
Development of Equity-Linked Securities Market in Europe: Drivers Behind the Growth

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Authors: Agnese Aboltina (80124)
Janis Skutelis (80123)

Tutors: Ph.D. Joel Reneby

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Abstract

This thesis examines development of equity-linked securities market in Europe, volumes of which have increased significantly only during the last decade. The area of this study has enjoyed little academic attention that makes this paper more valuable. The following aims had been set for this study:

- To determine what factors have driven and hindered the rise in volumes of convertible securities market historically.
- To distinguish convertibles as an asset class different from bonds and equity, while detecting the main benefits and drawbacks for investors and issuers.

Both quantitative study focusing on drivers covering period of 1987-2001 and a qualitative study detecting market participants and market development issues has been performed. Below is the summary of findings during both approaches.

Regression results:

- Equity volatility has a positive relationship with CB issue volumes: the higher the volatility, the higher the CB issuance volumes. This is believed to be the main driver, as it also represents the core profit driver for convertible arbitrage funds, the main investor group.
- Interest rate level has a negative relationship with CB issue volumes: the lower the interest rates in the market, the more CBs are issued.
- No relationship between equity market returns and CB issue volumes was found. It can be explained by the variety of investors buying CBs at both upturn and downturn of equity market.

Findings from qualitative study:

- Other significant CBs market drivers are: mergers & acquisitions activity, bigger focus on shareholder value resulting in sell-off of non-core equities, demand side growth facilitated by larger risk adjusted returns, supply side growth encouraged by cheaper funding in terms of lower coupon payments, and other significant forces like increasing competition among investment banks and more favourable regulations.
- Convertible and exchangeable bonds have many distinguished benefits compared to debt and equity suggesting to perceive them as a new asset class. However, market participants have to be aware of the various drawbacks to fully benefit from investment in CBs.

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1. Introduction

Although the first convertible security dates back to 1800s, the number of issues has been rising noticeably only for the last couple of decades, especially accelerating in 1990s. Nowadays volumes of equity-linked securities have risen so far that many actors within the finance universe recognize convertibles as a new asset class that will exist permanently being different from straight debt and equity.

Knowing the recent progress of equity-linked securities, a question that arises into one's mind is why convertible securities have not picked up before, but just in the last decade. It is believed that these securities were perceived to be too complex and unfamiliar to investors, and there were not enough funds in capital markets to create large demand and inject liquidity in this market. Now it seems to function, but there is still no consensus in the market whether the last four years' high volumes are a temporary phenomena or a permanent occurrence. Thus, one cannot be sure about the further development of equity-linked securities market.

Because of the limited research in the area of factors driving the convertible bonds market in Europe and considerable ignorance of this topic by financial literature, the thesis represents one of the first attempts to analyse the European equity-linked market providing both qualitative and quantitative analysis.

1.1. Purpose

The purpose of this paper is to explain the size and development of equity-linked securities market in Europe. This thesis aims to:

- Determine the factors that have driven and hindered the rise in volumes of convertible securities market historically.
- Distinguish convertibles as an asset class different from bonds and equity, while detecting the main benefits and drawbacks for investors and issuers.

1.2. Delimitation

Although equity-linked securities universe includes a wide variety of products, this study focuses on convertible bonds and exchangeable convertibles (CBs/ convertible bonds/ convertible securities used interchangeably throughout the thesis), since these instruments have the highest issue volumes in Europe¹. It is reasonable to combine these two instruments into one study, since both of them are being bought by the same type of investors. It is assumed that it is sufficient to look at the CBs only to achieve the purpose of this thesis.

The geographic market examined in this report is Europe. Period of study dates back to 1987 or a more recent year depending on data available for a particular variable. The focus is solely on the convertibles primary market, and secondary market is not analysed due to limited amount of data records. The CB valuation techniques will not be researched in detail, since most previous researches have focused on this particular matter. For the purpose of this thesis, it is sufficient to understand the main principles of CB value drivers.

1.3. Methodology

This study examines a market that has not been covered widely in academic literature and research beforehand. In order to produce a more valuable end result, both quantitative and qualitative approaches were applied. To discover the drivers of convertibles market in Europe, a theoretical background was established using a vast variety of sources. To estimate the impact of quantifiable drivers discovered during the theoretical overview, statistical regression was run on historical data

¹ According to banking professionals, other main types of convertible securities issued in European market include mandatory convertibles, convertible preferreds, reverse convertibles, and resettable convertibles. However, they comprise relatively little share of the market and thus are not of interest in this thesis.

of these factors. Since convertible securities market has been affected by many qualitative factors, active communication with specialists working in CBs' field was carried out including electronic correspondence and interviews on telephone. Other sources such as financial press, books, research papers and electronic resources were used in this study (see section References for complete list of sources).

1.4. Outline of the Study

The purpose of this section is to give the reader a brief overview of the thesis in order to assure a better understanding of the text and to ease the reading.

The first parts of the thesis present information about instruments, their concepts and theoretical foundation. Equity-Linked Securities part presents the concept of a convertible, as well as the main value drivers. Section Development of Equity-Linked Securities Market illustrates the historical development of the convertibles market comparing Europe to the US market, and shows the current composition of the European CBs market in terms of the represented industries and countries. Then, a theoretical overview follows in the next three sections. First, in Theory: Convertible Bonds as a Distinctive Asset Class, the most relevant and widely discussed theories about CBs are presented. The main market participants in terms of supply and demand, as well as their rationale behind investment and main drawbacks are explained in Supply Side and Demand Side parts of the paper.

From there, the thesis turns into a more analytical product, where the driving and hindering forces are pointed out based on the previously presented industry and instrument background. Plus, the Factors Driving the Equity-Linked Securities Market is enriched by sections Data and Regression Results that present the quantitative segment of this study. The thesis is concluded by Future Prospects part, main Conclusions from the study and suggestions for Further Research.

2. Equity-Linked Securities

2.1. Definition

Convertible bonds are fixed income instruments that give their holders the right to acquire a fixed number of shares of common stock of an issuing corporation (convertible bonds) or a company in which the issuer has a stake (exchangeable bonds). A convertible bond is primarily a financing product, while companies issuing exchangeables can reduce or get rid of their stake in an underlying company in parallel with utilizing them as a financing tool. Typical maturities of exchangeables are 2-3 years, whereas convertible bonds have maturity of 3-10 and even more years, as they are usually a part of issuers' long-term funding strategy. CBs can be zero rate securities or pay a typical semi-annual coupon of 4-5% in the current market situation.

Many convertibles carry a callable or redeemable feature. A *callable feature* gives the issuer the option to buy back the instrument at a specified price prior to maturity, while the *redeemable feature* gives the holder the right to redeem the security at a specific price prior to maturity. A more detailed description of CB terms is presented in Appendix I.

2.2. Convertible Securities: Hybrid of Debt and Equity

Convertible instruments are classic hybrid securities: they preserve some characteristics of both debt and equity. The upside of convertibles comes from their common stock component, while the downside protection comes from the cash coupon, payment of principal at a fixed maturity date, and status in the capital structure, since CBs are usually senior securities of a company ranked above common equity (but subordinate to straight debt).

Traditional equity is not as efficient compared to debt since the interest rate paid on debt provides particular tax shield whereas dividends do not. Then again, excessive debt might deteriorate the

capital strength and increase the financial distress. Thus, convertible securities are believed to find a bridge between these two extremes: CBs have cash flows that make them look more like equity securities², at the same maintaining the tax advantage associated with debt.

In the financial press, convertible bonds are compared with equity when speaking about their yields and future market size. CBs' resemblance with equity can also be seen from their feature of more likely conversions when market conditions are good.

