily on large and mature markets like the United States or China. This makes it difficult to assess the impact on smaller and emerging stock markets like the one in Vietnam. In Vietnam, documents about CW are mainly short articles in newspapers, magazines or blogs with theoretical frameworks adapted from foreign research and there are still some contradictions between previous conclusions. For these reasons, this paper's main goal is to assess the impact of CW issuance on underlying stocks.

## 3. Research Methods

### 3.1. Research hypothesis

#### *Price effect (abnormal returns)*

The price of the underlying stock is the price of a stock used as the reference asset for a derivative contract. According to the Efficient market hypothesis (Fama, 1970), prices should follow a random walk and therefore be unpredictable; and if they fully reflect all available information, it should not be possible for agents to make abnormal returns. However, there is extensive empirical evidence against market efficiency, which implies the potential arbitrage opportunities and the abnormal returns. Therefore, by analyzing the significance of abnormal returns, analyst can evaluate the price effects of securities on the market. In examining the impact of issuing CWs on the underlying stock price, many studies have used abnormal return variables, such as: Chen & Wu (2001) conducted research on SEHK in Hong Kong and found that the listing of warrants leads to a positive, long-term price impact on the underlying stocks. Besides, focusing on the Taiwan Stock Exchange (TWSE), Chan & Jelic (2005) investigated CWs. Their findings revealed a pre-introduction price increase for underlying

stocks, followed by a gradual decline. Similar results emerged from Aitken & Segeera's (2004) study on the Australian Stock Exchange (ASX) using call warrants issued between 1991 and 2000. They observed a significant negative impact on call warrant prices upon announcement and the first trading day. Therefore, the following hypothesis is proposed:

**H<sub>1</sub>:** Issuing covered warrants affects the abnormal return of the underlying stock.

*Liquidity*

Liquidity is a financial term that refers to how quickly an asset or security can be converted into cash without negatively impacting its price. The more liquid an asset is, the more quickly it can be sold, and the easier it is to sell it for fair value or current market value. In Taiwan, research by Chan and Jelic (2005) reported a positive impact on trading volume when issuing CWs. Based on the bid-ask spread and trading volume of the underlying stock in the Finnish market, Tommi Lindholm (2009) found the difference in the impact level of CW issuance on liquidity with different time periods. Meanwhile, Trevor W. Chamberlain (1993) conducted research in the Canadian market and Li Jiming (2010) on the Shanghai Stock Exchange all indicated that the listing of call options had no obvious effect on the trading volume of the underlying stock. Based on the above studies, the following hypotheses related to liquidity are proposed:

**H<sub>2</sub>:** Issuing covered warrants affects the trading volume of the underlying stock.

**H<sub>3</sub>:** Issuing covered warrants affects the bid-ask spread of the underlying stock.

**3.2. Model**

*Abnormal return*

Based on the results of the Wilcoxon-test of the Tommi Lindholm study (2009), this paper uses a quantitative research method through the Wilcoxon-test to examine the impact of CW issuance on the underlying shares. Event Study Methodology (MacKinlay, 1997) is based on a market model to examine stock price fluctua-

tions around 10 days before and after the issuance of CWs. Specifically, the study observed abnormal returns before and after listing CWs. The market model is described by the formula:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

In which:

$\alpha_i$  is the blocking limit

$\beta_i$  is the coefficient measuring the impact of market income on the income of stock i.

The return of stock i ( $R_{i,t}$ ) and the return of the market ( $R_{m,t}$ ) in time t are described as follows:

$$R_{i,t} = \ln[P_{i,t}(P_{i,t-1})^{-1}]$$

$$R_{i,t} = \ln[(VN - Index_t) (VN - Index_{t-1})^{-1}]$$

Abnormal return is calculated according to the formula:

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{m,t})$$

In which:

$AR_{i,t}$  is the abnormal return of stock i on day t

$\hat{\alpha}_i, \hat{\beta}_i$  are the estimates of  $\alpha_i, \beta_i$  in the Ordinary Least Squares method (OLS).

