

# Diplomarbeit

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„Mandatory Convertible Bonds as Special Hybrid  
Financing Instruments“

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# 1 Introduction

Since thirty years we witness a great progress in the financial innovation. CFOs of companies facing well-known problems and risks associated with the issuance of debt and equity turned to different instruments, hybrid instruments. In many situations they seem to provide them with a better solution exactly due to their “hybrid” nature. One of their prominent features is the ability to reduce the costs of “information asymmetry”<sup>1</sup>. Especially since the beginning of the credit crunch in 2007 new issues of convertible structures surged to very high levels<sup>2</sup>. In the times when liquidity dries up and there is an overall slowdown in issuance, this boom in convertibles is striking. In 2001 we experienced similar surge of these instruments as well as in 2002 after the sell-off in equities. It seems that investors in turbulent markets seek the kind of safety only these structures offer. This progress in hybrid market and especially increasing popularity of a relatively new hybrid instrument “mandatory convertible” over the last decade as an instrument for raising capital and its still somewhat mysterious nature motivated me to look for the reasons of the movement in these “hybrid convertible structures”.

## ***1.1 Problem definition and objectives***

The main purpose of my thesis is to investigate the rationale for using hybrid convertible financial instruments in the capital structure of the company and the motives that drive investors to consider convertibles as their investment choice. I would like to shed light on the question in which circumstances the companies decide to emit simple convertible bonds and in which mandatory convertible bonds are preferable. In order to obtain a more practical view over these structures I conducted interviews with some issuers of “mandatories”. I would also like to leave the issue of capital structure and see this instrument as pure investment products.

## ***1.2 Basic considerations of corporate finance policy***

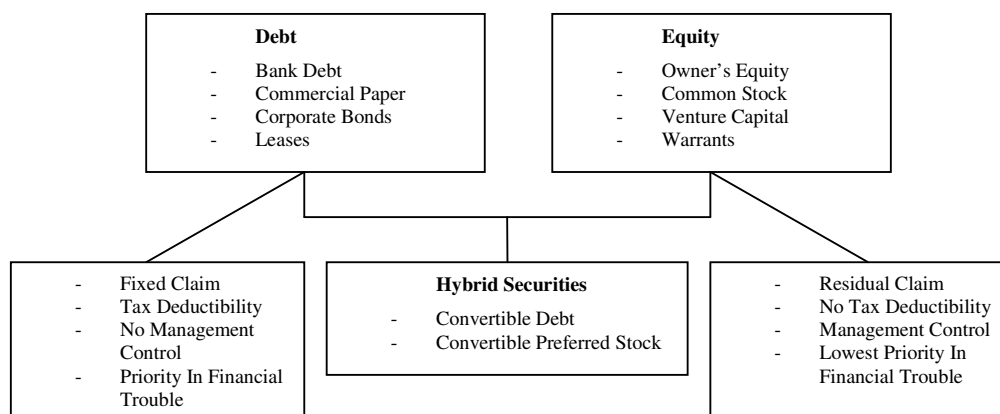
There exist several different financing instruments that are available for the firms. Usually they all can be categorized as either equity or debt. The essence of equity financing is that shareholders, the true owners of the company, receive whatever cash flow is left after the company has serviced the debt. Equity holders expect a higher return for taking on higher risk

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<sup>1</sup> The problem of information asymmetry will be explained further in the text.

<sup>2</sup> see Oakley (2005) , p. 27.

and in the event of firm's bankruptcy are last in line for the remaining assets. The debt which can come in different maturities, seniority and currency is bound to the promise of the company to make regular interest payments and repaying the principal. When company defaults on its coupon or redemption payment which may end with going into liquidation than bondholders usually stand in front of any other creditors.



**Figure 1: Review of possible sources of financing**

source: own depiction

### ***1.3 Asymmetric Information and cost of financial distress problems***

It is clear that the managers responsible of setting an optimal capital structure of a company are in the first place concerned about possible undervaluation of their securities in the capital market and their main objective is to minimize the dissipation in the long-term value of the equity held in the hands of the current shareholders. There exist a well-known problem of “asymmetric information”<sup>3</sup> when firm insiders have more information about the intrinsic value of their firm compared to potential outside investors. Insofar as managers represent the interests of existing shareholders, such managers have a much stronger incentive to issue new equity when they believe or know that the company is overvalued. Myers and Majluf (1984) developed a model and showed that when managers have superior information, they care more about existing stockholders wealth and decide to issue stock to finance a new investment then stock price will fall, other things equal. Already the announcement of the new stock issue drives down the stock price because investors believe managers are much more likely to

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<sup>3</sup> For further explanation of this problem see Akerlof (1970).

issue when shares are overpriced. Miller and Rock (1985) showed that external fundraising is a bad message for the investors because this usually signals anticipated cash flow shortages. Especially if managers do not really need to issue any new shares but decide to do it, the company signals to the capital markets that its shares are overvalued. It is a similar situation to the one when management decides not to repurchase shares in order to reduce excessive financial slack as in Fama and French (2005).

Moreover, as Myers and Majluf (1984) showed, management will even pass up a valuable investment opportunity, when the firm's stock is sufficiently underpriced in the market. In this case the overall firm value is less important for managers than the wealth of current shareholders. This problem can be solved by issuing securities that are less sensitive to changes in the firm value, such as riskless debt. When the firm issues default-risk free debt with the objective of financing new investment than stock price will not fall to such extent as in the case of equity issuance or even will remain unchanged<sup>4</sup>. Therefore firms prefer more internal finance and debt since these funds can be raised without sending adverse signals. That is in line with one of the most famous capital structure theories which will be mentioned further. Usually potential investors know that management has this incentive and ability to present their companies much more favorably than the true facts would warrant. Investors cannot really distinguish if the company raising new capital really does it to finance some profitable growth opportunities, to get the capital because it expects for example falling earnings or already over-invested the free cash flows<sup>5</sup>. That is why when issuing equity or debt company management has to be aware of and ready to accept the fact these offerings will be heavily discounted as uncertain investors would not take part otherwise. It is clear that some if not the most of the financiers of the company try to acquire as much as possible information regarding the true value of the company. But there exist another problem, as managers know that borrowers like indications of strong financial status of the firm they invest in, managers may try to embellish this status. As Leland and Pyle (1977) claim there is a big probability of "moral hazard"<sup>6</sup>. behavior on the side of managers.

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<sup>4</sup> see Jung et al. (1996) and Mikkelson and Partch (1986).

<sup>5</sup> see Jensen (1986).

<sup>6</sup> The risk that one party of a transaction did not enter into the contract in a good faith, consciously used misleading information about the value of its liabilities, assets or credit capacity or even is ready to take some unusual risks to make a profit.



The second problem is the probability of being in the financial distress or incurring financial distress costs. The traditional view on the capital structure and the cost of capital implied by it tells us that there is an optimal capital structure that minimizes the cost of capital. If the firm has a very low level of gearing, borrowing additional debt will not incur severe additional risk but at one point additional debt will start to increase the probability of default and though the cost of equity and debt capital. According to the well-known “Pecking Order Theory”<sup>7</sup> companies prefer to issue debt rather than equity if internal finance is insufficient. The debt plays an important role. By increasing the cash flows paid to the debtholders through interest payments the firm reduces the amount paid in taxes. Apart from clear benefit of “tax-shields”<sup>8</sup> due to tax deductibility of interest payments debt forces some discipline of the managers. If the company borrows money managers are obligated to ensure that the investment they make will earn at least enough return to cover the interest expense. Ross (1977) claims that debt levels and firm values are positively related because firms committed to making high fixed cash payments are signaling these payments are affordable. Drawbacks of debt are the loss of future flexibility and the bankruptcy cost. If the firm borrows up to its capacity, it loses the flexibility of financing future projects with debt. Additionally if one borrows more, one increases the probability of bankruptcy and hence the expected bankruptcy cost. The expected bankruptcy cost is a function of three variables: the direct (legal, reorganization costs) and indirect (people perceive the company to be in financial trouble, loss of sales, no capacity to raise new credit) and the probability of bankruptcy which depends upon the probability of how uncertain one is about future cash flows. “Trade-off”<sup>9</sup> theory tells us that the optimal capital structure represents a trade-off between tax savings and distress cost of debt. Here the main reasoning is that the debt issues reduce firm value when the present value of financial distress costs exceeds the present value of expected tax benefits created by this issue. MacKie-Mason (1990) supported this hypothesis empirically as he found that firms with a high probability of bankruptcy prefer equity to debt issues.

#### ***1.4 What is important to managers setting the financing policy?***

To leave aside for a moment theoretical considerations of capital structure I decided to get the insight of how managers in practice consider debt and equity choices in the capital structure.

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<sup>7</sup> see Myers (1984).

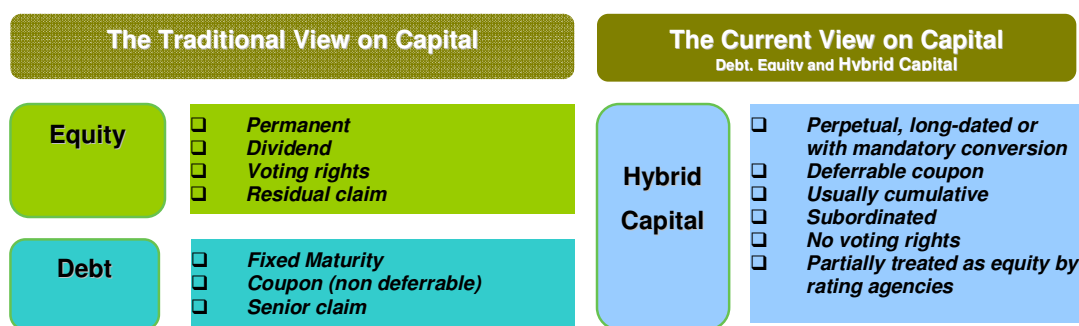
<sup>8</sup> A reduction in income tax that results from making use of an allowable deduction of debt interest payments from the income tax.

<sup>9</sup> see Kraus and Litzenberger (1973).

Good source of such information are the results of a survey by Graham and Harvey (2001). This survey conducted on 392 companies revealed somewhat surprising results: the most important factors in setting the debt policy was maintaining the financial flexibility and the credit rating and in the case of equity issues the most important reason against equity was the possible earnings-per-share<sup>10</sup> dilution.

## 2 Hybrid instruments in the corporate financing

As mentioned in the introduction equity and debt are not perfect securities and people try to create securities that would take best of both. Good example is a new instrument issued for the first time in the USA called ECAPS (Enhanced Capital Advantaged Preferred Security). It is almost ideal security for issuers “looking like equity to credit-rating agencies and debt to the tax authorities<sup>11</sup>”. Like debt ECAPS carry routine payments and have finite (Internal Revenue Service requires redemption date) but usually very long maturities. At the same time as it is with dividends on shares, interest payments can be deferred in times of financial difficulties. They can also be met by simply issuing new shares at maturity. Generally hybrid capital gives companies a flexibility they did not have before.



**Figure 2: Traditional Capital Sources vs. Hybrid Capital**

source: own depiction

Hybrid capital is a liability capital market instrument. The special feature of it is that it is designed to be a proxy to equity. It ranks junior to all debt obligations with maturities depending on the structure from perpetual or very long-dated to 3-6 years as in the case of mandatory

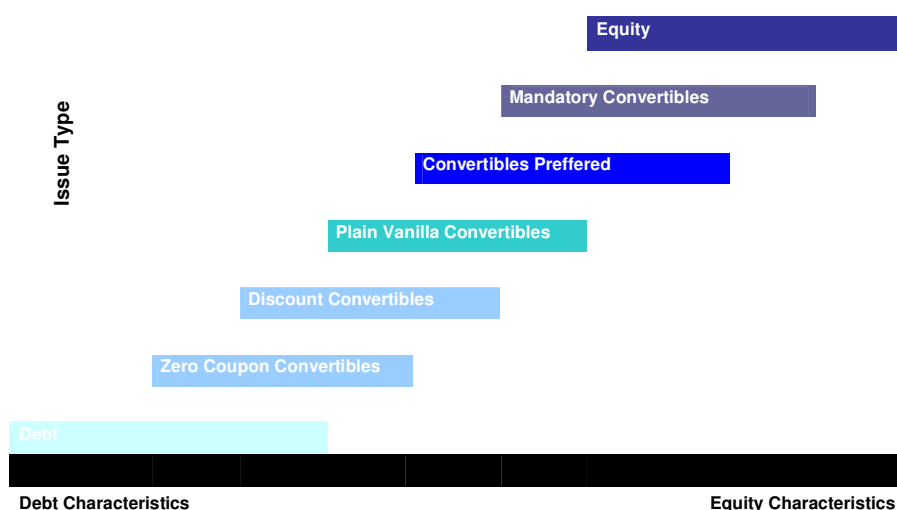
<sup>10</sup> The indicator of profitability, shows portion of the firm’s profit allocated to each outstanding share.

<sup>11</sup> “Cameleon Bonds” in The Economist (2005) 24 Nov.

convertibles. Issuers of hybrid capital pursue, amongst others, one key objective: to strengthen their financial structure at reasonable price .

Hybrid instruments that consist of debt and equity can be attributed to different degrees to pure debt or pure equity in the capital structure. This is important for managers who follow some relevant corporate financial strategy in which they have to balance advantages and disadvantages of both debt and equity.

Plain vanilla convertible debt can be positioned in the “middle ground” of debt and equity characteristics whereas mandatory convertibles are regarded almost as pure equity.



**Figure 3: Debt and equity characteristics of convertible instruments**

source: modified from Nick P. Calamos (2003), p. 28.

At this stage I would like to give a short description of some of these instruments focusing on the convertible bonds and mandatory convertible bonds.

## ***2.1 Zero coupon convertibles***

A zero coupon convertible bond is simply a zero coupon bond that can be converted into corporation’s common stock at a specific date. The difference between the zero-coupon convertibles and regular zero-coupon bonds is that the former offer lower yield. This may deter some investors from investing in these bond. On the other hand if a potential increase of stock price

would offer a larger capital gains than the accrued interest from the bond, then zero-coupon convertible gives the investor the flexibility to choose to receive this capital gain.