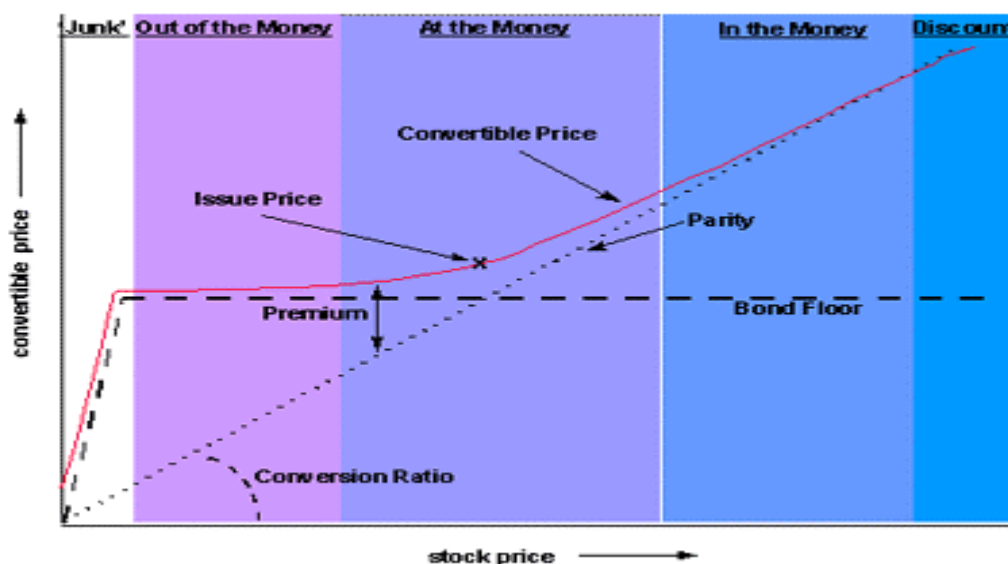
2.3. Valuation Drivers

Since convertibles are hybrid issues of part debt and part stock, the evaluation process should take both parts into consideration. CB prices hinge on two main factors: a bond component and the price of a call option. The bond value equals the sum of the redemption price and cash value of all the prospective coupon payments. This value is affected by such factors as interest rate, credit rating, maturity of the convertible, as well as the existence of special terms, e.g., a put option or possible call protection. The value of the call option is determined by the price and volatility of the underlying stock, conversion premium, dividend and time factor. Consequently, there is a broad list of factors affecting the value of convertible securities: *interest rate, underlying equity volatility, underlying equity movement, credit rating, conversion premium, dividend yield, maturity, and special terms, e.g., call protection*. The first variable represents an external factor and is studied further in the thesis. Similarly, equity volatility and movement are included, since they are partially affected by external factors. Since other variables depend on the issuer company itself, they are not of interest for this study.

2.4. Convertible Bond Payoff

The diagram below provides an illustration of CBs performance in the secondary market.

Figure 2.1. CBs Performance in the Secondary Market



Source: Deutsche Bank, 2001

Convertible bonds might be categorized into five groups: distressed debt/ “junk” convertibles, “out-of-the-money” convertibles, “at-the-money” and “in-the-money” convertibles, as well as “discount to parity” convertibles.

² Since CB's yield is smaller than the one on straight bond, it is often equated to dividend yield. However, the difference between the coupon on CBs and dividend yield might widen if interest rate level in the market increases significantly.

When a convertible issuer's share price falls dramatically, and its ability to finance its debt obligations is called into question, the convertible enters the *distressed debt* category. If the stock price is lower than the conversion price, CB is "out-of-the-money". It is assumed that when stock is trading at more than 50% discount to conversion price, CB is "deep-out-of-the-money" or "busted" behaving like an ordinary bond.

For "at-the-money" and "in-the-money" CBs, the formulas are respectively "stock price = conversion price" and "stock price > conversion price". But a "discount to parity" convertible is the one, for which parity is greater than the convertible price, where parity is the market value of the shares into which the bond can be converted at that time³.

3. Development of Equity-Linked Securities Market

While the previous section presented the essence of CBs in terms of their main value drivers and behaviour in the secondary market under various market circumstances, this chapter focuses on dynamics of the CBs market in Europe and comparatively to the US convertibles market.

3.1. Brief History

Convertible securities came into being as a way to make securities more attractive to the investing public by adding the option characteristics. The very first convertible securities used by investors date back to 1800s when convertibles were used to finance railroad construction in the US. At that time, the main reasons for convertible issues were to attract the investing public and to bring a wider class of shareholders.

After the first CB issues, these securities were overlooked for many years. They were not widely discussed in financial press that hampered investors' and issuers' awareness of the product, plus their complexity hindered public's interest. For many participants, CBs market was too small to develop complete investment strategies.

A dramatic change in CBs market situation was fueled by convertible bond offerings by many corporations in 1980s. The interest was continuously spilling over to possible investor classes including larger institutional investors, pension funds, individual investors, mutual funds, and bank trust departments. In 1990s, academics claimed that reasons behind such a sudden leap in the number of issues were increased investors' and issuers' knowledge, volatility of financial markets, innovation, and dramatic growth of the capital markets. The feasibility of these factors, as well as others influencing the CBs market development in Europe will be explored later in this study.

3.2. Difference between Europe and the US

It is important to compare Europe with the US, as it was the market where CBs developed initially, and it is still the biggest market so far. Also, Europe is moving towards a more capital markets oriented culture and towards a unified Euroland creating significantly larger market space that positively affects the capital markets and removes cross boarder trade barriers and currency risk that had existed beforehand. Thus, one might believe that the CBs market will follow the pattern of their American counterpart. Nevertheless, legislative differences, lack of an established investor base and traditional bank loan focused investment tradition in Europe so far has made the European convertible market fundamentally different from the US market in many aspects.

³ Discounts are very rare in developed markets; however, in some markets (e.g., Asia) they reflect the cost of transactions related to immediate conversion of a CB into the underlying shares that is not straightforward due to regulatory requirements. In some cases, a discount can also be caused by lack of liquidity in the underlying shares.

The terms of the issues differ in Europe and the US because of the conservativeness of European investors and issuers (DZ Bank, 2001). Maturities of European convertibles are shorter; they also have higher yields and higher conversion premiums. As regards issuers in the US, those have been mainly non-investment grade and high-growth companies that wanted to stretch their balance sheets. Today there are 28% Standard & Poor's investment grade rating issuers in the US. In Europe, in November 2001 there were 67% investment grade companies CBs outstanding that by far exceeds the US figure (DZ Bank, 2001) and again, it can be explained by more recent development of capital markets and risk-averse investor culture (see Appendix II for credit rating breakdown in the current European CBs market).

As it can be seen in Figure 3.1., Europe underperforms the US even more in terms of number of deals but then again outperforms on medium size of deals. However, during the last decade the European convertible bond market has grown at a faster pace than the US market.

Figure 3.1. Convertible Bond Market Statistics

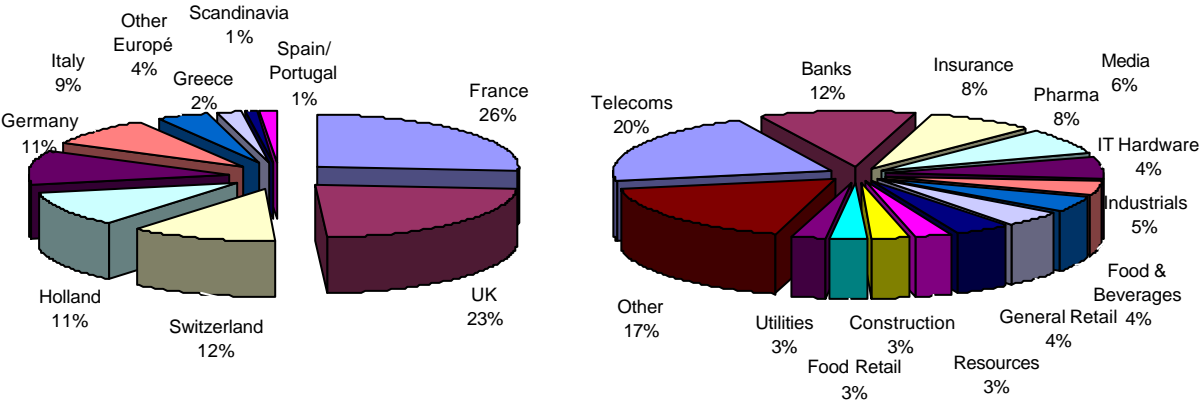
	Europe	US	World
<i>Market Capitalization USD bn</i>			
1980	35	50	175
1990	30	90	275
2000	110	140	450
<i>Number of CBs Issued, 2000</i>	240	743	n.a.
<i>Median Issue Size USD mm</i>	350	120	n.a.
<i>Investment Grade</i>	67%	28%	n.a.

Source: Insinger GIM Asset Managemen (2001), SSSB (2000), DZ Bank (2001)

The European market has larger median issue size of \$350 million vs. \$120 million in the US. Larger issue sizes are consistent with better rating profile in Europe.

Figure 3.1. illustrates the current European convertibles market in terms of geographic and sector breakdown. In 2001, the European CBs market is dominated by telecommunications companies, while the dominating market is France (see Appendix II for country representation from 1998).

