

11th International Conference on Industrial Engineering and Operations Management  
XXI Congreso de Ingeniería de Organización  
Valencia, Spain, July 5-6, 2017

## Mandatory Convertible Bonds as an Efficient Method of Issuing Capital

Huerga A<sup>1</sup>, Rodríguez- Monroy C<sup>2</sup>

**Abstract.** Mandatory Convertibles Notes (MCNs) mean only a small fraction of all the securities issued by corporate or financial institutions, however, they represent nearly a 30% in volume of the convertible securities issued every year. MCNs share characteristics of equity and debt securities but rating agencies assign them a high equity component and are commonly treated as equity by accounting standards. Despite the high facial coupon that MCNs seem to pay, a deeper analysis shows that the cost of MCN can be lower than the cost of issuing hybrid or subordinated debt and in some cases similar to the cost of issuing senior debt. Mandatory convertibles were profusely issued by financial institutions amid the global crisis as a means to increase capital and could be considered as a predecessor of some types of AT1 and Contingent Convertible. The academic literature about Mandatory Convertibles is scarce and we consider necessary to shed some light on a type of security that can be very useful for the real economy

**Keywords:** Mandatory Convertible Note, Capital, Dividend Protection, Call-spread, cost of capital

---

<sup>1</sup> Angel Huerga (✉e-mail: [angel.huerga@gmail.com](mailto:angel.huerga@gmail.com))  
Dpto. de Organización, Administración de Empresas y Estadística. ETS de Ingenieros Industriales. Universidad Politécnica de Madrid (UPM), España.

<sup>2</sup> Carlos Rodríguez-Monroy (✉e-mail: [crmonroy@etsii.upm.es](mailto:crmonroy@etsii.upm.es))  
Dpto. de Organización, Administración de Empresas y Estadística. ETS de Ingenieros Industriales. Universidad Politécnica de Madrid (UPM), España.

## **1 Introduction**

Mandatory convertibles Notes (MCN) are hybrid securities that share characteristics of both debt and equity. They are designed and documented as a bond, pay coupons regularly but upon redemption or at maturity are mandatorily converted into a fixed or limited number of common shares and no cash or other security is delivered. This unique feature makes this security to behave mostly like common shares but with specific characteristics and potentially with lower cost. MCNs pay a regular coupon that in general is higher than the dividend yield of the underlying shares, but the issuer can elect to defer the coupons at its sole discretion. Mandatory convertibles are junior to other debt securities and senior only to common equity. Mandatory convertibles do not have voting rights. Issuing a mandatory convertible can be considered as a deferred capital increase. Historically the scarce academic literature has focused on the information asymmetry implications as a rationale for issuing MCNs and only a few authors have studied the theoretical pricing model and its relationship and consistency with the observed market prices.

## **2 Objectives**

This paper is the first document of an ongoing academic research that aims to study the potential advantages for corporate and financial institutions of issuing MCNs compared to other forms of capital. One of the main objectives of this study is to describe and to shed some academic light on a type of security about which the number of academic studies is very limited.

## **3 Methods**

This paper researches the academic literature about MCNs and the notes issued, describes its main characteristics from the issuer point of view and also studies the potential advantages for issuers. Additionally, this is the starting point of a research that aims to develop an empirical analysis using the price data series and each MCNs characteristic using market data providers (Bloomberg, Reuters) to confirm the potential cost advantages for issuers of this form of capital.

## **4 Size of the Market**

According to Bloomberg in 2008 the market of MCNs peaked to its higher recorded level at USD24.5bn. The issuance of MCNs represented globally USD1.8bn in 1996 and the market grew steadily until 2008. The latest financial crisis meant a significant reduction of the amount issued due to the lower appetite of investors and their preference for cash, treasuries and other safe-haven investments. The market

recovered in 2013 and in 2016 the USD volume issued reached USD21bn. The total size of the convertible securities outstanding, mandatory and non-mandatory, was USD392bn on average from 2013 to 2016 (Bank of International Settlements, BIS 2016), and the new issues amounted to USD58bn, a mere 9% of the total debt issued globally. The issuance of MCNs represents on average 29% of all the convertible bonds issued annually. Mandatory convertibles tend to have shorter maturities (typically 3 years) than standard convertible bonds (5 to 7 years) therefore the annual issuance tends to be higher. Nevertheless, the academic literature related to standard convertible bonds is disproportionally larger than the one studying mandatory convertibles (Rodriguez-Monroy, Huerga 2014).