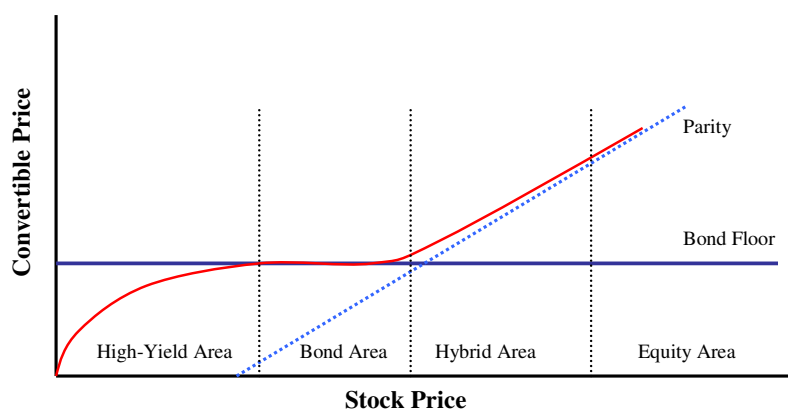
## 2.2 Convertible preferred stock

Convertible preferred stock is simply preferred stock that gives the holders the right to convert their preferred shares into a fixed number of common shares, usually anytime after some predetermined date. When a company does well, investors can and most probably will convert their holdings into common stock that is more valuable especially at the time of the bull market.

## 2.3 Convertible bonds

Convertible bond is a hybrid security consisting of straight bond and a call option on the related stock. It can be converted by the investor into shares of stock in the issuing company at some pre-announced ratio. The investors in these instruments receive usually lower coupons than on the straight bonds but they are compensated with the ability to convert it to common stock typically at some premium to the stock's market value. The value of any convertible bond is related to different variables, including changes in the price of the underlying stock, interest rates movements, credit quality, and volatility of both the stock and the interest rates.

What is special about convertible bonds is that they render a bond like (there exist a floor value) return if the underlying issuer stock is minimal or negative and equity-like return if the underlying stock's return is positive.



**Figure 4: Convertible bond degrees of equity and fixed-income sensitivity**

source: modified from Nick P. Calamos (2003), p. 22.

We can place the convertible bond behavior with respect to changing price into different areas: In the “equity range” convertible trades with a very high degree of equity sensitivity. The “hybrid range” offers simply the traditional convertible benefits with fixed-income and equity sensitivities. Here the current stock price is very close to its exercise price. In contrast “busted convertible” range means the convertible is definitely out-of-the-money and much more sensitive to its fixed-income features than to equity ones.

### **2.3.1.1 Conversion price**

Conversion price is a price for conversion into common stocks with the bond’s par value. The firm’s offering prospectus at the time of issue indicates the price of the common stock equivalent to the value of the bond at par. This price actually determines the number of shares into which the bond at par could be converted.

$$\text{Conversion Price} = \text{Par Value} / \text{Conversion Ratio}$$

### **2.3.1.2 Conversion premium**

Conversion premium can be calculated by simply taking the difference between the current convertible bond’s market price and the conversion price and expressing it as a percentage.

$$\text{Conversion Premium} = (\text{Conversion Price} / \text{Par Value}) - 1$$

### **2.3.1.3 Conversion ratio**

This ratio determines how many common stock shares a convertible bondholder would receive if the bond was converted into stock. It is set at the time of the issue of this security.

$$\text{Conversion Ratio} = \text{Par Value} / \text{Conversion Price}$$

## **2.4 Mandatory convertibles**

Mandatory convertibles as convertible bonds are equity-linked hybrid securities. But unlike normal convertible bonds they usually do not provide any downside protection and so do not have any fixed terminal value. They pay higher dividends than common stocks and at the end of maturity on the pre-specified date mandatorily convert into a variable number of stock

shares. These structures have been designed with a large variety of payoff structures, and carry different names depending on the investment bank that created and offered the issue for the first time. Second, mandatory convertibles have either a fully capped or to some extent limited appreciation potential compared to the underlying common stock.

There exist also so-called synthetic mandatory convertibles. These are issued by investment banks and are backed by the bank's inventory of another company stock. They are often issued on companies characterized by large and sustainable growth like for example Microsoft that usually tend to avoid issuing any securities with dividend requirements or appreciable interest.

Technical aspects of mandatories will be explained later in the text.

#### **2.4.1.1 Short history of mandatory convertibles**

The first mandatory convertibles, structured in the early 1990s in the USA, were generally known as PERCS (Preferred Equity – Redemption Cumulative Stock, issued for the first time by Morgan Stanley in 1988). They were structured in way to provide investors with relatively high current income while simultaneously allowing them to participate in about first 30-40% of the stock's appreciation from the point of issue<sup>12</sup>. Gains were capped at that point. PERCS at the beginning had a great deal of appeal to investors looking for a steady high income and ones uncomfortable with options. However, with the bull market of 1992 and 1993, the appeal of this capped structure diminished almost entirely because the combination of coupons and limited capital gains offered to investors did not really compensate them for the high risk of investment. Although they received this enhanced dividend yield (coupon on the mandatory) they participated fully in the downside risk of the issuer's common shares and earned capital gains only when the common stock price was actually low.

To solve this problem in the convertibles market, Salomon Brothers designed another equity-like convertible security called DECS (Dividend Enhanced Convertible Securities) in 1993. DECS are like PERCS as both are redeemable convertible preferred stocks. But unlike PERCS that cap their upside at 30–40%, DECS offer some upside capital appreciation potential when the underlying common stock rises above the conversion price. Since 1993, numer-

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<sup>12</sup> see Chen, Chen and Howell (1999).

ous DECS variations have been developed. But rather than to use a generic name, each investment bank has invented its own acronym: ACES (Automatically Convertible Equity Securities) by Goldman Sachs, STRYPES (Structured Yield Product Exchangeable for Stock) PRIDES (Preferred Redeemable Increased-Dividend Equity Securities) by Merrill Lynch and SAILS (Stock Appreciation Income- Linked Securities) by Credit Suisse<sup>13</sup>.

As mentioned above mandatory convertibles were first created and issued (PERCS) in the US market during the early 1990s and were used to rescue many companies that attempted to restructure their balance sheets in the wake of junk bond market crash<sup>14</sup>. In the time after the events of 11.08.2001 especially in October and December of that year there was a big interest in these instruments with two very big issues of AT& T (\$900 million) and Motorola (\$1.2 million)<sup>15</sup>. Currently during the credit market turmoil some financial institutions that were most damaged by the crisis find some rescue in using mandatories as Citi Group did in 2007.

Europe has always been far behind the USA in issuance of these instruments. First mandatories appeared in Europe for the first time in the late nineties. Reasons for that mentioned by CFOs I surveyed were complicated structure which was not really well understood by the investors and lack of models to value them properly.

### **3 Existing hypothesis explaining the issuance of convertible hybrids**

In the literature one can find few hypotheses that give explanation why this special structures are issued by the firms. Unfortunately most of them apply solely to simple convertible bonds and not to mandatory convertibles but they give us precious ideas of which problems hybrids are supposed to solve. Apart from the first, very simple theory, all of the theories mentioned below could be summarized under the Asymmetric Information Hypothesis. Stein (1992) argues that companies may decide to use convertible bonds to get equity into their capital structures when Informational Asymmetries problems make direct equity issues rather unattractive.

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<sup>13</sup> For a more detailed listing see Nelken (2000).

<sup>14</sup> see Mackie (2003).

<sup>15</sup> see Keating (2002).

### **3.1 Sweetener hypothesis**

Convertible bonds are surely a good option for firms where there is no liquid option market. Investors in convertible bonds are better protected in comparison to traditional options (bond floor) and the addition of the conversion privilege makes the bond more saleable.

### **3.2 Backdoor equity financing hypothesis**

In 1992 Stein developed a model in which he gave reasons why companies use convertible debt in the presence of information asymmetry and financial distress cost. The end result of the model was a separating equilibrium where bad firms issue equity, good firms can afford to issue debt and medium firms decide to issue convertible debt. This model presents convertible bonds as a kind of “middle ground” between high expected cost of bankruptcy associated with debt and sometimes huge announcement impact associated with equity issue. In this case convertible debt appears as a good substitute for common equity as it provides indirect equity financing that mitigates to some extent the adverse selection costs associated with direct equity issues.

### **3.3 Deferred equity hypothesis**

Evidence of surveys reported by Pilcher (1955), Brigham (1966) and Hoffmeister (1977) suggests that managers who issue convertible bonds often view these instruments as a delayed equity offer. In other words, the primary motivation for them to issue convertible debt is to obtain common equity financing at a better price than the issue date stock market price.

### **3.4 Risk insensitivity financing hypothesis**

Green (1984) showed that convertible bonds help to minimize the risk incentives of managers to shift to riskier projects and expropriate wealth from bondholders. Common shareholders like to gamble with the debt-holders money. Especially in the time when company is in financial distress shareholders can gain by making significantly risky investments, even if they have negative net-present-value – the problem commonly known as “over-investment” problem. But the negative net-present-value projects destroy the value of the overall firm. In the case of convertible bonds if greater post conversion equity is allocated to the convertible holders then common stockholder’s wealth from such actions is offset. In this case any at-



tempt to shift wealth to stockholders from bondholders would actually give a zero net present value project. In general the higher the risk associated with company operations (and the market's uncertainty about this risk), the higher the interest cost that the company will have to pay on its debt. But in the case of convertible this higher risk may not necessarily mean the higher burden of financing cost for the issuing company. Use of convertibles may allow high and intermediate risk companies not to pay this high cost of debt capital.

Brennan and Schwartz (1988) also argue that convertible bonds are relatively insensitive to the risk of the firm. This is because the value of the option component in such securities will increase with an increase in risk and this in turn will offset any reduction in the value of the debt due to the increase in risk. This hypothesis suggests that firms would be more likely to issue convertible debt instruments when their idiosyncratic risk<sup>16</sup> is relatively high.

### ***3.5 Sequential financing hypothesis***

Mayers (2000) argues that convertible bonds are very attractive for companies with large growth opportunities. Especially if the firm has many “real options”<sup>17</sup> and so needs to finance a sequence of investments of usually uncertain value and timing, convertible debt may be the most cost-effective way of doing it. In the case of this instruments the investor decides to convert into common stocks if investment opportunities of the company do materialize. This leaves the funds inside the company and they can be used to finance further growth. This mechanism ensures that future investment options are only executed if profitable, thus controlling very well the over-investment problem. The fact is that companies facing possible sequential investments have to decide if they should raise the entire capital amount up front or raise it only when it is really needed. Both possibilities have drawbacks. In the first case some investors would be afraid that their money can be spent in the future regardless the profitability of available investment opportunities. This is again an “over-investment” problem. Reluctant investors, fearing such over-investment, would decide not to invest or demand terms that would be much more advantageous to them than to issuers. In the second case raising capital fast whenever it is needed is associated with high issue cost. Mayers (2000) claims that con-

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<sup>16</sup> The company specific risk that can be reduced by diversification, opposite to the systematic (market risk) that cannot be diversified entirely.

<sup>17</sup> Here the financial option theory is applied by the firm to quantify the value of flexibility regarding different investments in a world of uncertainty.

vertible bonds are ideal for funding in the case of firms having a portfolio of real options in that they minimize over-investment and issue costs. But the advantage is even bigger than just minimizing the costs. If the investors convert into equity, firm's leverage will be automatically reduced allowing the company to issue more debt at the lower cost just in the time when additional funding is required to finance some new growth opportunities. If there exist a call provision<sup>18</sup> - it allows the managers to force the conversion. They will do it in order to reduce incremental costs of financing when the considered investment option is valuable. This again provides a kind of evidence for the backdoor equity hypothesis.

### ***3.6 Summary of advantages of convertible bonds in the corporate finance***

- When the company decides to raise money in the convertible debt market, it can do it more cheaply than it could do in the unsecured debt markets (the coupon payments are lower than by the straight bond). Investors are ready to accept this lower coupons because in this way they pay for the valuable option they have.
- Convertible bonds turn out to be more cost-effective because as mentioned earlier any discount by the market is smaller since inside managers have less opportunity to exploit their informational advantage. Effectively the company sells an attractive asset to the market with much less impact on the current share price than a direct share issue.
- The company retains more flexibility because usually the covenants on convertible debt are less restrictive than on unsecured deals.
- Even though at some point in time the company can see its stock diluted when securities are converted but still it avoids the short-term dilution

Apart from the advantages mentioned above there is one interesting feature of convertible bonds that is worth to be explained more thoroughly. Mayers (1998) see convertible debt as a good mechanism to mitigate agency costs<sup>19</sup> of free cash flow<sup>20</sup>. As mentioned in the Sequen-

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<sup>18</sup> The issuer's right to call or buy back the bond prior to maturity date.

<sup>19</sup> The agency costs arise because of divergence of control and interests between managers (agents) whose actions cannot be observed by shareholders (principals), the formers prefer often satisfying own aims than maximizing shareholders wealth.

<sup>20</sup> A measure of how much cash is left in the company after any reinvestment needed to sustain firm's assets and future growth have been made.

tial Financing Hypothesis companies sometimes have an investment program that requires staged financing. If there exist high uncertainty about the value of future investment options, follow-on investments options may be not exercised and there appear a free cash flow problem as funds remain without being committed to any specific project. Convertible bond solves this problem as the investors in these instruments have to be provided with the information that reveals real profitability of the projects. If there is no value-revealing action of managers convertible bond exercise does not occur and a further round of financing is not achieved. The principal has to be repaid. Managers remain without any surplus funds to squander or to use in the negative net-present-value projects and so the free cash flow problem is mitigated.

### **3.6.1 Issuers of convertible bonds**

Mayers (1998) argues that companies with high uncertainty about the future pay-offs of their projects are most likely to use convertible bonds. According to the author such firms are usually characterized by high leverage, marginally profitable risky investment opportunities, high amounts of free cash flow and high volatility of these cash flows. Essig (1991) in his paper claims that convertible issuers tend to have higher than average R&D<sup>21</sup> to sales ratios, long-term debt to equity ratios and market to book ratios. High long-term debt to equity ratio generally indicates that the firm has been aggressive in financing its growth using debt. Market to book ratio shows how the market values the company now compared to the initial value. The higher this ratio the more growth investors expect in the future. Finally high R&D expenditures relative to sales shows that company spends on developing new products ideas and improving process to expand its operations. All these high ratios indicate that these firms have higher growth opportunities. The second relevant issue is that they might have high distress costs by taking on more debt. What is more Essig (1991) finds that they have lower tangible assets per total assets and their cash flow volatilities are higher than straight debt issuers. Lewis, Rogalski and Seward (1999) investigated when do companies that have valuable investment opportunities decide to use this form of hybrid capital instead of issuing equity or debt. They provided evidence that if the company has a high cost of financial distress and a high cost of information asymmetry it substitutes convertible debt for equity whereas when it has high firm risk and debt capacity it usually substitutes convertible bonds for debt.