Figure 3.2. Geographic and Sector Breakdown of the European Convertible Market (EURmn)



Source: Goldman Sachs Convertible Research, June 2001

3.3. Convertible Bond Performance

A number of researchers have focused on the specific risk and yield profile of CBs at various times in the past. Studies of convertible performance suggest that, over a long time period, convertibles can replicate virtually all of the upside performance of equities with substantially less volatility (Howard, O'Connor, 2001). In 1992, Lummer and Riepe (1993) performed a study "Convertible bonds as an asset class: 1957-1992" which revealed that over the last 20 years, convertibles have had slightly better return at substantially less risk than common stock. They also concluded that, with respect to performance, convertibles had a compound annual total return of 8.3 percent over the years 1957 to 1992 compared with 6.8 percent for long-term corporate bonds, 7.3 percent for intermediate-term corporate bonds, and 10.5 percent for stocks. Although the study was based on the US data, the results should not be ignored while judging about the European convertibles market.

Good CB performance has also been proved by other more recent studies exploring the European convertibles market. Figure 3.2. presents results of one such research. The table includes information about returns and standard deviations for different European indexes: Merrill Lynch Convertible Index for Europe, the Financial Times Equity Index for Europe and JP Morgan's European Long Term Government Index⁴ for a time period from November 1995 to March 2000. The analysis was carried out by Merrill Lynch and reveals the CB performance in comparison to other securities, and proves again that convertibles offer superior risk adjusted returns.

Figure 3.3. Risk and Return Comparison for CBs, Bonds and Equities

	Return	Standard Deviation	Return/ St. Dev.
<i>Convertibles</i>	16.80%	9.90%	1,70
<i>Equities</i>	18.00%	14.00%	1,28
<i>Bonds</i>	2.60%	8.70%	0,30

Source: Merrill Lynch, April 2000

Also more recent data show convertible bond return superiority. According to M. Haycock, the head of convertible bond research at UBS Warburg, if one invested in equity in January 1, 2000, the loss would be 31% whereas equivalent investment in CBs would have lost only 8,7% by the end of September 2001.

At current times, CBs represent a defensive investment, and it is remarkable that many issues are taking place in the environment of equity downturn. According to research by Deutsche Bank, 75% of all CBs in Europe are trading at levels that imply no equity option value, i.e., they belong to the "busted" convertible category. This figure has increased from 20% in July 2000. Nevertheless, new issues continue to enter the market, and the most likely explanation is uncertainty about the possible recovery of equity markets.

3.4. Convertible vs. Exchangeable Bonds

Currently exchangeable bond issuance outperforms convertible bonds in the European market, both in terms of volume and number of transactions (Corporate Finance, 2001). European companies have been particularly large issuers of exchangeables, predominantly because the region is undergoing a dramatic structural shift towards a greater focus on shareholder value that involves selling non-core businesses and stakes in other companies. According to JP Morgan professionals, 66% of total new issuance since 2000 were exchangeables (JP Morgan, 2001). Especially in the

⁴ The argument for using a government bond index was introduced by Merrill Lynch and relates to less well-developed corporate bonds market in Europe.

current depressing economic environment, many companies decide to focus on their core businesses. For example, the biggest issuers – telecommunications companies – are selling non-core assets to decrease their debt overhang incurred due to buying 3G licences. Exchangeable bonds give these companies a possibility to sell the stake at share prices higher than the current market prices, as well as raise financing for core activities.

4. Theory: Convertible Bonds as a Distinctive Asset Class

This section, where three widely discussed theories related to convertible securities will be presented, will illustrate the uniqueness of a CB and its benefits from a theoretical standpoint. The first two theories explain the rationale behind CB issues as opposed to other alternatives, while the third looks at the announcement effects, thus, helping to understand CBs nature in terms of resemblance with equity or bonds.

4.1. Control of Over/ Underinvestment at Lower Costs

A well-designed callable CB can control managerial opportunism: it can restrict over-investment and help firms to avoid under-investment at the same time. In any leveraged firm, the equity holders effectively hold a call option on the value of the firm: if the value of the firm is greater than the redemption value of the debt at maturity, they will pay it off and their equity will equal the remaining value. If the company is worth less the shareholders will simply “put” it to the bondholders by defaulting on the bonds. This gives the company’s shareholders an incentive to increase the level of risk in the firm. Convertible financing addresses this potential conflict of interest between bond and equity holders by allowing bondholders to participate in any increase in risk in the firm.

A similar argumentation is a compatible explanation for utilizing convertible bonds in raising financing for future investments in multi-staged projects. If an initial project requires further funding in case if it is profitable, providing funds before the initial project may cause incentive conflict between those making the investment decision and those providing the funds. To tackle this conflict sequential financing might be effective; however, such a stage financing would increase issue costs. According to Smith (Mayers, 1997) smaller registered equity issues might involve reported costs as high as 15% of the total proceeds. Thus, CB’s conversion option reduces issue costs, at the same time helping to control the overinvestment incentive. Again, one might claim that there is a myopic incentive to expropriate wealth from convertible bondholders by inducing an early conversion. However, value-maximizing managers should choose to delay calling, in order to maintain access to capital markets on favourable terms.

This theory also explains a prevalent use of convertible securities in venture capital finance. CBs can be used to endogenously allocate cash flow rights as a function of the realized quality of the project, thus, mitigating the double moral hazard problem between the entrepreneur and the venture capitalist (Schmidt, 1999). According to previous researches about venture capital finance, an optimally designed CB outperforms any mixture of debt and equity, and it can induce both parties to invest efficiently. The result is robust to renegotiation and changes in the timing of investments and information flows.

4.2. Softening Asymmetric Information Problem/ Backdoor Equity Hypothesis

Stein’s model that is based on the idea of asymmetric information about assets in place uses convertibility to solve a financing problem at the time of the issue (Mayers, 1997). It explains the purpose of convertibles’ call provision as helping to avoid possible financial distress. When informational asymmetries make conventional equity issues unattractive, the call provision of convertible securities allows companies to get their capital structures “through the back door”.

Corporations use CBs as an indirect way to get equity into their capital structures when adverse-selection problems make a conventional issue unattractive. Thus, this theory suggests that potential

CB issuers are firms with high financial distress costs, high costs of asymmetric information, and at the same time having valuable investment opportunities. These companies issue CBs as an indirect and possibly uncertain substitute for equity. This “back door” equity explanation for the use of CBs is based on two factors that are not emphasised in other theories: 1) CBs almost always have a call feature, so that companies can force early conversion; and 2) excessive debt can lead to costs of financial distress (Stein, 1992).

4.3. Market Reaction to CB Announcement

Miller and Rock (1985) suggest that all security issues convey negative information to stockholders, since a company would not issue an underpriced security. Others claim that leverage increasing events such as issuance of debt are normally associated with positive abnormal returns, while leverage decreasing events such as common stock issuance are associated with negative abnormal returns. According to this statement, CB is a hybrid of the two previously mentioned categories, since CB issuance appears to be leverage increasing event, at the same time having negative stock price reactions (Davidson, Glascock, Schwartz, 1995).

The negative stock price reaction is explained by Myers and Majluf (1984) that suggest that companies’ managers have at least the potential to know more about their firm’s prospects than outside investors and, as they represent the interests of existing stockholders, such managers have a stronger incentive to issue new equity when they believe the company is overvalued. Recognising manager’s incentives to issue overpriced securities, investors require a discount to compensate for informational disadvantage that ultimately leads to negative reaction to CB announcement. Since CBs contain an equity component, the same logic applies to CBs but to a lesser extent.

Stein (1992) suggests that stock market may actually encourage the use of convertibles: when the market is persuaded that convertible issuers have solid growth prospects but no other economic financing options (little debt capacity and equity issue considered too dilutive), it is likely to respond less negatively or even positively to CB announcement. Management’s choice to issue CB may actually signal to investors that management is highly confident about firms future and thus, decreasing adverse selection costs carried by investor in a first place.

A similar idea is developed by Jen, Choi and Lee (Chew, 1999) who conclude that reaction to CB announcement is less negative for “growth funding” (firms with growing capital needs and limited debt capacity) and “high expected cost of financial distress” companies (firms having limited debt capacity seeking for lower interest coupon what CB can offer) having valuable investment opportunities. The same study about growth funding identifies positive reaction to CB announcement for companies paying no dividends that is a signal of valuable investment opportunities.

5. Supply Side

Having presented the most important theoretical aspects of convertible bonds being hybrid securities, the next two sections analyse the market from issuers and investors perspectives. Most of the aspects stem from the financial instrument’s concept and its theoretical foundation. However, it is particularly important to identify how benefits and drawbacks are seen by both supply and demand parties, since they have the principal impact on the CBs market development.