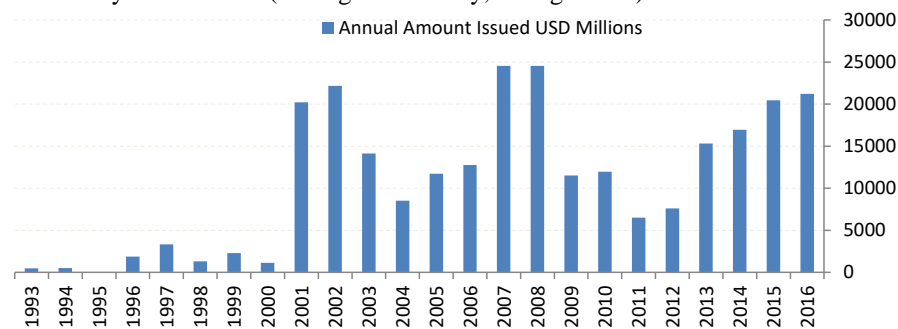


Figure 1. Annual Issuance of Mandatory Convertible Securities  
Source: Bloomberg

## 5 Pricing Model

There are several types of MCNs, (Arzac 1997), but all of them share some characteristics: a predetermined coupon regularly paid and common stock conversion at redemption with one or two conversion ratios that transform the initial notional into a limited number of shares. Due to market appetite, historical and fiscal reasons, the typical MCN has two conversion triggers, hence two conversion ratios, the lower conversion ratio and the upper conversion ratio. The number of shares delivered at redemption is given by:

$$\begin{aligned}
 \text{If } S \leq \text{Trigger}_{\text{Lower}} \quad \text{Number of Shares} &= \text{Amount Issued} \cdot \text{Conversion Ratio}_{\text{Lower}} \\
 \text{If } S \geq \text{Trigger}_{\text{Upper}} \quad \text{Number of Shares} &= \text{Amount Issued} \cdot \text{Conversion Ratio}_{\text{Upper}} \\
 \text{If } \text{Trigger}_{\text{Lower}} < S < \text{Trigger}_{\text{Upper}} \quad \text{Number of Shares} &= \frac{\text{Amount Issued}}{S}
 \end{aligned}$$

Being,

$$\begin{aligned}
 S &= \text{Stock Price at Redemption} \\
 \text{Conversion Ratio}_{\text{Lower}} &= \frac{\text{Amount Issued}}{\text{Trigger}_{\text{Lower}}} \\
 \text{Conversion Ratio}_{\text{Upper}} &= \frac{\text{Amount Issued}}{\text{Trigger}_{\text{Upper}}}
 \end{aligned}$$