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<sup>21</sup> Research and development (costs).

When issuing convertible debt it is crucial that the firm managers know more about the firm financial attributions than the market. But still the issue of the convertible debt remains a kind of a “bet” by the firm that its business is more stable than what is implied by the market assessment of the firm-specific volatility. If the company assess its own volatility properly then it will be able to incur lower marginal costs of financing and fewer restrictions. Of course it will also have to accept the possibility to pay up for it with the common stock in the future. Brennan and Schwartz (1998) again argue that convertible bonds “are likely to be especially attractive to company which is perceived as more risky by the market than by management”<sup>22</sup>. They say that this is the convertibility feature of the bond that reduces inside managers incentive to increase the risk of the firm when trying to transfer wealth from bondholders to stockholders as for example in the case of earlier mentioned “overinvestment” problem. The investors are almost always ready to provide funds to the issuers on better terms when the uncertainties are reduced and this explains why convertible bonds are rather most likely to be offered by companies which are perceived by the market as risky or whose investment policy and risk is rather hard to assess.

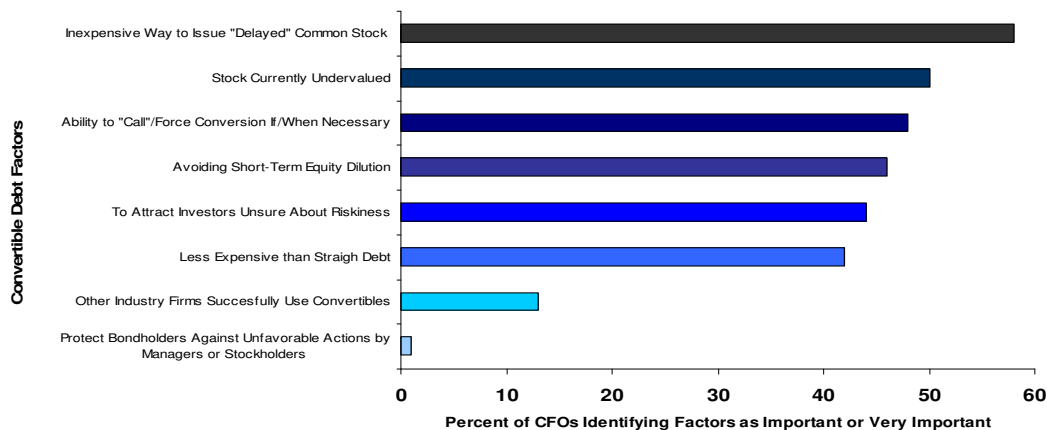
It seems to be obvious that if the firm issues convertible bond and the business prospects are not optimistic this choice, instead of simply issuing equity, will turn out to be a wrong decision. In this situation the bankruptcy cost will increase considerably. If on the other side the business is booming and the common stock price accelerate substantially, the firms convertible bonds will be converted into equity and the existing shareholders share of this growth would be diluted.

According to Stein (1992) the key reason to use convertible bonds is the adverse selection problem. The author claims that the medium firms that have good prospects and are sure of their value creating potential will issue these instruments. The true value (high one) of the firm will be known before the debt is due and so the conversion option will be exercised (or forced by the firm) and this will help to raise more debt in the future when needed.

Surprisingly the lower cost of financing is not the most important advantage of convertible debt. It turns out that for managers the most important is this delayed equity issue followed by current stock undervaluation. Attracting investors unsure about the risk took only the fifth position in the survey conducted by Graham and Harvey (2001).

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<sup>22</sup> see Brennan and Schwartz (1998), p. 63.



**Figure 5: Survey evidence on factors that affect the decision to issue convertible debt**

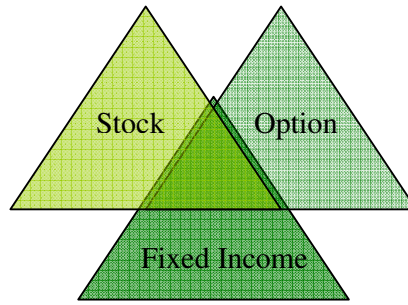
source: Graham and Harvey (2001)

## 4 Mandatory convertibles

Amongst the most popular mandatories has always been PERCS and DECS. Nowadays most of the mangers associate the name mandatory convertible with a DECS structure and its different modifications. Some of the managers I interviewed even did not know about the PERCS structure which lost popularity in the late nineties. Henryk Wupperman, Head of Capital Markets of Bayer AG when asked why Bayer AG emitted the DECS structure mandatory and not a PERCS for example replied me: “The downside of capping the pay-off is that investors would obviously need to receive a compensation for that, which would mean an even higher coupon. In that respect we were happy to keep the first 17% of the upside and leave the potential remainder to the investors (which they would also have gotten anyway if we had done a straight equity issuance)”.

Mandatories consist of three basic building components<sup>23</sup>: stocks, options and fixed income component and they can be replicated through different combinations of these three components. Further details on valuation of these components will be introduced in the section on valuation.

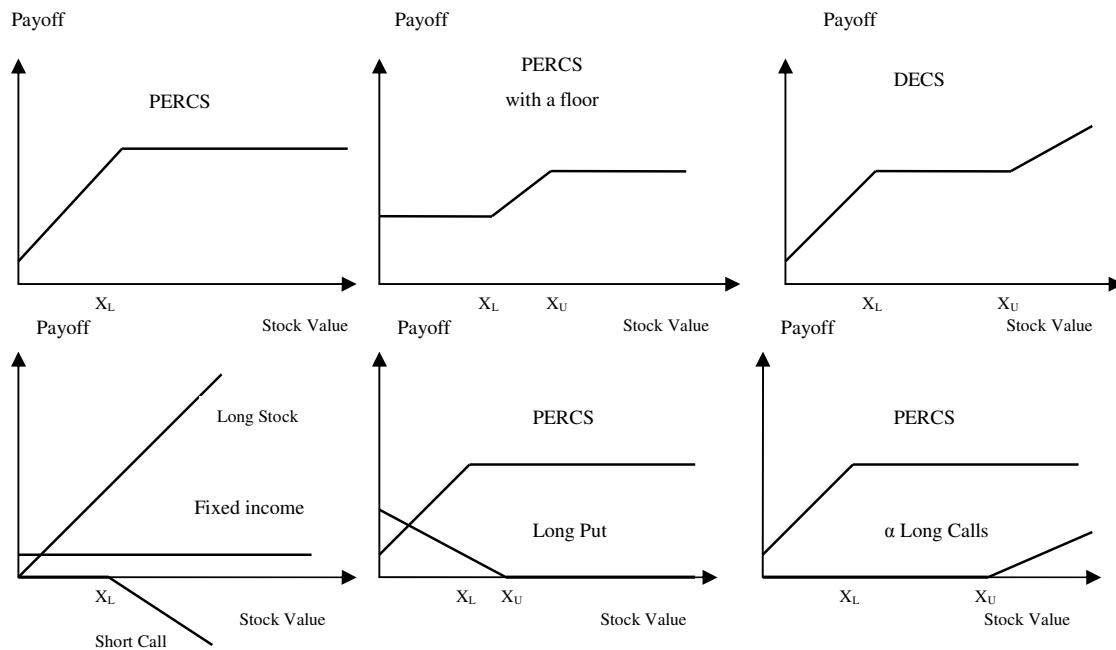
<sup>23</sup> see Arzac (1997).



**Figure 6: Three building components of the mandatory convertible hybrid**

source: own depiction

Before analyzing them deeper it is worth to see the payoff profiles of the PERCS, DECS and a PERCS with a floor (one that offers downside protection for the investor) as these are three basic and most popular structures. Looking at the building components one can see that adding or subtracting calls or put options to the basic mandatory structure one can easily obtain more complicated ones.



**Figure 7: Payoffs and building components of popular mandatory convertible instruments**

source: own depiction following Arzac (1997)

It can be seen that mandatories allow to tailor the payoffs to the needs of the issuers as well as different requirements of the investors. PERCS offer high income and appreciation only to some point, DECS do not have this cap (unlimited upside at reduced rate) but here also inves-

tors do not have possibility of full immediate appreciation as the payoff has a flat part. Finally PERCS with the floor offer a guarantee of no downside risk.

## 4.1 Important features of mandatory convertibles

There are two special features of mandatories that are worth to consider in order to understand these instruments better. It is the conversion ratio and the conversion premium. I assumed the DECS structure to be the representative mandatory convertible as these are the most popular.

### 4.1.1 The conversion ratio

The conversion ratio at maturity changes depending on the price of the stock.

- Lower strike price  $X_L$  is usually taken to be the same as the price of the common stock at the time of issue. Till this lower strike price the conversion ratio is 1. So when the stock price at maturity falls below, the investors suffer 100% equity participation of the downside.
- Between lower strike price  $X_L$  and the upper one  $X_U$  the conversion ratio falls with the rising stock price. That is because here the payoff is capped. So if the stock goes up from the issue price, the participation is simply at first delayed until the point of the upper strike.
- When the stock price at maturity moves above the upper strike  $X_U$  price, the investor starts to gain equity participation of the upside growth. But this participation is equal to a reduced rate of to the upper conversion number. From my observation this ratio lies usually within 0,7-0,85 interval.

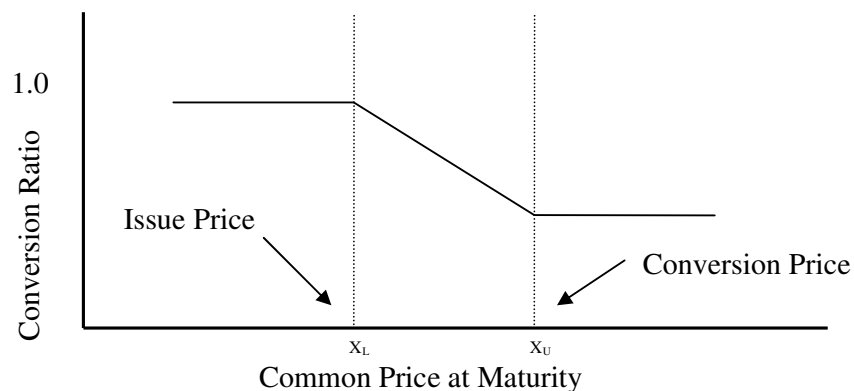
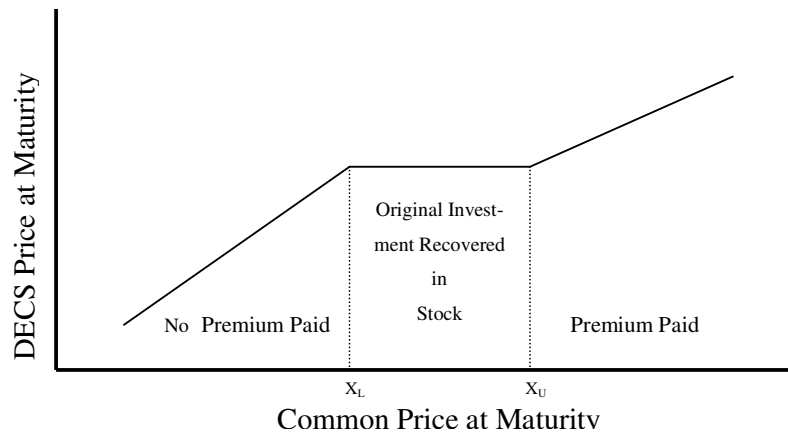


Figure 8: Hypothetical conversion ratio behavior

source: own depiction

## 4.1.2 Performance based conversion premium



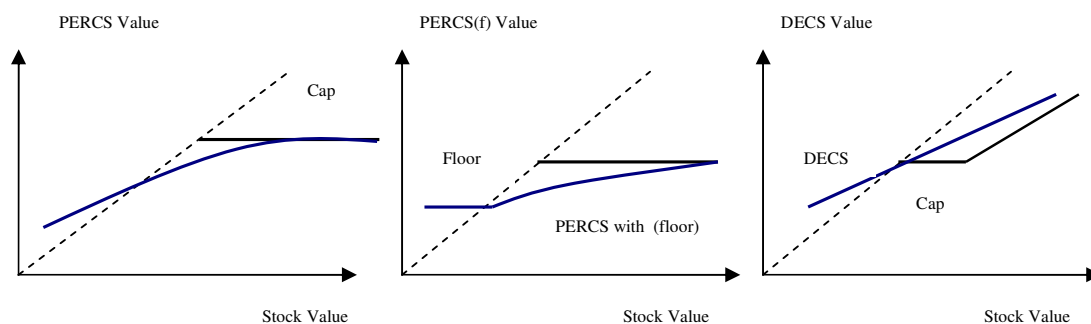
**Figure 9: Conversion premium of the mandatory convertible**

source: own depiction

The investors in these securities do not actually pay the conversion premium up front. The declining conversion ratio represents the conversion premium paid by the investor – but paid only when the stock performs well.

## 4.2 Mandatory convertibles from the point of view of the investors

From the point of view of the investors PERCS are like a long stock and short call. They tend to move much more in step with the stock on the downside and less on the upside because the shorted call neutralizes more and more the stock gain. So for the stocks that do badly after the issuance of this instrument, they become a stock substitute, albeit high dividend paying one.



**Figure 10: Value of three basic mandatory convertibles as stock price changes<sup>24</sup>**

<sup>24</sup> see Arzac (1997).



In fact they were structured to offer high current income but allowing a participation in about 30 % of the stock's appreciation from the point of issuance. Actually they offer very similar economic profile as a long-term buy-write<sup>25</sup> on the underlying stock with one difference that they pay this high dividend income.

Now I would like to concentrate on the most popular structure amongst mandatory convertibles the DECS. In the case of this hybrid instrument the area between the two triggers is a flat spot (deck) where the issue does not gain or lose significant values with the stock price movement. Below the lower trigger (issue price) the security declines one for one with the stock but has a higher dividend yield. The price area greater than the upper conversion price provides potential for upside appreciation with stock price movements but at a lower conversion rate, therefore returning around 70%-80% (depending on the each specific structure chosen) of the stock's upside.

From the investor's point of view PERCS would be a good investment in the bear<sup>26</sup> market and when the company is not doing very well. Investor receives in case of PERCS only limited payoff and so more important is relatively high dividend income. On the other hand DECS are better in more bull markets as here the payoff is not capped.

