

# Convertible bonds valuation in financial reporting

Alex Leung and Ross Wang explain the principles and techniques used in accounting for hybrid products and their impact on profit and loss accounts and balance sheets

In recent years, convertible bonds, being a hybrid of investment and financing vehicles, were favoured by many enterprises and organizations due to their flexible features.

Because of their hybrid nature, multiple accounting standards must be adhered to as they have a significant impact on financial statements. Corporate financial professionals must pay close attention to their corresponding treatment. This article aims to introduce some principles and techniques for convertible bonds valuation.

The world's first convertible bond was issued by the New York & Erie Railroad Company in the United States in 1843. After 170 years of development, modern convertible bonds have become more complex. Besides debt contract and conversion options, terms such as redemption options, call options and anti-dilution provisions now are also included. In some cases the terms of the convertible bonds may also be associated with the company's business operation, such as the level of net profit or the success of an initial public offering.

## Changes in the fair value of convertible bonds

Under basic circumstances, the value of a convertible bond can be categorized into debt portion and conversion option. The value of the debt portion may be affected by risk-free interest rates, credit spreads, maturity and other factors. The value of the conversion option may be affected by stock price, volatility, maturity and other factors.

Table 1 shows key variables affecting the value of convertible bonds from the holder's perspective:

Key variables	Changes	Changes in fair value of convertible bonds
Risk-free interest rates	Increase	Decrease
Credit spreads	Increase	Decrease
Remaining life	Increase	Increase
Stock price	Increase	Increase
Stock price volatility	Increase	Increase
Issuer's redemption option	Inclusion	Decrease
Holder's put option	Inclusion	Increase

**Table 1: Impact of variables on the fair value of convertible bonds**

## Relevant accounting treatment of convertible bonds

As convertible bonds include characteristics of equity instruments, debt instruments, derivatives and others, there is no single requirement under Hong Kong Financial Reporting Standards that governs convertible bonds. Compared to other investment vehicles, one must refer to multiple requirements of HKFRS when applying the correct accounting treatment to convertible bonds.

The following are several basic accounting concepts under HKFRS:

### Host contract

The host contract refers to one that can be applied independently without the presence of other contracts. With convertible bonds,

the host contract often refers to the debt portion of the convertible bond contract.

### Embedded derivative

With convertible bonds, the embedded derivative refers to the conversion option, issuer redemption option, holder put option and those derivatives affiliated with the host contract.

### "Closely related" conditions

According to HKAS 39 *Financial Instruments: Recognition and Measurement*, if the host contract and the embedded derivative are described as "closely related," they must be accounted for on a combined basis. If they are not recognized as closely related, the embedded derivative has to be separately accounted for from the host contract.

HKAS 39 provides that an embedded derivative should be separated (bifurcated) from the host contract and accounted for as a derivative if all of the following conditions are met:

- The economic characteristics and risks of the embedded derivative are not closely related to the economic characteristics and risks of the host contract;
- a separate instrument with the same terms as the embedded derivative would meet the definition of a derivative; and
- the hybrid instrument is not measured at fair value with changes in fair value recognized in profit and loss.

Under normal circumstances the conversion option and the host contract are not closely related. Redemption provisions and holder's put options must adhere to the three conditions above to arrive at a closely related conclusion.

**“Fixed-for-fixed” condition**

HKAS 32 *Financial Instruments: Presentation* states that a contract that will be settled by the entity (receiving or) delivering a fixed number of its own equity instruments in exchange for a fixed amount of cash or another financial asset is an equity instrument complying to a “fixed-for-fixed” condition.

Dealing with convertible bonds often requires a “fixed-for-fixed” judgment in order to go through with the conversion option of the embedded derivative.

**General valuation techniques of convertible bonds****Transaction price and market price**

For convertible bonds that have sufficient historical transaction records or that are traded on the public exchange market, the transaction prices are generally regarded as good fair value indicators.

**Comparable companies and comparable bonds**

When performing valuation on convertible bonds, some information such as the underlying stock prices and credit spreads of the convertible bonds issued by the entity may not be available. In these cases, valuers may try to find comparable companies or comparable bonds on the market as an auxiliary tool in determining such variables. A separate business valuation on the underlying stock may also be needed.

**Binomial tree valuation model**

The binary pricing model was proposed in “Option Pricing: A Simple Method,” an article published in the *Journal of Financial Economics* in 1979 by Stephen A. Ross, John Cox and Mark Rubinstein. This model was initially introduced to calculate the value of stock options. However, further development of this model has led to it becoming an effective and practical tool in estimating the value of convertible bonds.

The binomial tree valuation model is built on the basic assumption that in a given time interval the asset prices may rise or fall. By predicting future stock prices and market interest rates, the model can assess the value of convertible bonds in future time nodes and discount it to the valuation date. The model

involves comprehensive financial modelling knowledge and requires extensive expertise on the part of a professional analyst.

**Treatment of commercial terms**

To cater for various business needs, it is common to add terms related to the issuer’s business operations in the contract of the convertible bond. As an example, if Company A’s audited net profit in year 2012 failed to reach HK\$30 million, the holder can sell the convertible bond back to Company A at 105 percent of the nominal value. Another example might be that if Company B failed to obtain a qualified IPO from the Hong Kong stock exchange, the holder has the right to receive the principal amount together with a premium calculated based on a 15 percent internal rate of return upon maturity.

When encountering such commercial terms, the valuer must expand the scope of investigation. Aside from thoroughly examining the convertible bond contract itself, conducting due diligence on the entity’s operations is also crucial. It is necessary to conduct management interviews, financial statement analyses, financial forecasting reviews and other means to fully understand the operations of the target company. From such due diligence procedures, valuers can reach a reasonable conclusion and adopt proper valuation techniques.

**Selection of variables in convertible bonds valuation****Risk-free interest rate**

Normally there is not much controversy in determining the risk-free rate. Several applicable approaches are available, such as the forward rate of the bond term structure and the current rate of the long-term bonds.

**Credit spreads**

In order to determine the credit spread, valuers must obtain the credit ratings of the subject convertible bond. If the convertible bonds do not receive any credit ratings from an authorized organization, valuers may perform analysis on the financial information of the target company. Once the valuer concludes a reliable credit rating, market comparable bonds can be adopted

to obtain the credit spreads of the subject convertible bond.

**Stock price of the target company**

If the target company is a listed company and if the trade of the stock is active, valuers can generally use the listing price as the stock price.

If the target company is a non-listed company, valuers will need to first evaluate its equity interest. This requires further investigation to reach a value conclusion.

**Volatility of stock price**

If the target company is a listed company, valuers can use historical transactions as the basis and calculate the volatility of the stock price.

If the target company is a non-listed company, valuers may locate a set of comparable companies, research the volatility of their stock prices and reach a reasonable price volatility.

In general, the duration or history used to assess the volatility should match with the remaining period of a convertible bond.

**Redemption option, put option, conversion price revision clause**

In existence of more complex terms, valuers may modify the binomial tree model to incorporate various clauses. In many situations, valuers can also consider Monte Carlo methods of option pricing or appropriate software, such as Microsoft’s Visual Basic for Applications.

**Looking forward**

Before issuing convertible bonds, companies should obtain a full understanding of their effects on financial statements. Due to complications regarding accounting standards and the professionalism of the assessment techniques, even a minor term in the contract could have significant impact to the profit and loss account and the balance sheet.



**Alex Leung** is senior director and **Ross Wang** is manager of valuation and advisory services, Greater China, at CBRE Hong Kong.