5.1. Issuers’ Profile

The hybrid nature of CBs has made these instruments increasingly popular with issuers (Redmayne, 1995), although there is a wide variety of motives for CB issues. Many different explanations have been presented for CB issues for different companies at different stages of their development. Many issuers have a common feature: they want to sell equity at a premium to the current share price in return for paying higher yield to investors, since coupon payment is typically higher than

the dividend yield on the same equity. Yet, interest expense on CBs is lower than it would be on a straight debt, and many issuers might be attracted by the lower coupon payment.

Thus, many companies differ in terms of which side of the convertible they want to see more: debt or equity. Empirical observations show that some companies hope that no conversion takes place, and they will enjoy the benefit of a lower coupon. At the same time, these companies avoid equity dilution and hurting existing shareholders. Others see convertibles as a way to get equity into their balance sheets. For example, Internet companies usually want the conversion to happen, as they need more equity.

An issuer interested in a CB might represent a company that wants cheaper financing in terms of lower coupon, refinancing of more expensive straight debt, M&A financing, unwinding cross holdings through exchangeable convertibles or a company willing to become public after privatisation. According to one of the bankers, there are companies that issue convertibles without a particular need for financing. Nowadays, high volatility itself is believed to be a motive for the convertible deals where companies decide to capitalize on high volatility seen in their shares. Also governments can use exchangeables to monetise their equity holdings. For example, in July 2001, the Greek government launched two deals exchangeable into shares of Hellenic Telecom and Hellenic Petroleum companies.

Knowing the nature of a convertible bond and rather conservative investor culture in Europe, companies having a more likely access to the CBs market should have good cash flows, low levels of debt, more proven business stories, and good trading liquidity. Those are usually high investment grade companies that use issue proceeds in building their businesses.

5.2. Rationale to Issue

The following analysis reveals the rationale behind issuing CBs against issuing other instruments, i.e., straight debt and equity. There is also a possibility to duplicate a convertible bond by issuing a bond with equity warrants, however, empirical studies show that it is more costly due to higher transaction costs. Thus, this specific financing strategy is not explored in the text, but can be seen in Appendix III. In the analysis below, benefits of a convertible issue are grouped into three main categories: benefits related to cost dynamics, financial flexibility, and market dynamics.

5.2.1. Cost Dynamics

A company's cost of funds is likely to be one of the main criteria for evaluating the benefits of a convertible issue, relative to other forms of financing. The cash flow benefits of a CB usually stem from the fact that an issue can be launched with a coupon rate below that for a straight bond issue of a comparable maturity. Interest payments may range from nil on a zero-coupon convertible upwards to 5-6% in coupons depending on the structure of the CB, compared with 3-4% higher interest on straight bonds⁵. Thus, one might claim that initially convertibles represent a low-cost capital to issuers by *lowering interest payments*.

However, depending on the issuer's motive and the underlying stock price movements, in future the financing costs might rise due to dilution costs in case of high stock price or refinancing costs in case of no conversion and high interest rate level at the time of conversion. In fact, another implicit cost that seems to be insignificant to issuers is underpricing of convertible securities. Underpricing stems from issuing security whose price implies volatility lower than the one observed in the

⁵ To be more specific, according to Lorraine Lodge, ING Barings, difference can vary depending on credit rating and type of company. For investment grade, conservative company (e.g. France Telecom) difference can be 250-300 b.p., whereas for growth oriented, speculative grade company (e.g. Colt Telecom) it can reach 600 b.p.

market implying investors get cheaper equity option from a CB than in the OTC market of equity options⁶.

Lower interest rates on CBs allow higher debt amount to be raised by companies, and therefore, they are a good choice for financing M&A activities. During the period from year 2000 to May 2001, 29% of total new equity-linked issuance was targeted for financing M&A (JP Morgan, 2001). Likewise, many growth companies, that have not generated enough free cash and cannot make high fixed income payments on straight debt, choose convertible securities.

Lower tax liabilities represent another cash flow benefit compared to equity. According to equity and convertible researchers at one of the investment banks, the interest expense that issuers are able to deduct for purposes of calculating taxes is not the actual coupon of the bonds, but rather the higher interest rate that would be payable on comparable nonconvertible debt, with similar terms and seniority, at the company's prevailing funding rate. This feature improves cash flow by lowering cash taxes.

CBs offer *delayed dilution* while receiving cash at the time of issuance. Thus, CBs help the current shareholders to delay losing a controlling interest until certain strategic decisions have been already made. Conversion premium of convertible securities assures also *less dilution* than in a common equity issue. And even if the company's share price is affected by an economic downturn, by issuing a convertible it can still sell equity and at a premium to the current market price, usually between 5 and 30% (Redmayne, 1995).

As regards exchangeable bonds, there is no additional earnings dilution when the bonds are converted because the underlying shares already exist. A similar case might be with convertible bonds whose issuers have their own stock in treasury that is enough for conversion. A recent issue of France Telecom convertible bonds represents such a case (MacDonald, November 2001).

5.2.2. Financial Flexibility

In comparison to other security issues, CBs offer a much *quicker sale*, free of operating and restrictive covenants. Many deals are done in a day and do not require a "road-show". Equity-linked bonds do not normally require a formal credit rating. However, as stated by Standard & Poor's specialists, it is very difficult to issue non-rated debt in Europe, as the number of large investors allowed to invest in these issues is very limited, thus, making unrated debt more expensive to the issuer. In addition, investors do use their internal methods of determining the credit rating by analysing issuer's financial statements. However, on the whole rating agencies might consider CBs as a *less risky leverage*, since CBs contain the equity likelihood.

CBs offer companies a great variety of *customisation possibilities*, e.g., a *call provision*. CBs call provisions can help companies to actively manage their balance sheets by forcing conversion or redemption. Although it is one of the convertibles benefits, efficient management of convertibles is critical for an efficient use of this characteristic. It is the most important decision after the convertible issue, to decide when or whether to exercise its call option. Conversion combinations together with coupon rate can be used to tailor shareholders preference of interest expenses versus dilution.

5.2.3. Market Dynamics

Convertible securities add *diversity to investor/ shareholder base*. A company can potentially raise considerably more demand that it could by undertaking an equity issue, because a CB's issue gives ability to approach two to three different investor bases at the same time (see 6.1. Investor Profile).

⁶ According to Inderjit Bedi, BNP Paribas the underpricing in terms of underlying equity volatility can be 10 percentage points of volatility.

Sometimes they also offer an easier access to international markets. By expanding investor base outside the domestic market, a company can gain a dual advantage of allowing larger issue to take place, as well as building an expanded investor base for future financings (Redmayne, 1995).

Euroconvertible market is attractive to issuers who want to raise their profile overseas without incurring the cost of listing ADR's⁷ or other types of foreign share. As regards demand from international investors, many US funds that were focusing on the US equity-linked instruments before, have switched part of their funds to the European market to take advantage of diversification possibilities⁸. As can be seen in Appendix II, 25% of the outstanding CBs as of April, 2001, are denominated in USD that might indicate that some of CBs issued were targeted for foreign investors.

5.3. Drawbacks

There appears to be little downside risk associated with the issuance of CBs as seen by issuers themselves. One of the biggest risks is the notion that *current shareholders* will *subsidise* the cost of the convertible, since the issuer gives away the equity upside to bondholders. According to Euroweek's finance journalist, shareholders are the most likely losers in the convertibles market also recognized by most issuers. The risk is increased even more by hedge funds that buy convertibles and sell the companies' common stock short for purposes of arbitrage, thus creating pressure on stock price. The pressure can be severe if too many hedge funds try to pursue the same strategy of shorting the stock at the same time. Also, according to empirical findings, there is a negative announcement effect that diminishes existing stockholders wealth.

Another risk is associated with the *refinancing risk*. If a CB contains a clause that allows investors put back their bonds at specified dates, the issuers would need to repay the price of the bonds to the convertible holders. Most likely such a situation would involve a search for additional funds in the market. Thus, convertibles involve refinancing risk for the issuer in case of rising interest rates. One might claim that a similar risk is encountered with investment in straight bonds, however, due to lower coupon payments on convertibles, a company might decide to issue more debt than in a case of straight debt that would consequentially increase the refinancing risk. Also companies that counted on conversion to take place too much will be exposed to this risk if equity does not appreciate enough for conversion to happen. Nevertheless, in spite of possibility of refinancing risk, the issuer will still have gotten use of the raised amount of lower-cost capital for a year or more.

The rapid increase in popularity of convertible securities might activate various financial regulatory bodies. In the future, there might be a greater regulatory scrutiny and changes in the accounting treatment of convertible securities that could be added as an additional risk for the issuers.