#### **Summary of DECS facts:**

- DECS involves a forward sale of equity at a higher price than the current stock price, but without any downside support of investment value as in the case of the convertible bond
- In return, the investors receive a higher dividend (coupon)
- They are less interest rate sensitive but more equity sensitive compared to convertible bonds. This mandatories have a high delta of about 80% in comparison to the one of the convertible bond of 45%<sup>27</sup>. Delta measures the sensitivity of an instrument to the changes in value of underlying. In this case each 1% movement of the stock price results in a 0,8% movement of the mandatory convertible in the same direction.

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<sup>25</sup> This strategy consist of long position in the stock and short in the call option on that stock. This is the strategy for investors who have neutral or moderately bullish outlook on the underlying stock. The investors receive the premium on the written call and dividends as long as the stock is kept, this reduces the effective cost of the stock but this compensation is simply a compensation for the obligation to sell the stock at the strike price and so the lost upside potential.

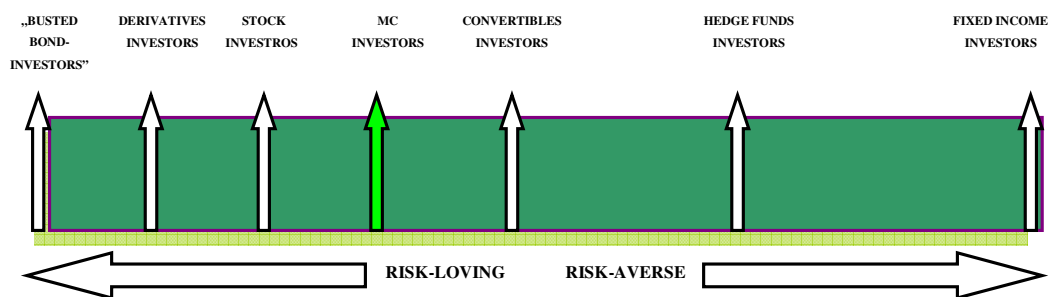
<sup>26</sup>The usually prolonged period when prices of securities fall, accompanied by widespread investor pessimism.

<sup>27</sup> see Basar (2003).

## 4.2.1 Investors in mandatory convertibles

The difference between regular convertible bonds which trade primarily over-the counter dealer market for institutional accounts is that most of the mandatory issues are traded on the stock exchanges. This makes them easily accessible to the individual buyer<sup>28</sup>.

Investments in mandatories are less risky than direct investment in stocks but more risky than in convertible bonds. As they do not offer any protection on the downside they would rather appeal more to risk-loving investors than risk-averse ones. Actually this instruments are a good alternative for equity-income-investors. Equity-income investors are definitely equity oriented but like high dividends. Mandatories provide them with higher coupons than regular convertible bonds (averages of 7.5% in the case of mandatories in contrast to 4.5% by simple convertible bonds)<sup>29</sup>. Actually when the investor is rather not attracted by the low yield on the underlying but he is interested in the upward potential of this stock, mandatory can be a good investment choice for him. They are definitely more sensitive to changes in the underlying stocks than regular convertible. "Recent mandatories were issued at an average premium of 20 percent, compared with 29 percent for all convertible bonds. The higher a bond's premium, the lower its equity sensitivity, since the stock has to appreciate more for an investor to be able to convert at a profit. Mandatories are therefore a good fit for anyone who likes income but believes the bottom of the market is near or just past"<sup>30</sup>



**Figure 11: Position of mandatory convertible in the risk spectrum**

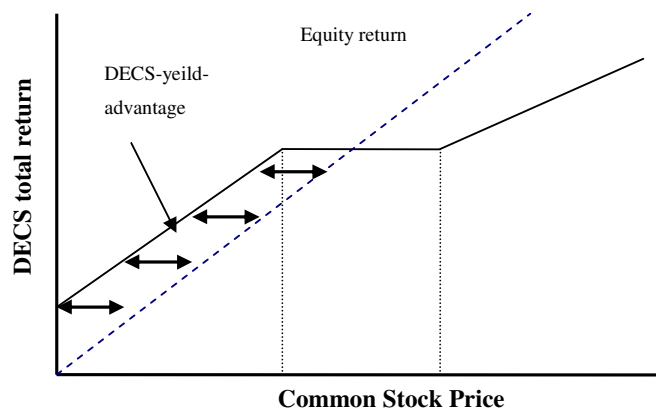
source: own depiction following Philips 1997, p.14.

<sup>28</sup> see Feingold (2007).

<sup>29</sup> see Hedge and Krishnan (2003).

<sup>30</sup> see Keating (2002).

As the mandatory is a instrument for those who finally want to acquire stock it is interesting to show the difference in payoffs of stock and the DECS. The mandatory clearly dominates the stock if the latter is flattish or simply down as it offers relatively high income stream.



**Figure 12 : Hypothetical payoff of stock and DECS investments at maturity**

source: own depiction

As Chen, Kensinger, and Pu (1994) argue buying the DECS can reduce the transaction and hedging cost of the investors who otherwise would have to buy separate components to replicate the payoff. Authors call the DECS purchase a “one-stop shopping” for a covered bull-call-spread strategy the DECS represents.

Noteworthy is the fact that mandatories are often offered to the investors slightly cheaper than they are really worth. This comes from the intention of the issuers to draw attention of the hedge funds that through their investments in these instruments help the issuers to build a required issuance volume<sup>31</sup>. And actually hedge funds dominate the mandatories market<sup>32</sup>. They create a portfolio of long mandatory convertible and simultaneous short-sell of the stock. In this way they try to gain profit from misevaluations. One idea behind this action is to use the lower implied volatility of the option embedded in the mandatory convertible compared to stock market volatility<sup>33</sup>.

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<sup>31</sup> see Suria, Tung and Kim (2003).

<sup>32</sup> see Delko (2005).

<sup>33</sup> Huckins (1999) found that DECS are almost insensitive to the stock’s volatility.

### 4.3 Valuation of mandatories

Although mandatory convertible is a security whose value depends simultaneously on different factors like stock prices, interest rates and default risk, in the literature it is rather hard to find more difficult approaches of valuation than simply valuing and adding all the components of the hybrid as in the Building Block Approach introduced below. However, there exist multi-dimensional lattice models that provide one with more flexibility. They give, amongst others, the possibility of modeling and implementation of correlations between different risk factors<sup>34</sup>.

#### 4.3.1 Building Block Approach

The model gives a simple way to value these instruments, one follows the Building Block Approach as in the paper of Arzac (1997) and finds the value of all separate components of the hybrid instrument which in the case of the mandatory consist of present value of fixed-income cash flows, current value of the stock and the embedded options. PERCS in this approach is simply the value of the stock to be received at maturity which is the price of the stock at issue time minus the present value of the forgone dividends plus present value of PERCS dividend (coupon) and minus a value of the call option.

$$P_K = PV(\text{div}_{\text{PERCS}}) - PV(\text{div}_{\text{Stock}}) + P - \text{Call}(X)$$

To get the value of PERCS with floor one have to add a one put option. As in this case investor receives something he has to pay for it with a lower cap on appreciation or reduced dividend.

$$P_P = PV(\text{div}_{\text{PERCS}}) - PV(\text{div}_{\text{Stock}}) + P - \text{Call}(X_L) + \text{Put}(X_U)$$

Finally in order to get DECS we just need to add  $\alpha$  calls with a higher strike than the first call to the PERCS and we get the unlimited appreciation potential.

$$P_D = PK(X_L) + \alpha \text{Call}(X_U)$$

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<sup>34</sup> see Das and Sundaram (2004).

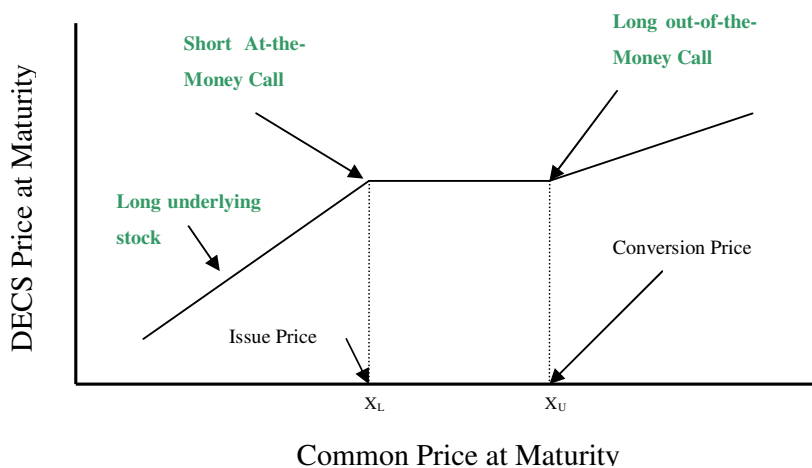


Figure 13 : The anatomy of a mandatory convertible bond (DECS)

source: own depiction

## 5 Mandatory convertibles from the corporate finance point of view

Although the existing literature on mandatory convertibles is still rather small there are some authors that tried to understand why and when companies decide to issue exactly these instruments. Huckins (1999) looking for characteristics of firms that issue this instrument found out that they are highly levered. In the nineties a number of companies including such big names as RJR Nabisco, General Motors, Citicorp issued mandatory convertible bonds and one of their main motives was to restructure their balance sheets. At that time their balance sheets were “overloaded” with debt. As one can see in the figure 14 on the following page during this first big wave of mandatories in the early nineties 10 out 19 issuers gave as a motive the need to use proceeds to reduce the debt.

Companies are concerned about equity capital ratio strength, which varies amongst different industries and serves as a an indicator of company’s stability. For the companies that already are in distress it is rather difficult to issue common stocks as investors facing such high risk

**Description of PERCS, PRIDES and DECS issues**

This table characterizes nineteen issuers of mandatorily convertible preferred stock. All information on the table was obtained from issuers' prospectuses, *Compustat*, *Moody's Industrial Manual* and the *Dow Jones News Retrieval*.

Issuer	Security	Issue Year	Issue Size(%) <sup>a</sup>	Div. Yields (in %) <sup>b</sup>		L-T Debt Rating <sup>c</sup>	Use of Proceeds
				Pref	Common		
Boise Cascade	PERCS	1992	5.27	7.8	4.5	BBB	Reduce debt, Gen. purpose
Bowater	PRIDES	1994	1.48	28.0	5.1	BB-	Capital exp.
Citicorp	PERCS	1992	1.88	8.2	0.0	BBB	Misc.
Consol. Freight.	PERCS	1992	8.39	8.7	0.0	BB	Reduce debt, Gen. purpose
James River, Va.	DECS	1994	1.95	11.9	3.5	BBB-	Acquisition
Kaiser Aluminum	PRIDES	1994	6.51	7.7	4.0	B+	Gen. purpose
K-Mart	PERCS	1991	6.51	7.7	4.0	A	Gen. purpose
Marco Tech	DECS	1993	10.01	6.0	0.0	BB-	Reduce debt
Olin	PERCS	1992	6.70	8.8	5.3	BBB+	Reduce debt
Reynold Metals	PRIDES	1994	11.37	7.0	2.0	BBB+	Reduce debt
RJR Holding	PERCS	1991	7.45	8.2	0.0	BB+	Reduce debt
Santa Fe Energy	DECS	1994	6.66	8.2	0.0	BB-	Reduce debt
Sears	PERCS	1992	2.21	8.7	4.6	A	Reduce debt, Gen. purpose
Sun America	PERCS	1991	2.08	8.5	1.5	A	Gen. purposes
Sun America	PERCS	1993	13.01	7.5	0.7	A	Gen. purposes
Tandy	PERCS	1992	1.59	7.2	2.0	A	Gen. purposes
Tenneco	PERCS	1991	3.24	9.5	5.4	BBB-	Reduce debt
Texas Instr.	PERCS	1991	7.36	7.8	2.5	A	Gen. purposes
Westinghouse	PERCS	1992	2.74	9.0	4.2	A	Reduce debt

<sup>a</sup> Issue size equals the issue's net proceeds divided by the each issuers' market value of equity + book value of preferred + book value of total debt in the announcement quarter.

<sup>b</sup> Dividend yields equal the annual cash dividends as of the announcement quarter, divided by the preferred's or common's offer price.

<sup>c</sup> Long-term debt ratings are for unsecured senior debt and are the last ratings assigned by Standard and Poor's prior to the preferred issues.

**Figure 14: Use of proceeds from mandatory convertible bond issues in the nineties**

source: Huckins (1999), p. 92.

would stay away from the company or demand return that could not be beard by the issuer. And that is surely one of the main reasons why many of these companies decide to issue mandatory convertibles as a way of more efficient refinancing.

“Typically companies offer mandatory convertibles (MC) in lieu of equity. The rationale for the MC is that it gives the Company an ability to raise money without severely putting pressure on share price, which may already be facing downward pressure due to operational performance or other issues specific and potential negative to the Company (...), We found ourselves in need of capital and given the existing pressure on our share price, opted for the mandatory convertible as one of several methods we used to raise capital”<sup>35</sup>.

(manager of the US company that went trough severe difficulties)

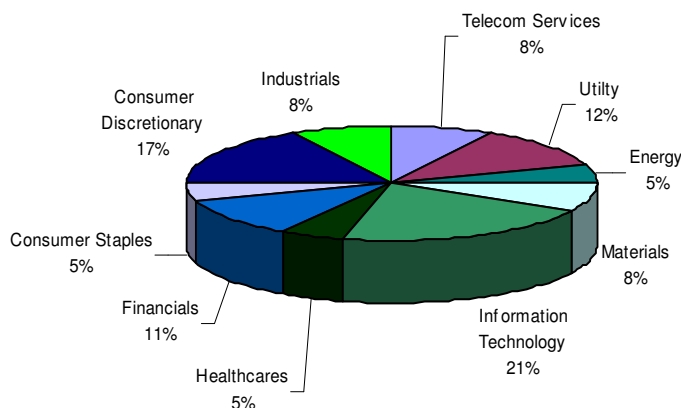
Recapitalization in the case of mandatory convertible issues is very different from issuing debt or equity. It is special as effectively although the decision to recapitalize is taken now it will be done under conditions in the future. If the stock price at maturity is above the conversion price then the dilution will be lower as less shares will have to be issued as mentioned

<sup>35</sup> A part of an answer of one of the managers I interviewed.

earlier. That is why in the general meeting the decision to issue mandatories instead of highly dilutive stock now might fall more easily. But of course old shareholders may have their own view on the issuance as one can see from the anonymous Deutsche Telekom shareholder comment in 1997: “They’re giving away free gifts to the people who take up the bonds at the expense of the shareholders”<sup>36</sup>.