To ensure the operation of trading issuance certificates is guaranteed in the situation and the total unexpected profit throughout the period, rapid abnormal return (CAR- cumulative abnormal return) will be used. Specifically, CAR in the period  $t_1$  to  $t_2$  is calculated according to the following formula:

$$CAR_{i,(t_1, t_2)} = \sum \{t = t_1\} \wedge \{t_2\} AR_{i,t}$$

*Trading volume*

The study examines daily abnormal trading volumes using a 21-day event window. First, the daily stock turnover for each of underlying stocks is calculated as:

$$TO_{it} = \text{Number of stocks } i \text{ traded on day } t \div$$

$$\text{Number of stocks } i \text{ outstanding on day } t$$

The cross sectional daily turnover for day 't' as the average turnover for all underlying stocks during the estimation period and the event window is,

$$TO_t = N^{-1} \sum \{i\} \wedge \{N\} TO_{it} (\overline{TO}_t)^{-1}$$

Where, N represents the number of CWs being researched.

The abnormal trading volume for each underlying stock during the estimation period and the event window is determined by the formula,

$$AV_t = TO_t - 1$$

The average cross sectional abnormal trading volume across the sample stocks during the estimation period is calculated as follows,

$$\overline{AV}_i = (\sum_{t=-40}^{-20} AV_{i,t}) \div 20$$

This article also measures and compares the trading volume ratios 20 days before and 20 days after the CWs introduction. The ratios are calculated as,

$$RV_{i,t} = (V_{i,t} \div T_{i,t}) \times 100$$

Where,

$V_{i,t}$  is the average daily trading volume of stock  $i$  on day  $t$

$T_{i,t}$  is the total daily trading volume of the market on day  $t$

### *Bid-Ask Spread*

The relative bid-ask spread was studied based on the method of Sahlstrom (2001). In this method, the bid-ask spread is calculated by dividing the dealer's bid-ask spread by the average between the bid and ask prices. The resulting value represents the percentage difference of the bid price compared to the average price of the asset. In this paper, the authors use the best selling price and best buying price, which are highest sell order price and lowest buy order price in the trading session of the underlying stock in Vietnam's market, and are calculated using the following formula:

Bid-ask spread = (Best selling price – Best buying price)  $\div$  ((Best selling price + Best buying price)/2)

The bid-ask spread is calculated for each CW code during the event period of 10 days before and after the issuing of CWs. Then, the Wilcoxon rank sum test is used to examine the impact of CW issuance on bid-ask spreads.

### **3.3. Data**

In this paper, the research team use the secondary data related to 113 unexpired CWs of 20 underlying stocks with CWs listed on HNX and HOSE. Due to the lack of time and the difficulty in data access, the authors concentrate on the unexpired warrants on the market, during April 2023 to January 2024. In cases when two or more CWs, on the same underly-

ing stock with similar introduction date, we selected only one represent CWs to avoid overlaps in observations during the event window. Data is collected from different sources such as the State Securities Commission, Vietstock, Investing, and financial statements of businesses. In particular, collected data includes release date, underlying stock's price, best-buying price, best-selling price, trading volume, and total market trading volume.

With price effects, this article uses a market model with an event window of 10 days before and 10 days after the issuance of CWs. In a total number of observations of 2,373, the authors estimate the return of stock  $i$  ( $R_{i,t}$ ) according to the return of the market ( $R_{m,t}$ ). Similarly, with the trading volume and the bid-ask spread, the authors use an event window of 10 days before and after the issuing covered warrants with a total number of 2,373 observations of 113 validated CWs.