4

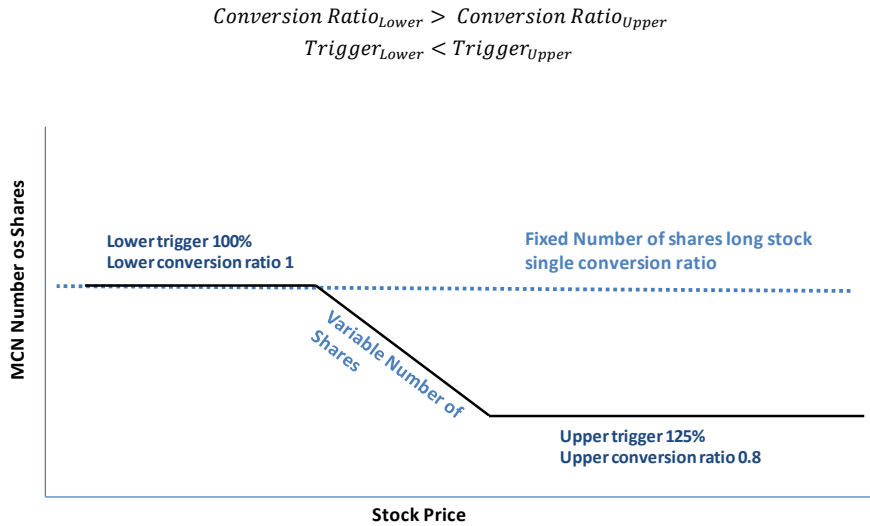


Figure 2. Number of shares delivered at maturity vs Stock Price  
 Source: Authors

The payoff for an investor in MCNs is substantially different to the payoff of a standard convertible since there is no downside protection, and it is also different to the total return of the common stock. The return is closer to a prepaid forward share purchase agreement. One feature of MCNs is that at higher stock prices the mandatory convertible delivers fewer shares and therefore less dilution for existing shareholders than a straightforward share sale and represents a lower total cost for the issuer.

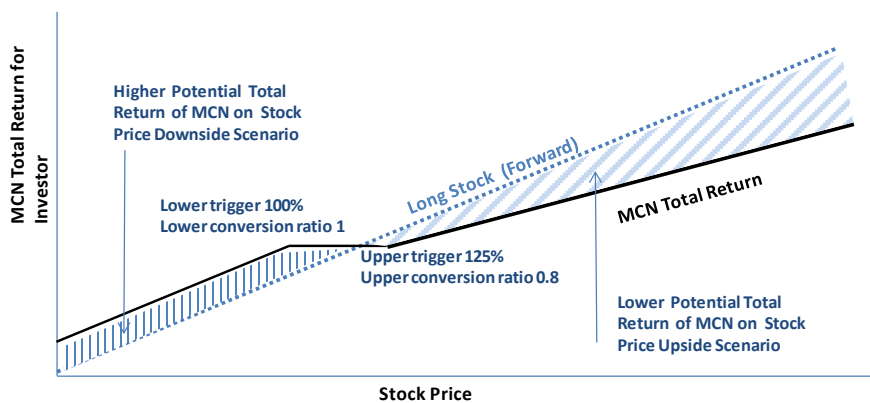


Figure 3. Total Return MCN vs Total Return Common Shares  
 Source: Authors

A MCN can be synthetically replicated as a prepaid forward share sale agreement plus a strip of fixed coupons, plus a sold equity call option and a purchased equity call option at a higher strike on a lower notional, a ratio call-spread (Arzak 1997):

$$Price = PV_{riskfree}(N) + PV_{risky}(C) - Conversion\ Ratio_{Lower} \cdot Call_{Lower\ stk} + Conversion\ Ratio_{Upper} \cdot Call_{Upper\ stk}$$

The present value of the amount issued must be discounted using the risk-free rate because the issuer can always deliver shares even in a distressed situation; however, the coupons must be discounted using the issuer's credit curve (Amman, Seiz 2006). Since the credit component is limited to the present value of the strip of coupons, standard options valuation as Black-Scholes and Merton or numerical models well tested in options valuations can be applied to calculate the value of MCNs (Black Scholes 1973; Merton 1973). Dividends may affect the pricing of MCNs and forecasting future dividends is never an easy task. To avoid this issue, recent MCNs include full dividend protection clauses to make them more appealing for new investors as convertible arbitrage funds and easier to hedge for them and for investment banks or even for the same issuers (Zimmermann 2016). Standard dividend protection clauses read as follows for both the upper and lower conversion ratios, where  $S_{cum}$  is the price of the underlying stock the day before the actual dividend payment:

$$Conversion\ Ratio_{New} = \frac{S_{cum}}{S_{cum} - div} Conversion\ Ratio_{Old}$$

Increasing the conversion ratio is equivalent to reducing conversion triggers and it adjusts the mandatory convertible by the value reduction on the underlying stock that represents the dividend payment. Full dividend protection clauses are in the center of an academic discussion that can be explored in future research.