## 5.1 Who issues mandatory convertibles?

There exist no special industry in which mandatories would dominate exceptionally except from the information technology and the fact that financial institutions has always been very present in this market.



**Figure 15: Issuers of mandatories in different industries**

source: Hedge and Krishnan (2003), p. 14.

Arzac (1997) claims that especially large companies with growth or recovery prospects and of which stocks are undervalued may signal their confidence in themselves when emitting mandatory convertibles. It seems to be true as it is hard to find small companies or even start-ups emitting these instruments. “Desperate startups and dot-com flameouts, however, can hold the phone. The mandatory convertible game is pretty much played only by well-established companies; riskier businesses still have to offer investors the option of conversion”<sup>37</sup>. To mention some issuers: AT& T, Bayer AG, Citicorp, Citigroup, Credit Suisse, Daimler Chrysler,

<sup>36</sup> see Rowley (2003).

<sup>37</sup> see Keating (2002).

Deutsche Telekom, Motorola, Swiss Re are all well-established companies. This all is consistent with what Ertugrul, Hegde and Krishnan (2004) claim that issuers of mandatories are typically larger firms that have lower indirect costs of financial distress than convertible bond issuers. They claim that mandatory convertibles issues is a good idea for firms that face undervaluation of equity because of market being too pessimistic about the firm's upside. So if the firm insiders face a problem of investors skepticism and they care more about financial distress than information asymmetry problem they can try to mitigate this skepticism by selling the stock to the investor and simultaneously buying the call option on that stock from them as in the case of mandatory convertible. Authors in their comparison of convertible bonds and mandatory convertibles found that the former have lower information asymmetry and that mandatories are issued in more down-markets than convertible bonds.

## **5.2 Other possible motives**

The advantage is that the company is 100% sure it will place the shares in the market<sup>38</sup>. Actually in no other case the firm can be sure it will sell all the shares to the investors. According to research of Koziol and Sauerbier (2003) the costs of issuing the mandatory convertible is about 3-4% of the issue value. In contrast costs of issuing equity is much higher, 4-15%. Interesting is that some of the managers I approached mentioned the time factor when issuing the mandatories. Time factor usually plays important role and issuance of these instruments can be executed very fast in comparison with stock issues (for example no need for a book-building<sup>39</sup>) and even convertible bonds.

Mandatories can also serve as a device against hostile takeover attempts. In 2003 Deutsche Telekom offered their investors in these instruments a special right<sup>40</sup>. Investor received an option to convert into stock at a very generous conversion ratio before maturity in the case of the possible hostile takeover. This higher conversion ratio and so more shares to be acquired by the bidder if investors decide to convert make the takeover more difficult<sup>41</sup>. Especially in

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<sup>38</sup> Under assumption that it first places the mandatory convertible bonds successfully.

<sup>39</sup> The process used in public offerings to identify the price for the shares, here the issuer sets some base price and different bands of it and ask investors for their bids. Investors state the number of shares they would be willing to buy in different buckets. From this the issuer is able to infer a proper market price.

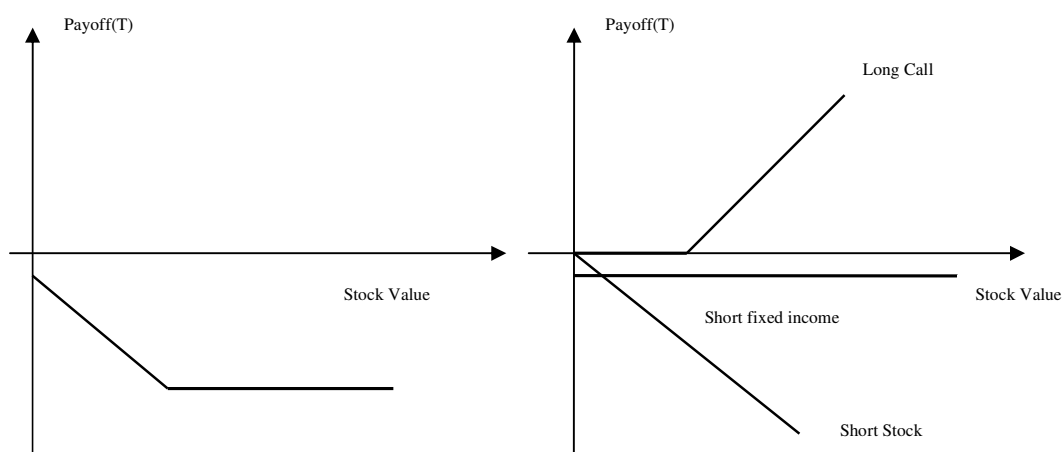
<sup>40</sup> see Deutsche Telekom (2003), § 8(5).

<sup>41</sup> see Koziol and Sauerbier (2003).



the case of cash offers when the bidder doesn't have unlimited cash liquidity this action of the holders of mandatories causes some difficulties to the bidder.

One of the main motives to issue the mandatory convertibles is definitely the intention to minimize the cost of financing. In the case of mandatory convertibles the issuer has the call option and so the higher the stock value the higher the profit of the issuer. It is obvious that firms emitting them must expect their stock to appreciate in the future. But how does the issuer profit from issuing these structures? To see it more clearly I decided to look at the PERCS structure, the simplest one, from the point of view of the issuer. His payoff actually is the mirror picture of the payoff the investor receives.



**Figure 16: PERCS payoff from the issuer's point of view**

source: own depiction

It is noteworthy that here the issuer buys a call option on his own stock. The basic question is when the investors buy the call option? Of course they buy this instrument when they expect stocks to appreciate in the future. One can conclude from this that managers issue mandatory convertibles when they expect their stock to appreciate. How does this decision attributes then to the corporate finance decisions? The answer is simple, the higher the stock at least in the case of most mandatories which have capped payoffs (as PERCS) the less stock the investor gets at the maturity. So the higher the stock value at maturity the lower the implied cost of rising capital. I decided to show this on the example of Citicorp PERCS issued in 1992. The

issue price was 14,75 and the bond matured on 30. November 1995<sup>42</sup>. Beneath the number of stock received at the maturity set by Citicorp ( X represents the stock price of 20,28 ).

$$\text{Number of stocks received by the investor} = \begin{cases} 1 & \text{if the stock price at } T \leq X \\ (20,28 / \text{stock price at } T) & \text{if the stock price at } T \geq X \end{cases}$$

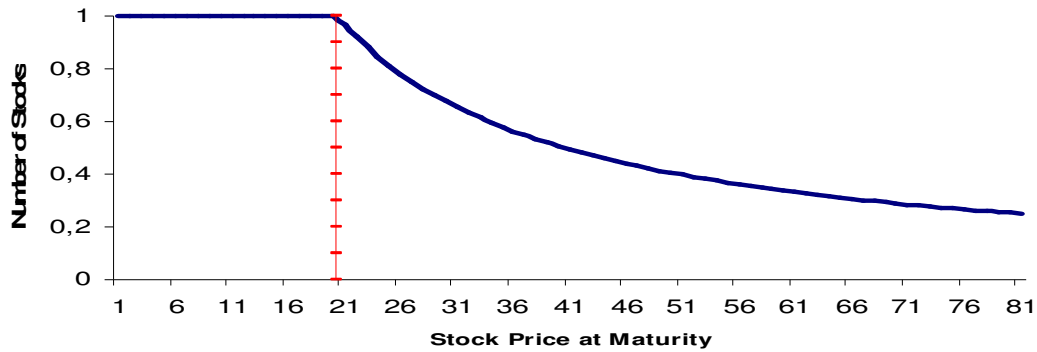


Figure 17: Number of stocks Citicorp investor will receive depending on the stock price at maturity

source: own depiction

I plotted the implied cost of financing with mandatory convertible as well as value gain from each one stock depending on the stock price at maturity.

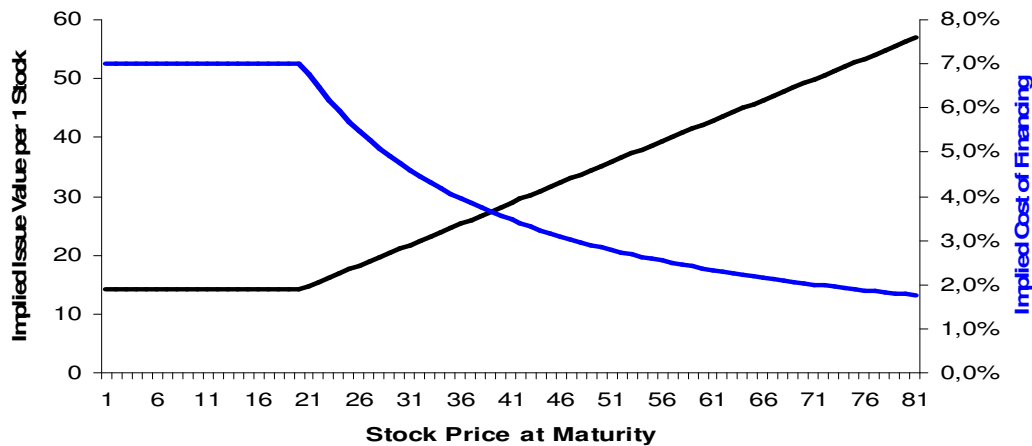


Figure 18: Implied cost of financing at maturity (Citicorp PERCS)

source: own depiction

<sup>42</sup> see Arzac (1997).

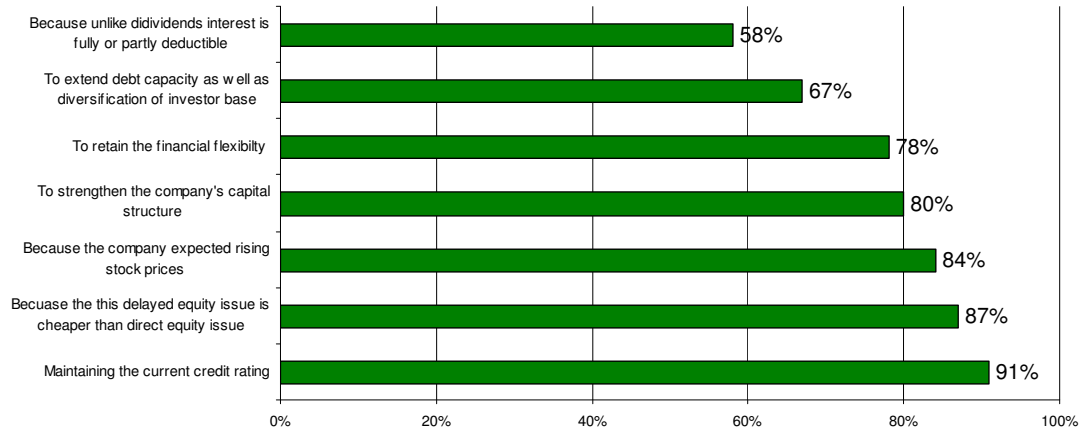
We see that this implied cost of financing falls down severely, if the stock price shoots up. At the stock price of 40,56 for example the cost would be only 3,5% compared to 7% in the area of stock prices at maturity between 0 and 20,28.

### **5.3 Interview results**

The objective of my interviews was to hear from very professional people representing the industry about their main motives of issuing mandatories. Even though I tried to reach over thirty firm managers and CFOs from the USA and Europe only sixteen of them gave me somewhat broader view over the problem than just one or two sentence response. Fifty-two percent of my respondents were ready to take part in a telephone interview which gave me more flexibility in exploring the problem deeper. The rest responded per email (7 firms). Majority of the respondents (11 firms) requested or insisted on remaining anonymous whereas very few of them as for example the CFO of the Bayer AG did not have anything against about being mentioned. I also received numerous very short replies from firms other then investigated sixteen that did not contribute much to my investigation as they usually only stated that the company issued the mandatory convertible in the process of recapitalization.

Each of my respondents was asked the main open question: “Why did your company decided to issue the mandatory convertible bond”. Some managers replied in a very exact way giving some main reasons and their importance. But many times I provided them with some possible answers and asked them to choose the most relevant ones and assign the importance according to their perception of the problem. I summarized the results in the figure 19 below. The percentages simply show how managers assigned this importance to the given motives.

I can say that most of the CFOs or managers I spoke showed optimism concerning mandatories and mentioned very similar motives. Maybe this optimism comes from the fact that I spoke only with those issuers that showed interest in speaking with me. Leading motive was the intent to maintain credit rating in a difficult situation for the company and the relative cheapness of this delayed equity. Another very often mentioned reason was that the company expected some upward potential.



**Figure 19: Survey results (with CFOs and managers) on the motives to issue mandatory convertibles**

I decided to present few sentences of two prominent CFOs I interviewed in this work. This may give the reader the insight on how they think about this instruments.

“The primary reason for Fortis as a financial institution to issue such mandatory convertible bonds is linked to the solvency and the cost of capital. These instruments are recognized by the regulator and rating agencies as a part of Fortis capital, virtually as strong as the cost of capital but the coupons of such instruments are deductible (at least big part of it) and much cheaper than the cost of equity”.

(General Manager Capital & Funding Finance of Fortis Jean Dessain)

“In order to minimize the WACC and to optimize the return on equity, these instruments are very useful for Fortis. Furthermore it allows us to diversify the investor base, hence to reduce the market risk of financing.”

(General Manager Capital & Funding Finance of Fortis Jean Dessain)

“The main reason to use a mandatory convertible was to issue equity (for rating agency purposes) as part of the funding for Bayer's Schering acquisition”

(Head of Capital Markets of the Bayer AG, Henryk Wuppermann)

“Compared with issuing straight equity, however, the mandatory has the advantage of tax-deductible interest payments (as opposed to dividends which are not tax deductible). In addition, the mandatory allowed Bayer to participate to a certain extent in the positive share price development after issuance.”

(Head of Capital Markets of the Bayer AG, Henryk Wuppermann)

“From today's point of view we are very happy with the decision and would again apply a mandatory as opposed to straight equity”

(Head of Capital Markets of the Bayer AG, Henryk Wuppermann)

What is more my respondents could be divided into two groups, ones that were very optimistic about this instrument that was part of financing strategy and some that saw the issue of these instruments more as a rescue effort from a bad financial condition. That is why I decided to try to show these two different characters with the help of two cases from the real world.