## **4. Empirical results and discussion**

### **4.1. Descriptive statistics**

Table 1 summarizes the descriptive statistics for the variables in the empirical models including the means, minimum, maximum, and standard deviations. As can be seen from this table, the average value of the return of stock  $i$  is -0.00134, while the return of the market has a higher average value of -0.00106. The average turnover of underlying stocks is 0.00374. The relative trading volume ratio, with the average value of 1.31692, has the highest fluctuation from 0.0398 to 9.2896. Similarly, the bid-ask spread also has a wide range of variation with the value fluctuating from -2 to 0.01954 and takes the average amount of -0.01937. Especially, the bid-ask price difference of -2 occurs on days when the sell order price of the underlying stock is 0, this shows that there are currently no investors in the market who want to sell the stock.

### **4.2. Abnormal returns**

**Table 1. Descriptive statistics**

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
$R_{i,t}$	2,373	-0.00134	0.01978	-0.15109	0.06729
$R_{m,t}$	2,373	-0.00106	0.01190	-0.046	0.0339
TO	2,373	0.00374	0.00476	0.00012	0.03982
AV	2,373	-0.99625	0.00476	-0.99988	-0.96018
RV	2,373	1.31692	1.25392	0.0398	9.2896
Bid-ask spread	2,331	-0.01937	0.10227	-2	0.01954

Source: Authors' idea

**Table 2. Average pre- and post-release AR and CAR during the event window**

	N	ARs	CARs
Before issuing (1)	113	-0.000094	0.001015
After issuing (2)	113	0.000175	-0.000155
Difference ((1) - (2))		-0.000269	0.00117
Z-statistics		-6.039	-6.039
P-value of Wilcoxon test		[0.62]	[0.00]

Source: Authors' calculations from Stata 17

To test whether the event of a CW issuance has an impact on abnormal returns, the paper uses a Wilcoxon test with the following pair of hypotheses:

$H_0$ : Abnormal returns have no difference before and after issuing CWs.

$H_1$ : Abnormal returns are different before and after issuing CWs.

The P value [in brackets] represents the significance level of the difference in the Wilcoxon test of AR and CAR, for the 10-day event period before and after the issuance of the CWs. With a P-value of 0.62, the research team found that there is not enough basis to reject the hypothesis  $H_0$  at the 1% and 5% significance levels. The above results do not show a difference between the median AR before and after publication. Our findings, consistent with Sahlstrom (2001) and Kaivolahti (2008), demonstrate no significant difference in median AR before and after CWs issuance.

The average abnormal return for the entire event with 2,373 observations in the event window from day -10 to day 10 is shown in Table

**Table 3. Daily Abnormal Return (AR) and Cumulative Abnormal Return (CAR)**

Day	AR	CAR
-10	0.00196	0.00196*
-9	0.00144	0.00340*
-8	-0.00345***	-0.00005*
-7	-0.00106	-0.00110
-6	0.00144	0.00034
-5	0.00143	0.00177
-4	0.00032	0.00209*
-3	-0.00038	0.00171*
-2	-0.00073	0.00097*
-1	-0.00191	-0.00094*
0	0.00032	-0.00062*
1	0.00293*	0.00231*
2	-0.00178	0.00054*
3	0.00069	0.00122*
4	-0.00237	-0.00115*
5	-0.00050	-0.00165*



Day	AR	CAR
6	0.00045	-0.00120*
7	-0.00019	-0.00140*
8	0.00099	-0.00040
9	0.00121	0.00080*
10	-0.00080	0.00001*

The level of significance for the T- test for mean = 0 vs. mean ≠ 0, given as: \* significant at 1%; \*\*significant at 5%; \*\*\* significant at 10%

Source: Authors' calculations from Stata 17

3. Before the event  $t = 0$ , the return is negative in the period (-3; -1) even though it was positive before, but the majority are not statistically significant at 1% and 5%. Considering the CARs, the majority before the issuance date and immediately after the issuance date are both positive and significant at the 1% significance level around this CW issuance. This contradicts and does not support the researchers' hypothesis 1, which is consistent with results previously reported in research on choice lists such as Long, Schinski & Officer (1994); Heer, Trede & Wahrenburg (1997). Therefore, stock prices on the days before CW issuance do not tend to change.

