Behind the scenes of Market Making

Warrants Fact Sheet

ASX
AUSTRALIAN SECURITIES EXCHANGE

For many investors, especially those who are new to investing and trading in warrants, market making is still a difficult concept to grasp. Questions that we often hear from investors are either general in nature, such as: "What does market making mean? What are the obligations of a market maker?" or more detailed and targeted questions such as: Why do bid and offer spreads change? Why does the warrant issuer change its volume? Here we take the opportunity to shed some light on these questions and to help investors feel more comfortable trading the warrants market.

"ASX obligates warrant issuers to maintain markets during regular trading"

ASX obligates warrant issuers to maintain markets during regular trading. Issuers must "make a market" in all warrant series on an ongoing basis, by ensuring that a reasonable bid and volume is maintained in the market for a prescribed period (90% of the time between 10:15 am and the close of Normal Trading on any Trading Day).

ASX may relax these obligations if the initial issue of warrants generates a sufficient spread of holders. A sufficient spread of holders demonstrates a level of interest that should ensure that there is a liquid market for buyers and sellers of the warrant series.

As a result of these obligations you should find a buy and a sell price for the warrant you are interested in. Sometimes, however, investors may not find a bid and/or an offer price for a particular warrant. One reason could be that an underlying share is suspended from trading and as a result, so too will be the relevant warrants issued over that share. Another reason for a bid and /or offer price not being quoted could be technical problems with the warrant issuer's market making system. In this case, investors should contact the warrant issuer directly.

One of the things that may prove difficult for investors to understand is the changing of bid and offer volumes or spreads (difference between bid and offer price) during a trading day. This however, simply reflects the liquidity in the underlying market and therefore the ability of the warrant issuer to hedge its exposure.

"A warrant issuer does not take an opposite view from the investor on the direction of the underlying stock"

To illustrate why the change in volume or spread might happen, we should take a look at an example:

When the issuer enters into a trade, they will hedge their exposure by buying or selling a number of shares as defined by the warrant's delta. If you buy 10,000 call warrants with a delta of 50%, the issuer would need to buy 5,000 shares nearly simultaneously. The price at which the issuer will be able to buy these shares will be reflected in its offer price for this warrant.

The reason for this is, contrary to the belief of many novices in the warrants market, that a warrant issuer does not take an opposite view from the investor on the direction of the underlying stock.

When looking at the liquidity of the shares the bid and offer could look as follows:

VOLUME	BID	OFFER	VOLUME
2,000	4.67	4.68	1,000
1,000	4.66	4.69	3,000
3,000	4.65	4.70	2,000

If the warrant issuer sells 10,000 warrants to you, they would need to buy 5,000 shares that they could get at an average price of $4.69, which is higher than the offer you would see for the shares.

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Now the issuer is faced with two choices:

Leave the quoted size untouched (10,000 warrants) and increase the spread of the warrant (bid and offer) to reflect the higher hedging cost, or maintain the spread, but reduce the volume available in the warrant for investors to buy, i.e. reduce the volume to 2,000 warrants on offer.

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Most issuers tend to go with the second option, so that spreads stay relatively tight and competitive.

Until now, we have assumed that warrant issuers do not like to take a view on the underlying stock when selling warrants. But why is this the case? Let's find out by looking at the following warrant issue:

Issue size	10,000,000 Call warrants
Maturity	1 year
Exercise price	$5.00
Price of underlying at issue	$5.00
Warrant price at issue	$0.20

Let's assume the warrant issuer sells 10,000,000 warrants and collects $2,000,000 in premium. At maturity, the warrant can either be in-the-money, requiring the issuer to deliver 10,000,000 shares, or expire worthless. If the issuer were to take a directional view on the share, there would be two possible scenarios:

a) The issuer is bullish on the stocks and buys 10,000,000 shares on issue as they would anticipate the warrant ending up in-the-money.

b) The issuer is bearish on the share and does not buy any shares at all, reflecting the view that the warrant will end up worthless at expiry.