#### **5.4 Market reaction to mandatories issuances**

Different authors tried to investigate the market reaction to mandatory convertible issues. Hedge and Krishnan (2003) found that the stock market reacts less negatively to mandatory convertible issue compared to ordinary convertibles. Although Huckins (1999) found a neutral response of the stock market to announcements of issues of mandatory convertibles and associates this fact with much lower adverse selection costs compared to equity issues the reaction of the market generally is negative. Mikkelson (1981) investigated stock reaction in the first week of issue announcement and found out that the stock price went down only about 1,01%. Ertrugrul, Hegde und Krishnan (2004) on the other hand investigated announcement effect in different time windows and found that the strongest fall in price of about 7% appeared in the 2 days window and the smallest in 10 days window of only 2,6%. A good example of two very different reactions to mandatory issues was a negative reaction (7,5%) to Deutsche Telecom issue and much more neutral of Swiss Re 1,3%. But in the case of Swiss Re the market could recognize that the issue is done from a strong financial position of the company and that is why did not react sharply<sup>43</sup>.

Where does the negative effects come from? Of course mandatory convertible seen as a delayed equity is still an equity issue and as I mentioned in the introduction the stock price falls when the firm announces stock issue. But there is also another problem, more specific for the mandatory convertible bonds. As mentioned before most of the mandatory convertibles are bought by hedge fund investors who simultaneously short-sell the issuing companies shares.

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<sup>43</sup> The case of the Swiss Re mandatory convertible will be presented later in the text.

This action has a negative impact on the share price. Probably 90% of the Deutsche Telekom mandatories was bought by large hedge funds which shorted stock of about \$2 billion<sup>44</sup>.

## **5.5 Credit rating considerations when issuing mandatory convertibles**

Only very few of my interview partners did not mention the objective of maintaining the credit rating as first or second important motive when issuing these instruments. That is consistent with what Graham and Harvey (2001) found out from their survey. When I asked the Head of Capital Markets of the Bayer AG, Henryk Wuppermann, for the main reason of issuing mandatory convertible in 2005, his response was: “The main reason to use a mandatory convertible was to issue equity (for rating agency purposes) as part of the funding for Bayer's Schering acquisition. The mandatory is treated as 100% equity by both Moody’s and S&P.” One of the Senior Financial Officers at Swiss Re which issued a mandatory convertible, which I will investigate in the further paragraphs, said: “The response of rating agencies to any solutions was key driver to us, as the rating is very important to our business”<sup>45</sup>.

Credit rating plays a very important role for the companies as the higher the rating the more confident the investors and lenders feel about the company.

Rating	Typical default spread	Market interest on debt
AAA	0,35%	4,35%
AA	0,50%	4,50%
A+	0,70%	4,70%
A	0,85%	4,85%
A-	1,00%	5,00%
BBB	1,50%	5,50%
BB+	2,00%	6,00%
BB	2,50%	6,50%
B+	3,25%	7,25%
B	4,00%	8,00%
B-	6,00%	10,00%
CCC	8,00%	12,00%
CC	10,00%	14,00%
C	12,00%	16,00%
D	20,00%	24,00%

**Figure 20: Spreads over and above long term (10 year) treasury bond rate for rating classes: 2003**

<sup>44</sup> see Rowley (2003).

<sup>45</sup> Information obtained from the Swiss Re investors service.

This confidence allows them to charge less for the capital provided. Above in the table with spreads over a risk free rate of 4% in 2003 in the USA for different rating classes one can see how much the rating influences the cost of debt<sup>46</sup>.

### **5.5.1 How do rating agencies see these instruments?**

As mentioned at the very beginning the rating agencies consider them as equity as opposed to plain vanilla convertibles, which means firms issuing these securities are rather safe from a credit downgrade. According to my interview partners adoption of this kind equity-like structures is expected to help companies with large debt load to de-lever their balance sheets.

Among the most important features rating agencies look for when assigning equity are<sup>47</sup>:

- lack of any maturity date
- mandatory conversion into stocks at maturity
- absence of the obligation to make fixed payments
- ranked as possibly most junior form of capital - no other capital provider ranks below it

The basic principle is that the more equity-like the structure is, the more equity will be assigned. In other words the more distant its maturity date, the more discretion the issuer had making coupon payments and the more junior the issue the more as equity the structure will be considered. Below some insight on how two most famous rating agencies treat different debt/equity hybrids.

### **5.5.2 Moody's Tool Kit**

Initially large number of the hybrid securities were issued by financial institutions. Much changed in 2005 when Moody's rating agency modified the rating treatment of these instruments. In its 2005 refinements to Moody's Tool Kit (issued for the first time in 1999), the agency declared much greater tolerance in assigning equity content. Especially important for many firms was a willingness to assign basket D status (75% equity) in the presence of strong replacement language - a clear intention to refinance with similar instruments or equity in the

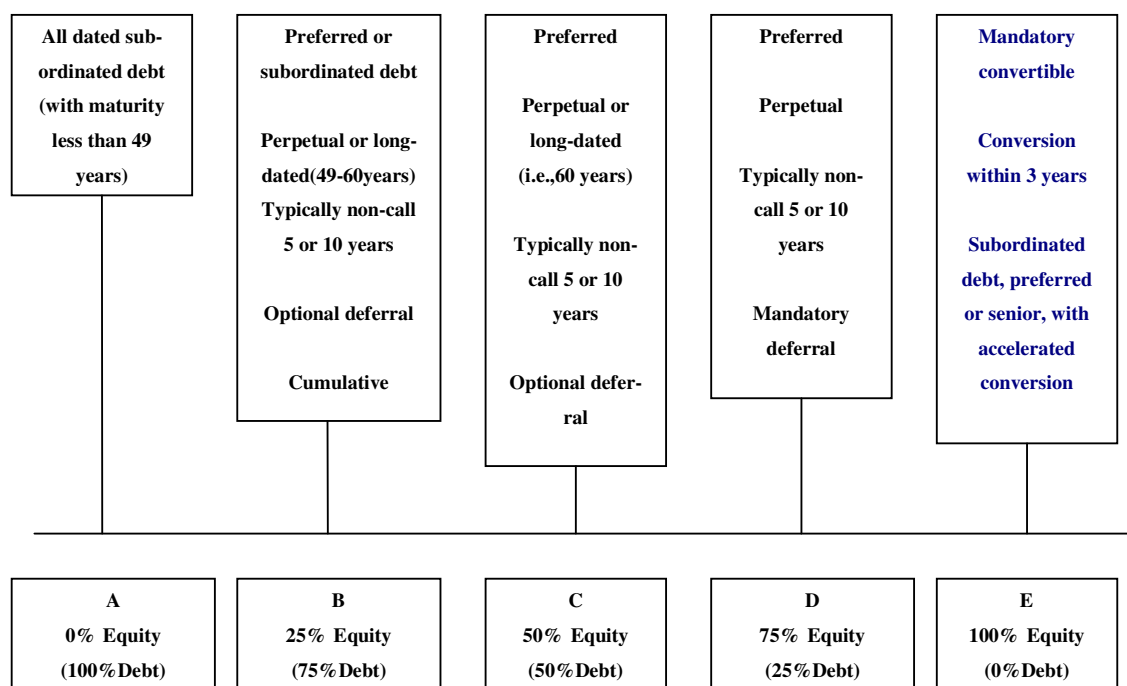
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<sup>46</sup> see [www.bondsonline.com](http://www.bondsonline.com)

<sup>47</sup> see <http://www.mofo.com/practice/docs/WSL10.pdf>

event of redemption and so-called mandatory non-payment triggers – the suspension of coupon payments once certain ratios are breached. In the Tool Kit, Moody’s provide a continuum of five baskets, beginning with the A basket, at one extreme which represents 0% equity and 100% debt, and ending with the E basket, which is treated as 100% equity and 0% debt, at the other extreme. This A basket includes long-dated subordinated debt (maturity of less than 49 years). The E basket encompasses securities showing five crucial characteristics<sup>48</sup>:

- mandatory convertible
- convertible within three years
- subordinated debt
- preferred or senior with accelerated conversion
- optional deferral and cumulative coupon



**Figure 21: Moody's A-E Continuum<sup>49</sup>**

source: Moody’s (2004) and Moody’s (2005)

<sup>48</sup> see Moody’s (2004).

<sup>49</sup> see Moody’s (2005).



### **5.5.3 Standard & Poor's**

By comparison Standard & Poor's rating agency that also modified its treatment divided the debt to equity hierarchy into three categories, with slightly more straightforward terminology. The three new levels of equity content are<sup>50</sup>:

- minimal equity content
- intermediate equity content
- high equity content

The high equity content bucket includes securities that would receive significant equity credit due to its very equity-like features. It includes instruments with a mandatory component, either a near-term mandatory conversion into a fixed number of common shares of the issuing company (only on a basis that would not make the issuer worse at the time of conversion) or regarding any kind of deferral of ongoing payments (at some appropriately set high trigger levels).

## ***5.6 Theoretical models explaining the motives of mandatory convertible issuances***

There are not many models that try to give some solution to the problem of when it is better for the firm to issue convertible bonds and when the mandatories. It may be due to fact that these instruments are still not as popular as other sources of financing. In the literature there exist three well-known papers amongst people who deal with these instruments that try to explain problem addressed before. Noteworthy is the fact that all of them are still working papers. I decided to present all of them as they give us different insights on the same problem.

### **5.6.1 Equilibrium model of Chemmanur, Nandy and Yan**

Chemmanur, Nandy and Yan (2003) built a model in which there exist three types of firms (good, medium and bad ones) and all are concerned about the undervaluation of their securities in the market as well as their default probability.

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<sup>50</sup> see Standard & Poor's (2005).

The authors decided to find out with the help of theoretical model which securities (debt, convertible debt, equity, mandatory convertible debt) will be issued by these companies under different conditions (different degrees of asymmetric information in the market and different degrees of probability of financial distress) so they can maximize their value.

They tested the implications of their theory on a sample of firms that emitted mandatories and regular convertible bonds using commonly used proxies for probability of financial distress (Altman's Z-score<sup>51</sup>, existing leverage) and the information asymmetry (number of analysts following the firm, the forecast error<sup>52</sup>, standard deviation of analysts forecasts, coefficient of variation<sup>53</sup> of analysts forecasts)<sup>54</sup>.

In their model a risk-neutral entrepreneur owns an all-equity firm and the firm needs to raise capital externally to fund a project with positive net-present-value. There are three dates in the model. At time 0 the true distribution of the firm's values is only known by the entrepreneur, at time 1 some of the firms may deteriorate with some probability and outside investors observing it are able to update their beliefs about the firm. At time 2 the whole asymmetric information is resolved as the cash flow from the investment is realized. All of the firms will receive either a low cash flow or high cash flow from the project. The high cash flow is larger than the needed investment and low cash flow lower. The difference between firms is the probability of receiving these cash flows at time 2. Additionally each of the firms may deteriorate at time 1. The bad firms deteriorate with higher probability than good and medium ones (these two have the same probability of deterioration). Assuming there is no deterioration at time 1 the good firms will receive high cash flows with probability of 1 and the medium and bad firms with probability less than 1. From this follows that bad firms have ex ante probability of low cash flow that is higher than medium ones and the medium ones have higher than the good ones.

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<sup>51</sup> Model for assessing the distress of the company, see Altman (1986).

<sup>52</sup> The absolute difference between the forecasted earnings and the true earnings.

<sup>53</sup> The ratio of standard deviation of analyst forecast to the absolute value of the mean estimate for the considered period.

<sup>54</sup> Firms with greater forecast error, standard deviation of forecast error and coefficient of variation and lower number of analysts following the firm are expected to have larger information asymmetry.

In the model, higher-valued firms can distinguish themselves from lower-valued firms by issuing straight debt or ordinary convertible debt. Why should companies want to distinguish themselves from others? Capital structure can be seen as a kind of an indication of future cash flows as bankruptcy costs for a company with higher expected cash flows are lower as argued in Ross (1977). Since financing with debt increases the possibility of financial distress more for a lower valued firm than for a higher-valued firm, the former do not always have an incentive to mimic this strategy. However, in the uncertain world, also high-valued firms face a problem of having a positive probability of financial distress. In that situation if the possible cost of financial distress is higher than the valuation benefits obtained through the separating from other firms the company may look for securities that fulfill two criteria: they keep the extent of undervaluation of the firm's securities low and protect against incurring the cost of financial distress. Chemmanur, Nandy and Yan (2003) try to convince us that mandatories do this well. In the model the only factors that influence the decision to issue this structure are asymmetric information and the probability of financial distress. The authors say that the issuance may be driven by many market imperfections but in their opinion these two are amongst the most important ones and crucial for such analysis.

They presented two types of separating equilibriums. In the first case (proposition 1) when extent of asymmetric information between investors and inside managers is high and the possible probability of financial distress is low for good and medium firms all three types of firms issue different securities. The equilibrium will be separating if one of the following two conditions is fulfilled: the probability of deterioration of medium and good firms is below some threshold level or the extent of asymmetric information is high. In this case good firms issue debt instead of the other securities since they want to distinguish themselves from the medium and bad firms. Medium firms issue convertible bonds as they want to distinguish themselves from bad firms. But why do medium firms do not issue simple debt? In the model they perceive their probability of bankruptcy associated with issuing debt higher than the gains from mimicking good firms. Bad firms, as they have large default probability, issue equity.

The partially separating equilibrium (proposition 2) is characterized by the following conditions: the lower information asymmetry as in proposition 1 and higher probability of financial distress of issuing firms than in proposition 1. Partially separating equilibrium will be fulfilled if one of the two conditions are fulfilled: the probability of deterioration of the good and me-

dium firm will be larger than the threshold value and good firm's probability of receiving the small cash flow lower than the one of the medium one or the extent of asymmetric information is moderate. In such an equilibrium the good firm still issues straight debt (benefit of separating is still larger than the possible financial distress costs), while the medium and the bad firm issue mandatory convertibles<sup>55</sup>. Why do medium and bad firms pool together? Medium firm facing higher cost of financial distress than benefits of separating through issuing debt or convertible debt that carry high risk of default prefer mandatories as these, thanks to their mandatory conversion into stock, reduce the danger of financial distress. What is more authors say that the medium firm prefer in this situation mandatories to issuing equity. In contrast to equity mandatories have a cap on the upside of the investor gains for which he is compensated with higher dividends. But this capped structure has one important feature – this cap reduces the cash flow differences of up and down states. This in turn means that the difference of the true value of mandatories issued by bad and medium firms is smaller than if they would issue equities. From this follows that the undervaluation due to asymmetric information of the medium firm is lower. In other words "subsidization of the bad firm by the medium one is lower". The authors stress that some undervaluation of higher value firms in pooling is unavoidable but mandatories can minimize it.