5.4. Concluding Remarks

The hybrid nature of a convertible instrument makes it a potential alternative financing tool to either a straight debt or pure equity financing, depending the CB type utilized. While choosing among all the different financing means, an issuer has to examine various criteria, for instance, cost of funds, the formal issue procedure, or the potential effect on the investor base. Regarding the cost of funds, it seems like issuers underestimate the costs of underpricing, pressure on stock price after issue, as well as the possible dilution costs. The most appropriate financing instrument might vary among companies depending on their preferences and needs; thus, there is no assertion that CBs are the most optimal instrument in all circumstances. However, they do offer considerable flexibility and appealing advantages (e.g., lower coupon payments, delayed dilution, flexible terms, enlarged

⁷ American Depositary Receipt: the form of security, in which the foreign countries can issue their stock in the US.

⁸ For instance, the US based Gabelli Asset Management has more than 40% of its Global Convertible Fund invested in European issues (Andersson, Johansson, 2001).

investor base, etc.), and represent a way to overcome many of the disadvantages characteristic to other instruments, thus, they are utilized by an increasing number of companies.

6. Demand Side

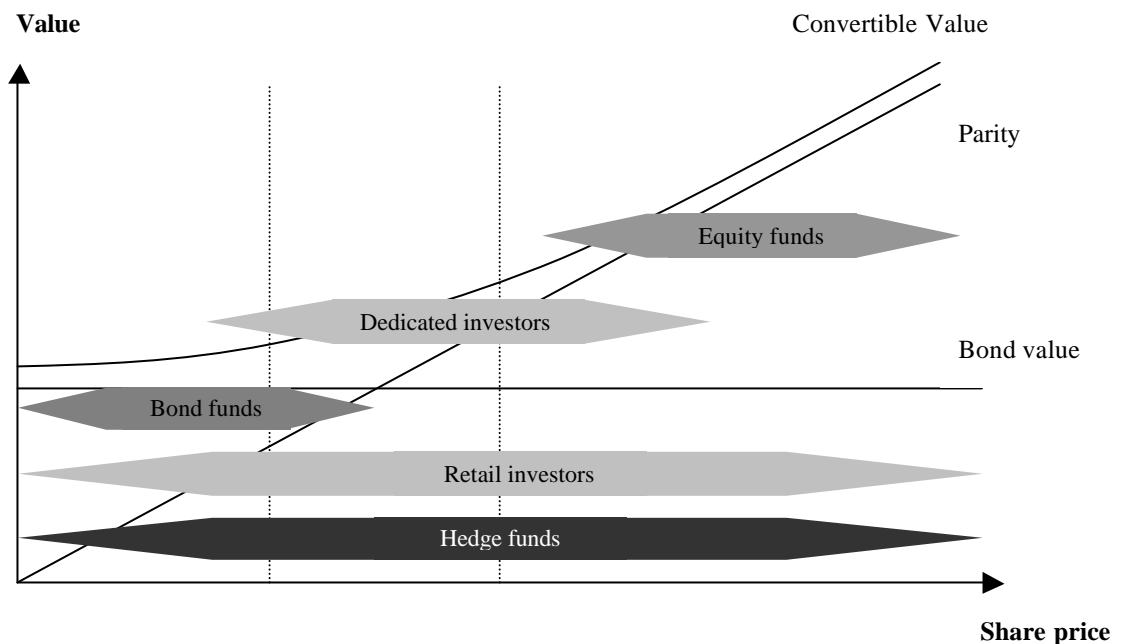
Issuers might be willing to utilize convertibles as a financing tool; however, their actions are constrained by investors' willingness to invest in these instruments. In the following section, most investor groups are identified, as well as the relative advantages of choosing CBs among other financial instruments.

6.1. Investors' Profile

The possible investor groups include *hedge funds, equity funds, fixed income investors, dedicated convertible bonds, and retail investors*. Investor base has been changing lately, and together with conventional fixed income funds and equity funds that have been popular in Europe so far, hedge funds represent 70% of convertible bond investors (Ostrovsky, Wiggins, 2001). The increase in investor base has also been due to the growth of funded retirement schemes and mutual funds in Europe.

Although many investors look for similar CB characteristics, there are differences within the investor universe and their demand for CBs varies depending on market circumstances and the underlying stock performance. Figure 6.1. illustrates where on the share price axis the particular investor groups find CBs most attractive.

Figure 6.1. The Investor Universe



Source: JP Morgan, May 2001

6.1.1. Hedge Funds

Currently hedge funds represent one of the fastest growing segments of the investment management community. From 68 funds worldwide identifiable in 1984 there are more than 5,000 in 2001 (Tremont Partners Inc, 2001). This rapid growth took place because the realised high risk-

adjusted returns⁹ attracted a lot of capital that was generated in bull run of equity markets. As mentioned before, hedge funds also own a huge stock of convertibles securities. On any given day in Europe, hedge fund trading can represent up to 75% of convertible volumes (Howard, O'Connor, 2001).

Hedge funds differ from outright investors by trying to exploit relative valuation anomalies instead of taking particular directional views. Hedge funds buy CBs and short the underlying shares (in some cases they also buy some credit protection) trying to isolate undervalued equity options. They take advantage of discrepancies in the price of company's convertible bonds and equity options. Hedge funds benefit from volatility, since it gives them more opportunities to re-hedge and capture value. Hedge funds' arbitrage strategies are described in Appendix IV.

When looking at monthly net asset flows in convertible arbitrage funds from 1994 (see Appendix V), there have been small amounts of net asset outflows that suggest a rather stable capital funds level. Large size and stability of funds might suggest that even in case of less favourable environment for CB issuance like, for example, lower equity volatility or higher interest rate level, there is a supportive demand for CB issues.

6.1.2. Equity Funds

Many *equity fund* managers seek convertible securities to diversify for defensive strategies or supplement income. Convertible bonds can offer the possibility of being defensive because of their consistent interest payments and, in the case of no conversion, the return of principal at maturity. When economy is in the downturn, equity investors may switch into convertibles and avoid low credit quality. In economy growing strongly equity investors choose common stock or "in-the-money" convertibles to increase the universe of available companies.

6.1.3. Fixed Income Funds

Fixed income portfolio managers may choose to sacrifice their current income in terms of lower coupon payments, in exchange for the upside potential offered by convertible securities and exposure to equity markets at a reduced risk of capital. Since convertibles recreate straight bond positions with additional exposure to rising equity markets, CBs can boost the fixed income fund performance. The greatest strength of convertibles for fixed income funds is that there is a negative correlation between bonds and equities, thus, CBs will achieve their performance enhancement exactly when the fixed income investors need it (Howard, O'Connor, 2001).

Fixed income investors can buy convertibles when they are "out-of-the-money" and trading with yields close to the straight bond equivalents. Fixed income funds ensure a fair CBs value in the equity market downturn like in the current situation when many convertibles are trading at price levels below equivalent fixed-income instruments.

Many equity funds and fixed income funds involve in the CBs market to escape regulatory restrictions. For example, fixed income funds might not be allowed to invest in equity, but convertibles give them such an opportunity by providing the option of equity participation at the same time not violating the rules.

6.1.4. Dedicated Convertible Investors

The *dedicated funds* invest solely in convertibles, normally those with underlying stocks traded. Such funds are finding demand from investors seeking balanced instruments that provide exposure to the upside potential of the equity markets, at the same time providing solid downside protection. These investors are more concerned about equity component than fixed income funds or hedge

⁹ According to Steven Metcalfe (December 2001) convertible arbitrage funds' returns in 2001 year-to-date have been around 15-16% that is much higher than typical equity or bond fund returns.

funds. Because of their particular interest in equity component, they might be less skilful in valuing fixed-income side. Therefore, fixed income funds may have an advantage in determining fair value of CBs in equity downturn circumstances.

Dedicated convertible investors provide easy access to a diverse portfolio of convertibles, which would be impossible for an individual investor to buy directly due to the large investment required. In Europe the number of funds is rather small, but it is growing rapidly and is expected to become an increasingly important source of demand¹⁰.