This can be explained by the existing data sample in the Vietnamese stock market, specifically: the market is still quite young, there is not a large enough concentration of professional investors, and at the same time the psychological investors' fear creates a major barrier to buying and selling, leading to the issuance of CWs not really having a significant impact on the price

of the underlying stock. The conversion rate is also an important factor that prevents the issuance of CWs from having a significant impact on the underlying stock price in Vietnam. With a relatively low conversion rate, buying and selling CWs have little impact on the supply and demand of the underlying stock on the market. Supply and demand are less volatile, leading to little impact on stock prices. Issued CWs usually have a conversion rate ranging from 10% to 30%. If investors are willing to invest in the market, the issuance of CWs will of course not have a big impact on the price of stock.

#### 4.3. Trading volume

To test whether the CW issuance event has an impact on the trading volume of the underlying stock, the Wilcoxon tests are conducted using the three following pairs of hypotheses:

The first pair of hypotheses:

$H_0$ : Stock turnover has no difference before and after issuing CWs.

$H_1$ : Stock turnover is different before and after issuing CWs.

Second pair of hypotheses:

$H_0$ : Abnormal trading volume has no difference before and after issuing CWs.

$H_1$ : Abnormal trading volume is different before and after issuing CWs.

And the third pair of hypotheses:

$H_0$ : Relative trading volume ratio has no difference before and after CW issuance.

$H_1$ : Relative trading volume ratio is different before and after CW issuance.

**Table 4. Average pre- and post-release TO, AV and RV during the event window**

	N	TO	AV	RV
Before issuing (1)	113	0.00399	-0.99601	1.2590
After issuing (2)	113	0.00351	-0.99649	1.34614
Difference ((1) - (2))		0.00048	0.00048	-0.05024
Z-statistics		3.169	3.190	-2.035
P-value of Wilcoxon test		[0.0333]	[0.0014]	[0.0418]

Source: Authors' calculations from Stata 17

**Table 5. Daily Stock turnover**

Day	TO
-10	0.00378***
-9	0.00428
-8	0.00450**
-7	0.00391
-6	0.00407**
-5	0.00428*
-4	0.00419*
-3	0.00335*
-2	0.00359*
-1	0.00390*
0	0.00349*
1	0.00345*
2	0.00350*
3	0.00375*
4	0.00300*
5	0.00312*
6	0.00329
7	0.00362**
8	0.00368*
9	0.00368*
10	0.00401**

*Source: Authors' calculations from Stata 17*

Table 4 reports the result that the difference between the average value before and after the release of the stock turnover and abnormal trading volume is 0.00048, indicating that there is a decrease in the abnormal trading volume after issuing. On the contrary, the relative trading volume ratio after issuance has increased by -0.05024 compared to the before ratio. With the P-value result of 0.0333, 0.0014 and 0.0418 respectively, the hypothesis  $H_0$  of the two first hypotheses are rejected at the 1% and 5% significance level, and the last hypothesis  $H_0$  is rejected at the 5% significance level. The results of all three tests according to the Wilcoxon test show that there was a difference between the trading volume of the underlying

stock in the event window before and after the issuance of CWs. This result is consistent with the results of previous studies by Chan & Jelic (2005) and Tommi Lindholm (2009).

Table 5 above shows the average turnover for the entire event window with 2,373 observations from day -10 to day 10. The average daily stock turnovers are most likely higher in the 10 days before CWs introduction than in the 10 days after during the entire event period. The table also indicates that the majority of turnovers are statistically significant at 1% and 5%. This result is consistent with our hypothesis 2, and with results of Chen & Wu (2001) and Chan & Jelic (2005).