A fully pooling equilibrium (proposition 3) is characterized by high probabilities of distress for all types of firms. This equilibrium is fulfilled if the probability of deterioration is larger than some certain threshold level and probabilities of receiving low cash flows of good and medium firms are very similar or the extent of asymmetric information is very small. Now the probability of financial distress is so high for the good firm that it outweighs benefits of separating. What is more the difference of receiving low cash flows of the good and medium firms are so close that their intrinsic values remain also close so the cost of the good firm of pooling does not constitute a severe burden. Hence according to the model, the equilibrium strategy for all firms would be to issue mandatory convertibles.

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<sup>55</sup> As the mandatory convertible bond the authors do not consider any one specific structure like PERCS or DECS. It was crucial that the structure fulfils three basic criteria of a mandatory convertible bond: mandatory conversion, either fully capped or limited appreciation potential and higher dividend than the underlying common stock pays. In the investigated sample were 12 different variations of them issued by different investment banks.

Main conclusion from the model is that, given a firm has a choice between ordinary convertibles and mandatory convertibles, the one facing higher probability of financial distress and smaller extent of asymmetric information will choose to issue mandatory convertibles, while the one facing greater extent of asymmetric information and lower financial distress probability will choose to issue ordinary convertibles.

### **5.6.2 A risk management model of Ertrugrul, Hedge and Krishnan**

Ertrugrul, Hedge, and Krishnan (2004) in their paper also examine under what conditions companies issue convertible bonds and mandatories. Like the authors of the precedent model they concentrate on two the market frictions: endogenous cost of financial distress and information asymmetry. But their basic idea for approaching the problem is different, they see decision of the firm to issues different instruments from the risk management perspective. In their considerations they put strong emphasis on the option components of the securities.

Chemmanur, Yan and Nandy (2003) stress that when possible probability of distress is high and the information asymmetry low or moderate than firms decide to issue mandatories but Ertrugrul, Hedge, and Krishnan (2004) see this in a somewhat different way. They stress that in their opinion mandatory convertible bond issuers do not really have more financial distress compared to convertible bond issuers. They explain this fact showing that investors are more likely to buy a call option than sell one when the ex ante firm risk is high. In the case of a mandatory convertible the investor sells a call to the issuer. Therefore from the issuers point of view when the firm risk is high it is more reasonable to sell the call to the investor to match with his preferences as it is in the case of the convertible bonds.

At first the authors introduce a simple “base case” where there are no market frictions (risk-neutral world) to show how the securities structures look like. They make use of the European put-call parity<sup>56</sup> and look at the components of the hybrids. The main objective behind it is to show how the difference between the payoffs from investment into a project to the issuer when issuing convertible debt and mandatories look like.

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<sup>56</sup> see Stoll (1969).

From the put-call parity where all the options have the same time to maturity and the strike price and (S-stock price, P-put price, B-bond price, C-call price, X-strike price,  $X_2$  – higher strike price) we have:

$$S + P = B + C$$

In this context the price of a simple convertible bond is:

$$CB = B + C = S + P$$

of the PERCS-kind mandatory:

$$MC = S - C = B - P$$

and DECS-kind of mandatory:

$$MC = S - C(X) + C(X_2) = B - P + C(X_2).$$

Having these components authors decided to see what is the difference between funding a project with convertible debt and mandatories. Assuming the firm decides to fund the project with a simplest mandatory convertible its portfolio holding will be:

$$S - S + C = C$$

This combined position is equal to the call option on the project. In the case the stock moves up the firm gets the upside of  $S_T - X$  and the investor gets fixed payment of  $X$ . In the down movement of the stock the firm is left with zero payoff and the investor receives the residual value of  $S_T$ , where  $S_T < X$ .

In contrast when the firm decides to issue convertible debt then the firm's portfolio is equal to:

$$S - S - P = -P$$

Here when the project turns out to be successful the convertible bond holder receives the whole upside as he decides to convert into stocks and the issuer. In the opposite situation the bond holder exercises the put option and being paid the  $X$  strike price turns over the project to the firm.

After introducing the market frictions, the authors hypothesize that as the investors do not receive this downside protection the convertible holders have, the issuers of mandatories should have lower indirect<sup>57</sup> cost of distress. They refer to Green (1984) and argument it with the fact that the regular convertible bonds mitigate the risk shifting incentives in the firm whereas mandatories are structured differently. Firms that issue them do not have to offer the floor to convince investors to buy them.

On the other side, they notice that simple convertible bonds add to the debt burden if the bad state is realized, whereas mandatories automatically convert into equity. Therefore, mandatories would appeal to firms that face higher direct financial distress costs.

Considering the asymmetric information problems they start with the question: when do less informed investors react negatively to the equity issue announcements? When they are doubtful about upside potential of the stock and when they are worried about the downside risk.

The authors consider the first case (investors doubt about stock upside) and say that the issuer can mitigate their skepticism by buying the call option from the investors (as it is in the case of mandatories) and that the lower the strike price the firm selects the more credible the signal for the market as this way more upside is bought by the firm. As in the presence of asymmetric information the price of the stock is simple the average of the high low value projects the options on the stock will be priced on this average. But there exist firms with different quality of projects and they would like to signal it. The high quality firm that have superior projects may set a lower strike price and pay higher call premium upfront as these are certain about positive gains in the future<sup>58</sup>. In contrast firms with worse projects will select higher strike (and so smaller premium of the overpriced call) to minimize payments. It follows from that that the choice of lower strike signals higher project quality and the firms with good prospects would signal it by setting a higher lower strikes and/or paying higher dividends.

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<sup>57</sup> The costs that arise due to debt related agency problems in the company.

<sup>58</sup> The lower the strike price is set the larger the percentage of upside ownership bought back by the firm.

In the second case they consider, there is a firm with medium quality project and this time the investors are worried about the downside of the stock. The authors say that now the entrepreneur may sell a stock together with a put to the investors (convertible bond). This is especially appropriate when the information asymmetry is high and the financial distress low.

Now, in the case of convertible bond the higher the strike set by the firm the more downside the firm is ready to buy from the investors and so sends a good signal. Again the firms with higher quality projects will set higher strike and ones with lower will select a lower strike to minimize the potentially large loss (to maximize profits) from selling the underpriced put.

Authors found the evidence for their hypotheses introduced above<sup>59</sup>. Especially they found that companies that issue the mandatory convertibles have lower indirect cost of financial distress, signal favorable information to the market and that the lower the strike price set by the company and the higher the dividend the greater the signal of the firm quality.

### **5.6.3 Signaling effects of mandatories**

Hedge and Krishnan (2003) in another paper decided to test hypothesis regarding mandatories: whether they have lower risk than regular convertible bond issuers and whether the issuance of these instruments signals lower risk of the company's investment opportunities. They investigated a sample of firms that issued mandatories, convertible bonds and a sample of non-issuers. The benchmarking sample of non-issuers was chosen in a way to include firms with similar characteristics to mandatories issuers. As they claim they considered only firms that have "high distress costs of issuing straight debt and large adverse selection costs of issuing straight equity". They confirmed that although issuers of both mandatories and regular convertible bonds face high growth prospects the firms with lower risk would prefer mandatories. Hedge and Krishnan (2003) argued that if the firm really has opportunities of lower risk and issues mandatory than this action should evoke less negative response from the market than convertible bond issuing firm during the announcement and issue. They supported their hypothesis with the evidence from the market which responds less negative during the announcement and issue of mandatories than convertible bonds. The cumulative abnormal return (CAR) surrounding mandatories issues turned out significantly less negative than the CAR surrounding convertible bond issues. What is more after conducting statistical tests on

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<sup>59</sup> They used similar empirical methods to the ones used by Hedge and Krishnan (2003).



differences of the mandatory issuer's sample and benchmark samples it turned out the issuers of mandatories are much larger in size and have larger sales than convertible bond issuers. This may indicate a lower risk of these firms. Further they extracted the systematic and unsystematic risk of firms from its stock prices and also found that mandatories issuers have lower idiosyncratic and total risk. Other issue that may serve as an evidence was the fact that they found that higher rated firms would choose to issue mandatories with higher probability. Mandatory convertible bonds issuers ratings although significantly worse than a one of the non-issuing companies were better than the one of convertible bond issuers. The authors investigated pre and post issue standard deviation of cash flow growth rates and found that in both cases mandatories issuers had lower growth rates. This also confirmed that again that they may have investment opportunities of lower risk.

### ***5.7 Theory and the survey results***

I decided to see if my interview results are in some way compatible with what the models tried to convey. It was pretty obvious to me that managers of the companies I spoke with, almost never used terms as asymmetric information or asset substitution problem, only the "financial distress" term appeared few times. Interesting, although not relevant for the overall aim of this work, is the fact that if these terms were mentioned then usually by very few managers who hold a PhD degree.

Both papers stressed the relevance of the cost of distress. Most managers claimed that the intent to keep the rating at the current level was very crucial for them. It is clear that if the firm is bad rated than it effectively means that its probability of default is higher, at least investors see it this way. So this argument is in line with what the Chemmanur Nandy and Yan (2003) think. Many of the companies I interviewed were already or had behind some difficulties, their stock prices were depressed as the market was pessimistic. They issued mandatories to prevent the rating downgrade in the case they would decide to issue other instruments apart from equity. But issuing equity when the stock in their opinions was undervalued would be to costly. Emitting mandatories they were trying to signal to the investors, as Hedge and Krishnan (2003) hypothesized, that they are certain about the future, that the risk is less severe than the market presumes. Additionally many firms gave a as the reason the expected stock rise and so the potential for the gains and this in a way confirms the good future prospects.

There is of course a question if firms really were optimistic about the future and wanted to show this optimism to the market or their situation was so bad that they used mandatories to disorient the investors and hoped the firm's situation would get better with the time. They could use these instruments to ensure the investors, at least keeping the rating unchanged. But on the other hand if the latter possibility was true than paying high coupons for couple of years would not make their difficult position easier.

## **5.8 Two issues of mandatories from very different company situations**

I decided to show that issuance of mandatories can be driven by very different motives and this confirms the flexibility the instrument provides to the issuers. First example of the Citi Bank shows a company in a difficult situation that needed capital and decide to issue mandatory convertible. Second example of Swiss Re shows healthy company that decided to use this security and the reason for that was very different from any kind of a rescue effort.

### **5.8.1 Citi's mandatory convertible**

The current subprime<sup>60</sup> mortgage crisis caused huge losses and forced many banks to look for fresh capital.

UBS	\$37,5bn
Merrill Lynch	\$22bn
Citigroup	\$21,1bn
HSBC	\$17,2bn
Morgan Stanley	\$9,4bn
Deutsche Bank	\$7,1bn
Bank of America	\$5,3bn

**Figure 22: Main credit crunch losses as of April 2008**

source<sup>61</sup> : BBC news, Tuesday, 1 April 2008

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<sup>60</sup>The mortgages made to borrowers with high credit risk and lower income, they carry higher interest payments.

<sup>61</sup> see <http://news.bbc.co.uk/2/hi/business/7323809.stm>

Also the America's largest bank Citi decided to strengthen its capital base with an injection of capital to improve its balance sheet hurt severely by huge write-downs. On the day the information about possible \$7,5 billion of mandatory convertible securities issuance was revealed to the public a Bloomberg television headline that morning said: "Citigroup Pays Junk Rate to Keep Dividend After Mortgage Losses"<sup>62</sup>. Financial journalists stressed that the Citi is paying a high price for the capital injection by selling mandatories to the Abu Dhabi Investment Authority (ADIA) which pay a high fixed coupon of 11%. Actually the Citi was paying a higher interest rate than companies that borrow on the high-yield, or junk-bond market which paid roughly 9%<sup>63</sup> for straight bonds at that time.

But taking into account bad condition of the bank was the issuance of mandatory convertible really a bad decision? First one has to notice that this bank selling its 4,9% stake bolstered its "Tier 1"<sup>64</sup> capital which is a stated priority. "Mortgage write-downs cut Citigroup's Tier 1 ratio,...., to 7,3 percent on September.30. The figure, while above U.S regulator's 6 percent threshold for a well capitalized bank , was below the bank's 7,5 percent target"<sup>65</sup>.

Citi, as one of the CFOs claims, minimized its cost of equity capital and strengthened the capital base in a very difficult situation. Another said that the mandatory was issued to access new capital in an efficient way that is consistent with Citi's strategy of maintaining a balance sheet that benefits from different sources of funding both in terms of geography and the type of security. Both of them stressed that because the share issuance is deferred, it doesn't depress the price of the common stock in the short-term<sup>66</sup>.

Clear benefit of this issue is that the it got very high equity credit. Fitch assigned an "AA-" rating to these \$7,5 billion mandatory convertible bonds<sup>67</sup>. The rating agency said it considers the portion of this instrument that converts into common shares within three years (half of the total issue) to be a E basket hybrid security (100% equity credit). The remaining portion is

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<sup>62</sup> see Keoun (2007).

<sup>63</sup> see Petruno (2007).

<sup>64</sup> Tier 1 capital – core measure of bank financial strength from the regulator's point of view, it includes equity and disclosed reserves.

<sup>65</sup> see Keoun (2007).

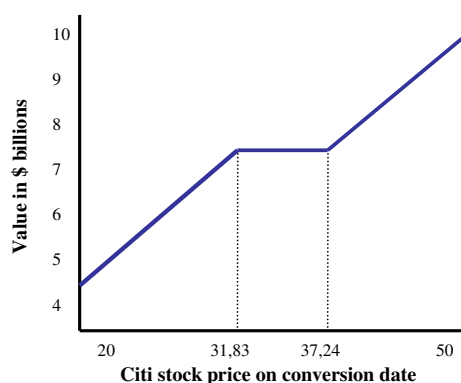
<sup>66</sup> Information obtained from interviews and Citi's investors relation service.

<sup>67</sup> see [http://findarticles.com/p/articles/mi\\_m0EIN/is\\_2007\\_Nov\\_27/ai\\_n27455759](http://findarticles.com/p/articles/mi_m0EIN/is_2007_Nov_27/ai_n27455759)

considered to be a D basket hybrid security (75% equity credit) as the conversion occurs in over three but still within five years.