## 6 Mandatory Convertible Notes Greeks Profiles

The Greeks are defined as the sensitivities of derivatives and investment securities to the change of some observed underlying parameter and are necessary to manage and understand the financial risk of investment portfolios or securities. The more representative Greeks are the Delta, the Gamma, the Vega and the Theta. Mandatory convertibles have Greek parameters that differ greatly from traditional convertibles and other securities (Calamos 2011). The Delta can be defined as the change of the price of the mandatory convertible linked to the unitary change of the price of the underlying stock. The Delta is close to one when the stock price is below the lower trigger, the Delta decreases between the lower and the upper strike, and stabilizes close to the upper trigger.

6

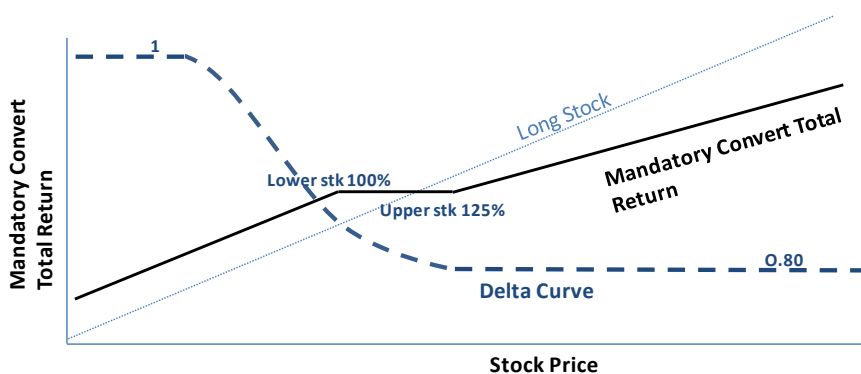


Figure 4. Delta of a mandatory convertible security  
Source: Authors

The Gamma of a security can be defined as the changes in the Delta of MCN per unitary change in the underlying stock. Gamma management is important as a means to manage the Delta of a portfolio and to avoid abrupt changes in the price. Portfolio hedging techniques and options are used to manage Gamma.

## 7 Accounting for Mandatory Convertibles

A MCN is an instrument that includes an unconditional obligation requiring the issuer to redeem the security delivering a specified number of the underlying stock at a specific date. Under the International Financial Reporting Standard (IFRS) accounting rules, if the MCN represents the obligation to deliver a fixed amount of shares, the instrument can be bifurcated as an equity component and a debt component. The initial carrying amount of the debt component is the present value of the coupons that the issuer is obliged to pay, discounted at the credit risk curve of the issuer (Ramirez 2011). The equity component is calculated as the difference of the issuer proceeds and the debt component. Most mandatory convertibles deliver two fixed amounts of shares, the lower ratio and the upper ratio and a gap where the number of shares is variable. Therefore, issuers tend to bifurcate the instrument into a fixed parity mandatory convertible and a sold call-spread that is accounted at mark to market.

## 8 Potential Motivations for Issuing Mandatory Convertibles

A few studies research the motivations of the issuers to access the MCN market and the effects of the announcement of MCNs on the stock prices, and some other papers apply the asymmetry information theories to the issuance of convertible bonds (Chemmanur et al. 2014; Wang 2017). The commercial and academic literature highlights the following advantages:

1. Firms issue a mandatory convertible because of its rating agencies treatment as equity. Additionally, mandatory convertible securities are accounted partially or totally as equity.
2. Huckins (1999) shows in his research that MCNs allow companies to increase capital delaying the equity dilution to redemption.
3. Private placements or accelerated book building stock sales imply a substantial price discount that can be avoided by issuing MCNs.
4. Issuers of mandatory convertibles tap an investor base that is different to the straight debt or equity investor base.
5. The lower slope of the mandatory convertible ratio at higher stock prices can represent a lower dilution and a lower cost for the issuer compared to straight equity, thanks to the ratio call-spread purchased by the issuer.