The impact of issuing CWs on changing the trading volume of the underlying stock can be explained by the following reasons. First, CWs are considered a risk-hedging investment tool with flexibility, high liquidity and high leverage, which can attract investors with small amounts of capital who both want to amplify profits and keep losses at a fixed level that they can afford. Therefore, when a firm issues CWs, investors in the market also have higher expectations for its underlying stock, thereby increasing the demand of trading. Second, issuing CWs and putting them into trading on the market also increases the interest of foreign investors in Vietnam's stock market. In 2023, foreign investors participated in buying more than 8.45 million CWs, accounting for 10.37% of the total market trading volume and selling more than 10.12 million CWs, accounting for 12.42% of the total trading volume (HOSE, 2024). In addition, due to Vietnam's regulations limiting foreign ownership in businesses, issuing CWs will help businesses attract more foreign investment capital. Accordingly, domestic investors will also see more potential in the stocks of those businesses and participate in trading more of the businesses' stocks, increasing market liquidity.

#### 4.4. Bid-Ask Spread

To test whether the CW issuing leads to a change in the bid-ask spread of the underlying

**Table 6. Average relative bid-ask spread before and after issuing CW**

	N	Bid-ask spread
Before issuing (1)	113	-0.022568
After issuing (2)	113	-0.0166478
Difference ((1) - (2))		-0.00592
Z-statistics		-3.448
P-value of Wilcoxon test		[0.0006]

*Source: Authors' calculations from Stata 17*

ing stock, the research team uses the Wilcoxon rank-sum test with the pair of hypotheses as follows:

$H_0$ : The bid-ask price spread has no difference before and after issuing CWs.

$H_1$ : The bid-ask price spread has difference before and after issuing CWs.

Stata 17 is used to take the Wilcoxon test and get the results.

The results of using the Wilcoxon rank sum test show that there is a difference in the bid - ask spread at two times before and after the issuing of CWs, specifically follows the table 6. The authors' research results find that the difference between the average value before and after the issuing of CWs of the bid-ask spread is -0.00592, indicating that the bid-ask spread after issuing CWs is more than at the time before issuing. With a P-value result of 0.0006, the hypothesis that there is no difference in the bid-ask spread before and after CW issuance is rejected at the 1% and 5% significance levels. This result shows that there is a difference between the bid-ask spread before and after issuing CWs. This is consistent with the study of Tommi Lindholm (2009). Therefore, it can be seen that the issuing CWs have an impact on the liquidity of the underlying stock due to the difference in the bid-ask spread. The bid-ask spread reflects the liquidity of the stock (Vasiliki Plerou et al., 2005).

Table 7 above shows the average value of the bid-ask spread of 10 days before and 10 days after issuing a CW. This table indicates that the majority are statistically significant at 1% and 5%. During the period (-10;-1), the average

value of the bid-ask price difference fluctuates but increases and decreases irregularly with the difference between the largest value and the smallest value being 0.0583 and not in a certain direction. The smallest difference is -0.00977 before the CW's issuance date, showing that the level of interest of investors in the market about the underlying stock is greatest when the smaller the bid-ask spread shows good liquidity. The negative sign of (-0.00977) finds that the best-selling price is smaller than the best-buying price, which shows that investors are willing to spend more money to own the stock. During the period (1; 3), the average

**Table 7. Daily Bid-ask spread**

Day	Bid-Ask Spread
-10	-0.01585***
-9	-0.01222
-8	-0.01819***
-7	-0.01362*
-6	-0.01249*
-5	-0.03669*
-4	-0.01212**
-3	-0.04520*
-2	-0.04855*
-1	-0.00977*
0	-
1	-0.01414*
2	-0.02900*
3	-0.03385*
4	-0.01749*
5	-0.01462*
6	-0.01271
7	-0.03559*
8	-0.01350*
9	-0.02056*
10	-0.01734**

*The level of significance for the T- test for mean = 0 vs. mean ≠ 0, given as: \* significant at 1%; \*\*significant at 5%; \*\*\* significant at 10%*

*Source: Authors' calculations from Stata 17*

value of the bid-ask spread tends to increase slightly, showing that liquidity has changed in a downward direction. However, the difference tends to decrease in the period (3;6). This can be explained by the fact that the current Vietnamese stock market is still very young as the market has just been established for more than two decades and the efficient market is still weak, so the lag is still long and the level of influence is shortened.