If the issuer were to pursue strategy a), but the stock fell over time (contrary to their view) and the shares closed at $3.00 on expiry, the outcome would be that the warrant would expire worthless and thus wouldn't be exercised by the holder, forcing the issuer to sell the shares bought at $5.00 for $3.00, realising a $20 million dollar loss. After taking into account the premium income of $2,000,000 the issuer would end up with a net loss of $18 million dollars purely on the speculation that the stock would rise.

If the issuer had pursued strategy b), but the stock had gone up to $6.00 instead, the warrants would finish in-the-money, the holders would exercise the warrants and the issuer would need to buy 10,000,000 shares at $6.00 at expiry of the warrant. The issuer would need to deliver the shares for $5.00 to the warrant holders, creating an $8 million dollar loss after taking into account the premium income.

Obviously, if the warrant issuer's view was right in either scenario, they would make a profit. However, the risk of losing money if their view on the stock is wrong is too great, and this is one of the reasons why warrant issuers maintain a market neutral position and undertake delta hedging.

"The delta of a warrant changes when the underlying share price changes"

Once a warrant issuer has entered into a trade to sell a warrant, and has implemented their first hedge based on the delta of the warrant, it needs to monitor its position to remain delta-neutral. However to achieve this isn't always easy. The delta of a warrant, which indicates how many shares need to be bought or sold to hedge the issuer's risk, changes when the underlying share price changes. The issuer therefore needs to hedge risk "dynamically".

To illustrate what is referred to as "dynamic delta hedging", let us look at an example on how warrant issuers monitor their position from day to day.

Consider a warrant issuer sells 1 million warrants at $0.20 on day one, earning $200,000. The delta of the warrant is 40%, thus the issuer needs to purchase 400,000 shares.

Time	Delta	Price Share	Issuer buys/ sells shares	Cost ($)
Day 1	40%	$2.00	+400,000	(800,000)
Day 2	41%	$2.10	+10,000	(21,000)
Day 3	42%	$2.20	+10,000	(22,000)
Day 4	40%	$2.00	-20,000	+40,000

As the share price increases, the delta of the warrant changes which means that on day two, the issuer would need 410,000 shares to cover its position and to be neutral. As they carry over 400,000 from day one, the issuer is forced to buy an additional 10,000 shares into a rising market. Vice versa on day 4, the delta has come down again and the issuer only needs 400,000 as a hedge. As they are long 420,000 shares, they need to sell 20,000 into a declining market. The issuer is doing what is called "dynamic delta hedging", and is forced to buy high, sell low.

Looking at the issuer's overall position on day four, the issuer holds 400,000 shares worth $800,000.

However, the net cost of the shares was $803,000, reflecting a $3,000 loss. Warrant premiums are calculated in a way to compensate the issuer from the cost of delta hedging.

The above example shows the rebalancing of the issuer's portfolio on a day-to-day basis. In real life, however, share prices do change nearly continuously, and the above mechanism of hedging will be implemented throughout a trading day.

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Most warrant issuers do offer indicative pricing matrices on their websites to investors. The intention is to give an indication about the price of a warrant, given a certain level of the underlying asset. Investors should be aware that various factors affect the pricing of warrants. As parameters like the share price, the underlying liquidity or the volatility in the underlying asset changes so does the warrant price. As the matrix is a "snapshot" of the warrant price for a given set of conditions it does not reflect pricing parameter changes during the trading day. Investors should therefore see pricing matrices as providing indicative pricing information only.

Warrant pricing and market making is not rocket science, but the investor should have an understanding of the functionalities in the market to understand why prices are the way they are, and how they are being calculated. This also helps investors to avoid frustrations when and if market volume and/or spreads are changing in volatile times.

For more information visit **www.asx.com.au/warrants** or email **warrants@asx.com.au**.

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