Focusing on the cost one has to remember that if the ADIA had acquired 235 million shares outright at \$31,83 per share, it would be receiving a dividend yield on those shares of 7,4% (under assumption the common stock dividend wouldn't get cut). That tells us that the bank had to set a coupon of at least 7,4% to compensate for these forgone dividends. What is more it was clear that on top of that, they would have to add some extra coupon to make up for the fact that the ADIA is not going to participate in most of the first 17% of common stock price appreciation. On mandatory conversion the ADIA gives up this initial 17% above the stock price of \$31,83 and fully participates in downside or any upside above \$37,24. In other words the structure looks like the bank purchased the right to put stock to the ADIA at 31,83 and sold a 17% out-of-the money call so that the ADIA participates in any upside above this \$37,24 per share.

Analyzing this cost should mention another advantage to the bank which is that this preferred dividend (coupon) is tax deductible, while common dividends aren't, so the cash flow impact is not really an issue.



**Key features of the deal from the termsheet:**

- Type: Mandatory convertible (DECS)
- Dividend (coupon): 11%, quarterly
- Term: Approximately 4 years
- Settlement amount:
  - 235 m shares if stock price below 31,83
  - 201,39 m shares if stock price above 37,24
  - straight line interpolation between these lines

**Figure 23: Citi's mandatory convertible payoff**

source: own depiction

How does the deal look from the ADIA's position? Effectively they bought something that might eventually turn out to be cheap equity in a huge bank. Citi is almost certainly considered by authorities in the USA to be "too big to fail". Although the ADIA faces some uncer-

tainty over the actual number of shares they will receive at the maturity above the current market prices it gets compensated for this with extra guaranteed yield. Unlike in the case of the plain equity this dividend cannot be cut in the future.

They will receive a maximum of 235 million shares, if the share price at the maturity is less than \$31,83 and a minimum of 201 million shares, if the share price at the time of conversion is higher than \$37,24. The drawback of this is that the ADIA essentially loses out on a quiet large part of that 17% share price appreciation from \$31,83 up to \$37,24. But still the managers of ADIA say that this investment reflects their high confidence in this bank's potential to build the shareholder value.

### **5.8.2 Swiss Re mandatory convertible<sup>68</sup>**

Swiss Re, world's largest reinsurance company, faced in 2004 a problem many issuers of convertible debt have when stock price drops. Company had to do something with US\$1,15bn convertible bonds issued in 2001 which are not due to convert until 2021 that were severely out-of-the money<sup>69</sup>. The stock underlying these bonds was a conditional capital that was approved by the shareholders. Swiss Re preferred not to have this capital locked up by convertible bonds that stood rather very little chance of being converted by the investors. Any ideas of the company to deal with this problem were abandoned because the reaction of rating agencies was always negative. Senior CFO at Swiss Re said: "The response of the rating agencies to any solution was a key driver, as the rating is very important to our business". At that time Swiss Re was AA rated by S&P and Aa2 by Moody's and did not want to risk any downgrade.

Finally Swiss Re found a solution to this problem and it was so successful that it was awarded as International Financing Review's European Structured Equity Issue of the year 2004. First Swiss Re approached a number of biggest investment banks to price call option on the stock. Only Paribas and Merrill Lynch gave reasonable prices and what is more offered sufficient number of options. Swiss Re bought these options and in that way created almost a perfect hedge for 2001 convertible bond. Simultaneously the company re-issued the underlying through a mandatory convertible bond. Proceeds of that issue were used to refinance some senior maturing debt. This way they managed to achieve their primary objective: the maximum

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<sup>68</sup> Detailed information on the issue was obtained from the investor relation service at Swiss Re.

<sup>69</sup> The embedded call option's strike price was much higher than the market price of the stock.

equity credit. It was also the first time when the European financial institution's hybrid capital issue achieved the maximum rating from S&P and Moody's.

The market accepted this deal actually very positively as the stock was trading without any disturbances at the day of placement only losing 1,1%. This only minor negative reaction may be attributed to the fact that the market knew that this is only a "trick" of the company and not kind of a rescue effort from a difficult situation. The issue was heavily oversubscribed as the demand for these securities was strong<sup>70</sup>.

## **6 DIFFERENCES BETWEEN CONVERTIBLE BONDS AND MANDATORY CONVERTIBLES**

Even though most of the differences between mandatories and regular convertibles have been mentioned in the preceding paragraphs I would like to give some short summary over three important areas where the differences are crucial.

### ***6.1 Cost of financial distress***

Focusing on the problem of the cost of "financial distress" when deciding on the capital structure there is a huge difference between convertible bonds and mandatory convertible bonds. In the case of the adverse stock movement the investors will not exercise the call option embedded in the conventional convertible bond and the issuer will have to pay back principal as in the case of plain vanilla bond. This can only worsen already bad situation of the company and increases the probability of bankruptcy or simply trigger it. Mandatories do not carry this risk as the conversion at the end of the maturity, as the name indicates, is mandatory. Investors take the risk of falling stock prices.

Essig (1991) found that firms that issue convertible bonds have higher cash flow volatilities than simple debt issuers and their tangible assets per total assets ratios are lower. This, as mentioned before may indicate that such firms are more uncertain about value and timing of their investment opportunities. So it is clear that firms facing this problem may tackle such uncertainties by issuing convertible bonds, which, as mentioned before, are much less sensi-

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<sup>70</sup> see <http://www.insurancejournal.com/news/international/2004/07/02/43743.htm>

tive to risk than other securities. However, in the same case when firms have this large growth opportunities and somewhat less uncertainty than they may be able to get even a better deal by issuing mandatory convertibles.

## **6.2 Conversion ratio**

Kim (1990) in his paper concludes that the response of the market to the issue of a regular convertible bonds should be inversely related to the conversion ratio of these bonds. He claims that higher conversion ratios may actually signal low expected future earnings. Surprisingly in this situation stockholders are willing to risk high dilution if they can influence new investors to invest and share the risk. Thus, the lower conversion ratio implies that old shareholders anticipate rather high future earnings that they are unwilling to share with new investors. A unique characteristic of mandatory convertibles is that the conversion ratio depends on the price of the underlying stock and effectively declines the higher the stock price at maturity. As I showed before has influence on the implied cost of financing.

## **6.3 Agency problems**

Considering debt related agency problems mandatory convertibles might be less prone to them than convertible bonds. According to Brennan and Schwartz (1988) ordinary convertibles shield investors from them. As mentioned before the asset substitution to much riskier projects is controlled thanks to their embedded option feature. Authors claim that the regular convertibles are relatively insensitive to the risk of the company because the more the volatility increases (the variance of the returns of the underlying stocks is high) the more valuable is this call option component. This offsets the reduction in the value of the debt component. It follows that firms that have higher risk (as proxied for example by cash flow volatility or stock return volatility) from their projects should find it more optimal to issue convertible bonds. Since such an option is not present in the mandatory convertibles (conversion is mandatory), one may expect that the asset substitution problem should be less of a concern between the mandatories issuing firm and investors.

In contrast, when we apply the same consideration to mandatories, their value actually decreases marginally with an increase in the volatility. As mentioned before here the investor is short the call, so whenever the volatility increases the investor loses on that component. Therefore, one can draw conclusion that a firm and its investors would find the mandatories a superior fund raising vehicle if the uncertainty about the firm's returns is less of a concern.

This again suggests that lower volatility firms would choose mandatory convertibles over ordinary convertibles. Therefore, one can expect that firms that issue mandatory convertible securities would have less uncertain investment opportunities (and hence lower risk) as compared to a set of similar firms of convertible bond issuers.

## **7 Conclusion**

Mandatory convertibles surely provide a good solution to highly levered companies that cannot afford or do not want to put their credit rating at risk issuing any other conventional debt instruments. Credit rating agencies regard them as very equity-like instruments if some special conditions are fulfilled.

As it is with convertible bonds they can reduce the cost of information asymmetry and are especially liked by the issuers for their “delayed equity” feature. In the Pecking Order Theory they appear before equity and this may explain the much more positive (less negative) reaction of the market to their issuance.

In the literature there exist somewhat contradicting views under which circumstances a company decides to issue them. However, the argument that these instruments signal firm’s confidence about the future as here the company buys a call option from the investor and hence the issuers should have less uncertain opportunities compared to convertible bonds issuers seems to be plausible. Positive attitude of the managers to these instruments together with the fact that in the case of these instruments higher stock price of the issuing company effectively means lower cost of financing may serve as good argument for that either.

Investors in these risky hybrids are rather bullish regarding the future stock price. In contrast to the convertible bonds they give up the guarantee of now downside for the promise of much higher coupon. As the history showed the PERCS which capped upside fully could not compensate this risk with only higher coupons. That is why DECS structure that allows for upside gains when stock shoots up appeared on the market and till is now the most popular one.



## Abstract in English

Mandatory convertible bonds, in contrast to regular convertible bonds, do not give the bondholder the option to convert into common stocks. The conversion is mandatory at maturity. Interestingly, the issuer of mandatory convertible bond buys a call option from the investor on its own stock and the investors in these hybrids receive a capped or partially capped payoff profile but are compensated with high coupons. As the option component plays a crucial role in structuring of these instruments, this paper devotes much attention to this issue. These hybrid instruments positioned closest to equity in the debt-equity hierarchy turn out to be a flexible financing instrument for companies in the past three decades. Especially the very equity-like treatment by the rating agencies has a great appeal to companies with severe debt overload. Apart from that, firms feeling undervalued, can signal confidence in themselves when emitting mandatories. Even though they effectively constitute a delayed equity issuance, the announcement reaction is much less negative than for conventional equity issues. In this thesis the author investigates with the help of existing literature and surveys conducted on issuers of “mandatories” what drives the manager’s decision to issue exactly these structures. Emphasis will be put on the differences and similarities to simple convertible bonds. Also the motives of investors buying these securities will be considered.

## Abstract in German

Pflichtwandelanleihen überlassen dem Investor - anders als bei herkömmlichen Wandelanleihen - nicht die Entscheidung ob er die Anleihe in eine Aktie umwandeln will oder nicht. Die Wandlung ist am Ende der Laufzeit verpflichtend. Interessant dabei ist, dass der Emittent der Pflichtwandelanleihe eine Option auf eigene Aktien von dem Investor kauft. Für den Investor - auf der anderen Seite - ergibt sich daraus ein teilweise oder ganz begrenztes Auszahlungsprofil, wofür dieser aber mit höheren Kupon Zahlungen kompensiert wird. Da die Optionkomponente eine wichtige Rolle in der Gestaltung dieser Instrumenten spielt, wird diese im Rahmen dieser Arbeit verstärkt behandelt. In den letzten drei Dekaden hat sich dieses Hybridinstrument, das in der Fremd-Eigenkapital-Hierarchie dem Eigenkapital am nächsten liegt, als ein sehr flexibles Finanzierungsinstrument etabliert. Vor allem wegen der sehr eigenkapitalähnlichen Behandlung vonseiten der Ratingagenturen ist dieses Instrument bei Firmen, die hoch verschuldet sind, sehr beliebt. Auch die Unternehmen, die ihre Aktien für unterbewertet halten, können mit der Emission von Pflichtwandelanleihen dem Markt ein positives Signal senden. Obwohl diese Instrumente effektiv als verzögerte Aktienemission betrachtet werden können, ist die Marktreaktion auf Ankündigung der Emission viel positiver als bei der normalen Aktienemission. In dieser Arbeit wird mit Hilfe der vorhandenen Literaturquellen sowie mit den Emittenten durchgeführten Interviews untersucht aus welchen Gründen ein Unternehmen Pflichtwandelanleihen emittieren könnte. In erster Linie wird ein Vergleich zwischen Wandelanleihen und Pflichtwandelanleihen angestellt ebenso wie eine Untersuchung der Motive der Investoren, die für den Kauf solcher Instrumente verantwortlich zeichnen könnten, untersucht.

# CV

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EDUCATION	
International Exchange Student Programme 2007-2008	<b>CASS Business School, City University/London.</b> MSc level courses in (Investment Management, Banking & International Finance)
University of Vienna 2002 – Present	<b>International Business Administration</b> Completed coursework in Banking and Investment Analysis specializations. Additional coursework (interest) in progress in Financial Engineering and Corporate Finance (partly at the Vienna School of Economics).
2002	Secondary School Certificate

## EMPLOYMENT EXPERIENCE

<b>BANK GUTMANN</b> <b>Vienna, Austria</b> August 2007	<b>Summer Intern</b> <ul style="list-style-type: none"> <li>Partly responsible for deals and manager database creation of the Central and Eastern Europe Equity Funds.</li> <li>Tasks included also preparation of presentations and comparison of different funds with peers using Private Placement Memorandum and other data.</li> </ul>
<b>ERSTE BANK</b> <b>Vienna, Austria</b> July – August 2006	<b>Summer Trainee – Interbank and Corporate Lending Departments</b> <ul style="list-style-type: none"> <li>Gained knowledge of Credit Risk Model (KMV, Credit Metrics) in practice and how the syndicate loans market works.</li> <li>Tasks included company and market analysis, usage of KMV model, continuous country risk exploration and observation.</li> </ul>
<b>ERNST &amp; YOUNG</b> <b>Warsaw, Poland</b> September 2005	<b>Trainee - Corporate Finance and Infrastructure</b> <ul style="list-style-type: none"> <li>Assisted with Project on construction of a new Terminal 2 at Warsaw Airport and A1 motorway in Poland</li> <li>Prepared information for the cost-benefit analysis, project environment analysis, simple simulations.</li> <li>Gained knowledge of cost-benefit analysis, project valuation (DCF methods, simulations).</li> </ul>
<b>ALIBI Hostel</b> <b>Vienna, Austria</b> July – August 2005 [+ weekends - Summer 2006]	<b>Receptionist, progressing to Assistant Manager</b>

## IT SKILLS

Systems PC Applications	Microsoft Office; macros in Visual Basic [finance], EViews Basic skills in HTML, Java and SQL, R Basic knowledge of Bloomberg
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## PERSONAL DETAILS

	<b>Language Skills:</b> <i>Polish</i> <b>Native speaker</b> <i>English</i> <b>Fluent</b> <i>German</i> <b>Fluent</b> <i>Spanish</i> <b>Advanced level (written and spoken)</b> <i>French</i> <b>Intermediate level (written and spoken)</b>
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