### 5. Recommendations

#### *For investors*

Investors should equip themselves with knowledge about this type of warrants being issued and conduct research on the CW affects the underlying stock and the rate of return according to the characteristics of the warrants (maturity time, price, etc). Monitoring market information and developments is crucial as it allows investors to identify CW issuers with growth potential and invest in them to benefit from underlying stock price appreciation. Additionally, understanding how CWs affect the underlying stock price can help investors effectively manage risk. If they recognize that CWs can create selling pressure on stocks, investors can take measures to reduce their holdings to protect their interests from negative impacts. Investors need to consider information on the company's growth prospects and the potential for future price appreciation of the company's stock through financial analysis reports from securities companies.

#### *For securities companies*

*Firstly*, securities companies can adjust fees related to CW transactions, such as fees for buying and selling CWs, transaction fees, and management fees. Additionally, they may offer incentives to investors to enhance the attractiveness of CWs.

*Secondly*, securities companies can adjust the holding period for CWs to be shorter (up to a maximum of 1 year). This is because when there is a large number of CWs with extended holding periods, there may be selling pressure on

the stock when investors use CWs to purchase shares at a discounted price. This could potentially create downward pressure on stock prices. *Thirdly*, securities companies need to implement technology, blockchain-based systems to provide transparency and increased security in CW transactions, while minimizing risks and price manipulation.

#### *For the Government*

Although with many advantages and potential for development, CWs still carry certain risks such as: the risk of default by the issuing organization, the risk of insolvency of the issuer, the risk of CW price manipulation, risk of manipulating underlying stock prices, etc. Therefore, to ensure the stability of the CW trading market, the government can implement the following measures:

*Firstly*, strengthen the standardization of information and information systems, and closely monitor the market. Legislation should provide regulators with effective and specific management tools, such as standardizing information collection, the right to collect information from any relevant party, the obligation to report immediately upon executing a transaction, an automated information update system, and the right to conduct inspections when irregular transactions are detected. Regulators have the authority to intervene or prevent transactions or practices that are harmful to the market, such as price manipulation. In addition, it is necessary to study and amend some criteria of VN30 to ensure quality and scale. Furthermore, the research team proposes the application of an early warning mechanism. The regulator is also responsible for early warning to the entire market and implementing appropriate measures to prevent and control risks.

*Secondly*, strengthening training for securities companies and investors systematically through direct training courses seminars, and through securities companies (SSCs) Expand the development of large-scale scientific courses to provide investors with opportunities to learn and equip themselves with knowledge about CWs, helping the CW trading market to

become increasingly active.

*Thirdly*, investing in technology infrastructure, unlike the basic stock market, the role of securities companies is largely related to infrastructure for investors' trading. CW trading requires SSCs to participate at a deeper level as CW issuers. SSCs need to invest heavily in upgrading infrastructure to ensure compatibility with the Stock Exchange.

## 6. Conclusion

Based on the research and evaluation, the research team draws the following conclusions:

*Firstly*, using the Wilcoxon signed-rank test, the team found a relationship between CW issuance and trading volume, as evidenced by the stock turnover ratio, abnormal trading volume, and relative trading volume ratio.

*Secondly*, similar to the trading volume of underlying stocks, the issuance of CWs has a clear impact on the bid-ask spread, with the bid-ask spread after issuance being larger than

the bid-ask spread before issuance. This result reflects the impact on the liquidity of the underlying stock.

*Thirdly*, considering the overall Vietnamese market, the issuance of CWs does not affect the value of the underlying stocks of listed companies. This result is fully consistent with the nature and conditions of the Vietnamese market at present. Although this factor has no practical significance, it provides a full theoretical basis for the issuance of CWs and the price of underlying stocks, thereby contributing to the improvement of subsequent research.

There are many difficulties in the issuance of CWs in the Vietnamese market. Therefore, future research should extend the research period and increase the data window to consider the long-term impact of CW issuance. In addition, expanding the scope of research and other factors should also be considered to better determine the impact of CW issuance on enterprises. ■

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