The main reasons for investing in CBs is summarized in Figure 6.2., showing the main advantages of such an investment for each investor group:

Figure 6.2. The Main Investor Groups and their Incentives

Investor Type	Reason for Using Convertibles
<i>Hedge Funds</i>	<ul style="list-style-type: none"> • Exploit the asymmetrical link between convertibles and bonds/ equities to exploit arbitrage opportunities and profit from volatility
<i>Equity Funds</i>	<ul style="list-style-type: none"> • Retain upside potential • Manage risk/ exploit defensive strategies • Enhanced income through higher coupons than dividends • Increased universe of available companies
<i>Fixed Income Funds</i>	<ul style="list-style-type: none"> • Achieve exposure to equity markets at a reduced risk to capital • Manage interest rate cycle
<i>Dedicated Convertibles Investors</i>	<ul style="list-style-type: none"> • All of the above

Knowing the different preferences of various investor groups, as well as keeping in mind the possibility to choose among other financial instruments, the following two sections examine benefits and drawbacks of an investment in CBs.

6.2. Rationale to Invest

Since the rationale of different investors depends on their perception of the prospective investment in terms of the choice between debt and equity, the following analysis presents several arguments in favour of convertibles as opposed to common stock and straight debt.

6.2.1. Comparison with Equity

As regards equity, convertible bonds are *less risky* than common stock due to the price support provided by its fixed coupon and the return of principal at maturity date. CBs have a considerable appeal to those investors willing to preserve their capital and fearing to lose its proportion by making a direct equity investment that can experience a sustained decline in the share price. Thus, convertibles serve as a defensive way into equity markets. By being less risky, convertibles broaden investment horizons by turning more speculative shares into much safer investments. According to investment banking representatives, a convertible will fall more slowly than the underlying shares if the equity experiences sudden weakness, thus, giving the investor more time to unwind a large position.

CBs provide *enhanced current income* compared to common stock, since the offered coupon is typically higher than the share dividend and it cannot be varied like the dividend. However, it will be lower than the comparable fixed-rate yield for a similar maturity.

¹⁰ According to a study by Andersson and Johansson (2000), the number of dedicated funds has risen from 3 in early nineties to over 80 in 1999.

Convertibles offer *relative safety* since convertible securities rank senior to an issuer's common stock and therefore tend to entail relatively less principal risk. However, CBs are normally subordinate to straight bonds.

In general, CBs provide *relative stability*: many convertibles tend to outperform common stocks in a falling market, because their higher yields cushion the effects of a market decline. In a rising equity market, convertibles provide an opportunity for capital growth, although they tend to appreciate less than common stocks. In a stable equity market, convertible securities' higher yields and conversion feature provide attractive total returns.

By investing in CBs, investors might have *greater control of investment*, since for many convertibles there is no obligation to exchange for shares of common stock, but one can choose to do so. During periods of economic uncertainty or market turbulence, investors have an alternative to keep their convertible option.

6.2.2. Comparison with Straight Debt

Concerning convertibles comparison with an investment in straight bonds, CBs *decrease* the *downside risk* relative to straight bonds at a time of rising interest rates that decreases the value of fixed-rate bond. In such circumstances, convertibles benefit from the value attached to the embedded equity option and the possibility of rising share prices that is not the case with straight bonds.

Convertible securities give investors the upside potential of the issuer's common stock by offering investors *equity participation* at a price usually fixed in advance. This is often considered to be the biggest attraction especially to fixed income funds, since investors have the long-term growth potential of shares together with the income and capital preservation characteristics. Convertibles can also offer *diversification opportunities* in companies that have not issued straight debt. Thus, in a way it also completes the debt market.

Although it is hard to compare convertible bonds with equity and debt in terms of the scale of available instruments, an investor can choose a convertible security also because of the diverse CBs universe. An investor can choose the instrument not only according to currency, industry, or credit rating, but there is also a wide selection in terms of debt or equity sensitivity and special conversion terms. At the same time, the investment consists of only one financial instrument unlike a combination of, for example, debt plus equity warrant, that might be advantageous by reducing transaction costs.

6.3. Drawbacks

The first drawbacks relate to the convertibles investment compared with common equity. Later, CBs are contrasted with bonds, and similarly to the previous section, the discussion is completed by presenting more general disadvantages of a CBs investment.

6.3.1. Comparison with Equity

A *bullish equity market* might cause poor CBs performance compared to equity investment, since a convertible investor will be paying a premium to the price at which the share could be bought in the market (see Appendix VI). However, the investment might lead to good returns for other investor classes and also equity funds might decide to pay the premium in order to diversify their investor base.

CB investors face a *liquidity risk*. Although convertible and exchangeable issue sizes in Europe have increased in the last couple of years resulting in a much better liquidity, it tends to be less than

for the ordinary shares. As mentioned before, hedge funds play an important role in improving the liquidity by actively trading CBs.

Compared with equity, investment in convertible securities gives the holders *very little influence* over issues affecting the company, for example, selection of the board (except conversion into ordinary shares takes place).

6.3.2. Comparison with Straight Debt

Convertible securities generally offer *lower coupon* than do similar non-convertible securities. Larger returns than on equivalent bonds can be achieved if option component becomes more valuable due to equity price appreciation. Thus, convertibles may yield lower returns when compared to fixed income if the underlying stock does not appreciate. Underperformance of the common stock may cause the market value of the convertible security to fall even below the price that was originally paid at purchase.

Also, convertible bonds are *junior* in companies' capital structure compared to straight debt but senior to equity. Thus, in a case of bankruptcy investment recovery rate for a CB can be smaller than on straight bond. Even before bankruptcy becomes a high possibility high financial distress costs and signs of potential bankruptcy can hurt the convertible more than straight debt.

6.2.3. General Drawbacks

Convertibles are relatively *complex* instruments, especially for non-specialist investors, and their management requires careful attention to terms, conditions, and timing. As regards CBs, there is usually *no protection* for those who, for example, miss or do not respond to a call notice, and their securities are mandatorily redeemed. The complexity of the instrument might cause also other problems, for example, in case if a convertible does not have a *takeover protection clause*, in the event of a takeover, the embedded equity option usually becomes worthless and any conversion premium in the market price of the bonds will disappear (Redmayne, 1995). Thus, many investors still might feel insecure, since the CB market is relatively new and does not have standardized procedures yet.

The *call feature* of CBs can affect the overall return of securities representing another source for a potential risk, since the issuer might call the securities at a certain date, or force conversion into common stock. Funds that are allowed to hold only fixed income securities dislike provisional calls, as they do not get coupon payments after the call date and investors can miss the upside. New terms called make-whole call try to solve this problem by identifying the period in which CB holder will receive coupon payments independent of call being executed. Also hard call stipulations is a solution according to which investor can choose not to convert as long as the investor wants to.

Contingent conversion – requirement for the stock to surpass the conversion price by a certain percentage for consecutive number of days before actually enabling the switch. If stocks are priced cheap, in some cases it is easy for investors to bid up the price of the equity quickly, enabling fast conversion that would cause a large dilution of the shares. Consequently, conversion premiums tend to increase to levels of 40-45% as a protection measure to prevent dilution of equity base. From the perspective of investors such a high premium makes *exit strategy more difficult*.

The main investor group – hedge funds – face a *stock-borrow risk* since they need it to sustain short position made into stock when buying convertible. This risk could become realistic in the market downturn when investment banks might be unwilling to lend their stocks to arbitragers to avoid more pressure on equities.

In some cases, the scheme of hedge funds includes getting credit protection, as they want to hedge the credit risk as much as possible and concentrate only on market movements. Thus, a possible

risk is *lack of liquidity in credit protection market* that was clearly observable after September 11th terrorist attacks. The attacks intensified investors' desire for credit protection partly due to their convertible portfolios rapidly becoming like fixed income portfolios. The credit protection became more expensive¹¹ negatively affecting convertibles valuations and sending them lower than equivalent straight bonds. Liquidity was lacking in both, asset swapping and credit default swaps, markets.

Serial Killer Convertible Deals are cases when companies issue new convertible deals on top of existing ones. They are usually issued cheaper than the outstanding ones to attract investor interest and that makes previous convertibles fall in price hurting existing holders. They also are negatively affecting common stock price. However, the positive side of new issues is multiple choices of different structures of CBs issued by the same company like more downside protection or more equity sensitivity or different terms of maturity, calls, etc.

The table below summarizes the CBs nature compared with other financial instruments. Although, most of them have already been discussed in the text, the following summary includes also comparison with such instruments as debt with equity warrant and money market instruments.