Additionally, our research determines another motivation for issuing MCNs, since the total cost for the issuer can be lower than the cost of hybrid debt and sometimes in line with the cost of senior debt. The real cost for the issuer is related to the cost of a long term repurchase agreement of the underlying shares.

## 9 Preliminary Results of the Research

MCNs investors traditionally compare the coupon of the note with the dividend yield of the common stock at issuance. Preference for a constant and high dividend stream are the main driving aspect in the long-only investors decision making process, but the ratio call-spread embedded in the note can have an important weight in the coupon, depending of the volatility of the underlying shares. Arbitrage investors can hedge the MCN with a short equity position and a purchased call-spread. Stripping out the cost of the call-spread and bid-ask spreads, the minimum required coupon for the buyer would be the cost of a long term stock borrow agreement plus its liquidity cost. Therefore for the issuer, the cost of the instrument is mainly linked to the availability and cost of long term stock borrow and the liquidity of the stock and not fully correlated with its own credit spread, credit rating or credit availability.

There are presently 71 public mandatory convertible securities outstanding. The notes have been issued from 2014 to 2017 with an average maturity of 3 years. Out of the 71 notes, 51 include dividend protection mechanisms that facilitate the access to the arbitrage investor base. The average running cost of the embedded ratio call-spread is 3.7% annually. Under the above assumptions, if we want to compare the cost of issuing a MCN with the cost of issuing senior or subordinated debt, the spread paid by the issuer can be broken down as:

$$MCN\ Spread = Nominal\ Coupon - Call-spread\ running\ cost - Mid\ Swap\ Rate\ at\ issuance$$

Our analysis of the outstanding MCN shows that the average MCN cost is 2.3%.

## 10 Conclusions

The present paper represents the starting point of an ongoing academic research that aims to shed some light on a barely known type of security that is becoming increasingly popular among issuers, corporate and financial institutions, as a means to increase capital. Some studies show that MCNs can offer substantial advantages for securities issuers. This paper shows that the real price paid by issuers of MCN is relatively low compared to other forms of capital, subordinated debt and in some cases comparable to senior debt. The investor community tends to react positively to the announcement of this type of security.

## References

- Amman, M; Seiz, R (2006). Pricing and Hedging Mandatory Convertible Bonds. *Journal of Derivatives* 13(3), 2006, 30-46.
- Arzac, ER (1997). PERCS, DECS, and other Mandatory Convertibles. *Journal of Applied Corporate Finance*, 10(1), 54–63.
- Bank for International Settlements (2016). *BIS Quarterly Review* December 2015. Available at <http://www.bis.org>
- Black,F; Scholes,M (1973). The Pricing of Options and Corporate Liabilities. *Journal of Political Economy*, 81 pp.637-654.
- Calamos, N (2011). *Convertible Arbitrage: Insights and Techniques for Successful Hedging*. The Wiley Finance Series.
- Chemmanur, T; Nandy, D; Yan, A; Jiao, J (2014). A Theory of Mandatory Convertibles? *Journal of Banking & Finance*, 42, 352-370.
- Huckins, NW (1999). An Examination of Mandatorily Convertible Preferred Stock. *The Financial Review* 34, 89-108.
- Merton, R (1973). Theory of Rational Option Pricing, *The Bell Journal of Economics and Management Science* Vol. 4, No. 1 (Spring, 1973), pp. 141-183.
- Ramirez, J (2011). *Handbook of Corporate Derivatives and Equity Capital Markets*. The Wiley Finance Series.
- Rodríguez-Monroy, C; Huerga, A (2014). Los instrumentos convertibles en acciones para la financiación empresarial en un entorno económico de restricción del crédito bancario. *Economía Industrial* (n. 392); pp. 89-100.
- Wang, S (2017). A Theory of Mandatory Convertibles: Distinct Features for Large Repeated Financing. *The European Journal of Finance* Pages 1-18.
- Zimmermann, P (2016). The Fallacy of Fully Dividend Protected Stock Options and Convertible Bonds. *The Journal of Derivatives*, Spring 2016, Vol. 23, No. 3 pp. 61-72.