Figure 6.3. Advantages and Disadvantages of CBs Compared to other Financial Instruments

Instrument	Advantages	Disadvantages
<i>Equity</i>	<ul style="list-style-type: none"> Enhanced current income More limited downside risk More senior in the list of creditors 	<ul style="list-style-type: none"> In a bullish equity market, due to the premium the investor does not benefit as much as he/ she would from an investment in equity Less liquid secondary market Little influence over corporate decisions before conversion Regulatory inefficiencies: in a case of takeover, the embedded equity option might disappear
<i>Straight bond</i>	<ul style="list-style-type: none"> Embedded equity option Limited downside risk at a time of rising interest rates 	<ul style="list-style-type: none"> Lower coupon yield Convertibles are subordinate to straight debt Complexity contrasts the relative simplicity of straight bonds
<i>Warrants and equity options</i>	<ul style="list-style-type: none"> Guaranteed coupon payments Protection in the event of falling equity prices 	<ul style="list-style-type: none"> Due to gearing, the same degree of exposure might be purchased for a fraction of the capital outlay
<i>Money market instruments</i>	<ul style="list-style-type: none"> Exposure to both bond and equity markets 	<ul style="list-style-type: none"> Convertible bond suffers from both falling shares prices and rising interest rates, while money market instrument does not

According to banking professionals, higher transaction costs and higher price to pay for debt plus warrant or other instrument replicating convertible than for convertible bond makes convertible bonds hard to substitute with combination of other securities. In addition, warrants have much shorter maturity than convertibles and different strike prices than investor might need. The price of convertible is claimed to be lower because of the combination of bond and equity option that is hard to separate.

¹¹ Sellers of credit protection wanted to avoid too much risk and therefore widened bid-ask spreads. For example, for a triple-A company like Swiss Re the spread was increased from 10-15 basis points historically to as high as 70 basis points (MacDonald, 2001).

6.4. Concluding Remarks

Investors' appetite for convertible bonds is one of the prerequisites for a sound existence and further development of the CBs market. This section examined various types of CB investors, as well as their particular interest in the product. Since these investors have a wide choice of financial instruments available in the market, it is important to identify the differences in order to ensure an informed choice. Although there are many bottlenecks for convertibles investors, their base is very diverse and covers a number of various investment strategies. The diversity is crucial for maintaining the market under any equity market circumstances.

7. Forces behind the Equity-Linked Securities Market

Having discussed the convertible securities from various perspectives – conceptual, issuers' and investors' – the following section will summarise those aspects that have served as forces behind the surge in the convertible and exchangeable bonds market. These factors will be divided into three groups where the first one discusses changes in European capital markets giving a sound base for convertibles development. Next, since the CBs market development was supported by favourable economic factors such as high stock market volatility and lower interest rates, these variables will be examined in the second sector. More specific CBs market dynamics including both drivers and impediments will be revealed in the last group of factors. Also, some of these factors are measurable, while others represent more qualitative aspects of the market. Hypotheses for further tests will be presented after each of those factors that are applied in the regression analysis later in this study (see Section 9).

7.1. Capital Markets Development

Transition from traditional bank-loan culture towards more *equity culture* has contributed to the growth of CBs market. Convertibles appeal to Europe's historical fixed-income culture, while giving the ability to obtain equity market returns through a debt security. Investors continue to prefer a defensive way to participate in the equity markets amidst all the prevailing volatility.

Harmonization of legislation is expected to take place while moving towards *unified Europe* that should ease cross-boarder issues. Many European governments are encouraging a shift to funded private sector pension provision system. Pension funds, banks and insurers are no longer tied to investing in their local stock markets and so are re-allocating their portfolios across Europe.

Introduction of Euro also has positive implications. One currency has eliminated some of the currency risk existing before and has boosted development of European capital markets. In particular, introduction of Euro is believed to be a catalyst for remarkable growth in M&A deals that in turn increases both convertibles bond and gross equity issuance. As a result of Euro money, market rates have converged resulting in a lower interest rate level. On most measures Euro markets are deeper and more liquid than the national currency markets they had replaced. Regarding liquidity, dealing spreads have narrowed in the money and swap markets that are also used to a large extent by hedge funds to get credit protection. Euro currency has enabled companies to sell many of their non-strategic holdings. According to Standard & Poor's (2001), in the past there was not the liquidity to monetise large holdings, but the euro has changed that

M&A activity has been a considerable catalyst for CB issues. Numerous benefits compared to other financing means like avoiding dilution if issuing undervalued equity, bigger amount possible to raise due to lower coupon, easy execution, more favourable credit rating than in case of straight bond, make a CB an optimal choice for many companies involved in M&A activity. As mentioned before, 29% of M&A deals are financed by acquirer's equity, especially in bullish equity markets. CBs imply selling own equity, but at a premium compared to the current stock price, thus, making paying by stock appealing to acquirers also in equity market downturn. Additional boost to issuing CBs in Europe is the growing trend to focus on shareholder value and selling non-core equity holdings in other companies. These sell-offs are captured by M&A data.

Hypothesis 1: Higher M&A volumes have a positive affect on the CB issuance volumes

7.2. Economic Forces

Interest rate level affects both the bond element of the convertibles, as well as its equity portion. Falling interest rates make convertible securities more attractive to issuers as coupon payments are even lower and their goal of achieving cheaper financing compared to straight bonds is realized. Furthermore, lower interest rate implies lower interest expenses on borrowings for companies, and increases debt capacity. For investors, lower interest rates represent lower opportunity costs in a low yield environment. Also, since stocks and bonds correlate negatively, stock price performance normally improves when interest rate is reduced. Thus, convertible bonds are more likely to be converted that attracts investors willing to gain from upside potential of CBs. Consequently, falling interest rates are expected to result in higher CB issuance.

Some of the banking professionals suggest that credit spreads are a better indicator for variation in CB volumes than interest rates, since credit spreads also capture the risk level more appropriately. Others assert that credit spreads have a minor impact on CB volumes among other variables. There is no strong consensus regarding the preferred measure. One of the disadvantages of using credit spreads in this study is that they vary a lot depending on industry, country and individual issuer's credit risk that also makes data hardly available¹² and would lead to insufficient regression analysis. Since the definition of an appropriate credit spread used for the purpose of this thesis is the yield premium on corporate debt over a swap rate,¹³ the best approximation of interest rate level in our opinion is the swap rate. In addition, bond yields of high credit rating companies usually strongly correlate with the swap rate¹⁴.

Hypothesis 2: Lower interest rates positively affect CB issuance volumes

Volatility of equity market – because of the embedded option, CB's value increases with increasing volatility of the underlying stock. The probability of conversion increases, as well as CBs advantage of being a defensive instrument strengthens under volatile equity environment. Since equity volatility is the main profit driver for hedge funds, higher volatilities will most likely lead to more capital inflow in hedge funds. Consequently, money inflow would create larger demand for CBs that would make companies issue more CBs creating demand driven supply and vice versa. Although the most proper variable would be the underlying stock volatility, the overall equity market volatility was chosen as a measure while looking at the European convertibles market.

Typically volatility arises from uncertainty in the market that lately has been brought from technology and telecom companies. Bullish stock prices until spring 2000 and the following burst of telecom and technology bubble was behind increased volatilities. Telecom industry could be characterised as having high financial distress costs, possibly valuable investment opportunities and increasing asymmetric information all arising from investment in 3G licences and expansion in Internet and data transfer businesses, thus, making convertible issue the optimal choice to soften the asymmetric information problems. Currently telecommunications represent the biggest sector of the European convertibles market and volatility might have influenced their financing decisions, thus, volatility of equity market leads to the third hypothesis.

Hypothesis 3: Higher equity volatility positively affects CB issuance volumes

¹² Data on European credit spreads has been recorded only from 1999.

¹³ Swap rate is used by most bankers in convertible bond pricing models.

¹⁴ In the sample of this study there is a correlation of 95,25% between corporate yields of the UK and Switzerland and swap rates of the same countries.

Although the market is more mature, one cannot be sure that the market will stay as big as now since one of the main drivers - *equity volatilities* - might eventually decline. Such an uncertainty about the future volatility of equity markets impedes the development. Deflating equity volatility can cause decreased demand from hedge and other funds in future. Consequently, decreasing liquidity will make it expensive for investors to manage portfolios containing convertible bonds.

Equity market performance – it is hard to predict the direct effect of equity market performance on CBs market since the effect varies by type of investors due their differing preferences in terms of share price performance. Falling market is not good for convertible holders, as it makes convertible deep out-of-the-money and worth less than a straight bond. In rising equity markets, equity investors switch to equities, but fixed income funds or hedge funds are still potential buyers of convertibles. In general, hedge funds that represent the biggest investor portion are not influenced by equity market performance since their arbitrage strategies are built upon the idea of variability and not the absolute level of share price. Because of the scattered demand, it is hard to capture exact equity performance effect on CB issue volumes. One can expect equity market returns having no influence on CB issuance volume.

Hypothesis 4: *Equity performance shall have no affect on CB issuance volumes*

7.3. CBs Market Internal Forces

Size of the market, its incompleteness and backwardness in terms of *transparency and liquidity* are some of the problems for the CBs market. CBs do not exist for every common stock in the market. It means that stock selection versus CB market is problematic. As regards liquidity, historically CB issues were too small with poor secondary market liquidity. However, now the convertibles market has bigger size and there are many new market makers. A remarkable source bringing more liquidity and depth is the increased investor base in Europe, especially hedge funds that is discussed further in this section. To mention another step towards correcting transparency and liquidity drawback, Deutsche Bank and CSFB have launched their online trading in Europe. However, even though some of the drawbacks seem to be corrected, new ones appear on the way. With a relatively small number of *large funds dictating* flow true and accurate pricing becomes difficult for lead managers and issuers, and can further affect liquidity (Corporate Finance, August 2001). Also *larger issues* are needed to have privacy when, for example, executing CBs in portfolios of many funds at the same time.

Intensifying competition between investment banks – due to the aim of banks to get higher position in league tables and rapidly rising CB issue volumes, many investment banks want to involve themselves in convertibles business, especially under the current recessive market circumstances. CB issues generate good fees to advisors because of the complexity of convertible securities valuation and low costs of issue execution. Competition has intensified so much that banks are claimed to underprice CBs, tying it to underpriced credit facility and aggressively trying to out-win mandates. Competition has also provided incentive for *financial innovation*. Investment banks have found a way to profit in economic downturn by capitalising on uncertainty that enters convertible valuation models as equity market volatility.

Increasing awareness and familiarity – issuers and investors gradually have become more familiar with the product. Beforehand, many investors ignored this asset class due to its complexity. In recent years high returns on convertibles and their benefits to issuers attracted an immense amount of interest from both issuers and investors. According to data from Lehman Brothers, only about one third of all issues brought to the convertibles market each year come from companies that have never issued convertible before. Most of the deals come from repeat issuers that implies companies understanding the benefits of convertibles and their striking risk/ reward characteristics, as well as getting comfortable with them.

Larger and more diverse issuer base – because of the increasing familiarity with CBs, the number of issuers is increasing and their base is becoming more diversified. For example, there are more non-investment grade companies coming to Europe. Provided that there is a continuing confidence in the business strategy backed up by relative financial stability, the CBs market will certainly remain open for them.

Higher demand from investors, especially hedge funds is a significant factor driving the market. The increasing money inflow into these convertible arbitrage funds together with their exceptional interest in convertibles generates numerous new issues. According to Steven Metcalfe (2001) issuers often say that high liquidity/demand has been one of the reasons for issuance. Obviously, higher demand implies possibly better terms for issues. High historical returns of hedge funds and general growth of capital markets and investor base have boosted capital inflow in hedge funds.

Hypothesis 5: Capital inflow in hedge funds positively affects CB issuance volumes

Market friction and completeness – CBs market increase completeness of the capital markets. Although there have been some ill-informed comments about the increased number of convertible arbitrage funds, they have a significant beneficiary effect on the market. First, they facilitate the efficiency of pricing by ensuring that CBs are traded closer to their theoretical or “fair” value. Second, hedge funds facilitate product innovation and develop strategies for successful investments into these financial instruments. And third, frequent trading by arbitrage funds has dramatically improved liquidity of the European CB market. Thus, increased demand for convertible securities from hedge funds has not only resulted in a significant increase in issue volumes and sizes, but also contributed to the efficiency of CBs market. Convertibles can also substitute commercial paper for fixed income funds if there is lack of debt issuers in the market or if debt securities are too concentrated in certain industries like telecommunications and technology in years 2000 and 2001. In fact, corporate debt is rather undeveloped in Europe if to compare with the US.

Nevertheless, *segmentation* represents a challenge also for the CBs market. Issuance is tilted to certain sectors and types of companies; thus, CBs lose their effectiveness as a diversification tool. Concentration of issuers in certain sectors increases the market’s inherent risk. High concentration in TMT sector is a great threat if the industry goes out of favour (see Figure 3.2 for sector breakdown of the European convertibles market).

Various regulative considerations have served as forces behind the CBs market development, either by impeding the growth or boosting new issues. For example, the UK pre-emption laws state that if the amount of shares into which bond converts is more than 5% of the company’s shares outstanding, the issuer has to offer subscription rights to current shareholders. It takes away the issuer’s flexibility and is claimed to have held back convertible issuance in the UK (CFO Europe, 2001). Another example is that in some countries there are restrictions on selling stocks short that makes impossible to do arbitrage for hedge funds, the main liquidity provider in the market.

A positive example is the decision by the German authorities to remove *capital gains tax* on holdings starting from 2002 (announced in 1999) that is expected to unlock sales of stakes. Another positive move has been taken by government of Italy allowing hedge funds to be set up in Italy. Also, since April 1990, rule 144A of US Securities Act has made convertible bond offerings exempt from registering with SEC. The rule thus eliminates regulatory delays and costs related with documentation needed to meet accounting and disclosure requirements like it is when issuing equity in US. It has made it easier for European issuers to tap the US market at lowest cost and faster than it would be through equity issue in US.

Because of the complexity of CBs and the escalating innovation in deal structures over recent years, very few of these terms and conditions have customary, established standards forms. For example, *prospectuses are non-standard*. It makes these instruments difficult to understand and

thus might discourage potential investors' funds (especially retail investors). For example, prospectuses of even some relatively recent issues are formulated in a way that hurts convertible holder in a case of merger by suggesting that bondholders may be forced to convert before the merger in order to receive shares in the new company. This means that any premium to the shares that existed prior to the merger would be lost. It is hard to estimate the effect of complex prospectuses, but it could be large, as many investors need time and knowledge to understand this complex instrument.

Prospectuses should definitely include the legal framework to be applied. Terms and conditions should be the central part of the documentation and include information about how to act when a possible problem arises. Such problem areas most likely include capital distribution to shareholders, issuer calls, M&A activity, and status of share received (Howard, O'Connor, 2001).

7.4. Concluding Remarks

Before performing regression analysis, one can expect that the most reasonable drivers are the recent development in the European capital market including the introduction of Euro and the potential harmonization of Euroland, low interest level, high stock volatility, increasing M&A activity, and continuous money inflow into hedge funds. Financial innovation, increased awareness of the product, as well as intensifying investment bank competition have unquestionably played an important role. The increased demand from investors and their diversifying base has fuelled the development further and is believed to be sufficient to maintain a healthy CB market.

Although the market is firmly established in the minds of people within the convertibles market, there are still people outside the convertibles market that treat CBs as obscure derivatives. The impediments include problems caused by the relatively small size of the CBs market, its incompleteness in terms of liquidity and transparency. Regulatory issues represent another sector of possible impediments including no standards for prospectuses. Nowadays investors' and issuers' interest in this market is enormous, thus, it must be supported from the intermediary institutions such as investment banks, other financial institutions and regulatory bodies to the extent to which they can influence and enhance the market's setting.

8. Data

The most important measurable factors identified above are included in the regression analysis, and they are equity volatility, interest rate level, M&A deal flow, capital inflow in hedge funds and equity market performance. This section briefly describes the assumptions behind defining these variables.

8.1. Convertible Bond Issue Volume

CB issue volume is defined in absolute form with a time interval of month. Data are available since 1980 but only those since 1987 are used in the regression, since other variables have a shorter time span (see Appendix VI for CB volumes since 1980).

8.2. M&A Deal Flow

First, deals where a *European company is an acquirer* were taken. The reason behind such a choice was an argument that these companies will need financing for completion of the deal, and they might use a convertible or exchangeable bond. Deals with a European company being the target were not included because most likely the foreign acquirers of these companies will get financing in their home country, and these deals will not affect the convertibles issuance in Europe directly.

The second assumption concerns the choice between *all purchases or exclusion of minority stake deals*. It is believed that convertible bonds are most likely to be used to finance 100% purchase, because acquisitions of minority stakes usually are planned in advance and also pre-financed by funds other than convertibles. However, minority stakes are often sold via exchangeable bonds and that is why they are included in this study.

The third assumption concerns the date: *announcement vs. completion date*. It seems that the announcement date is the right choice, as it should normally coincide with the date of financing. The completion date could be too late, as financing has already been attracted and used. However, there is an argument that bridge financing is used in mergers and acquisitions initially, and after completion they are refinanced with more long term financing like convertible debt, straight debt or equity. The drawback of considering completion date is that refinancing may take place right away or after few months, and these timing differences may distort the expected relationship between M&A deals and CB issuance.

8.3. Interest Rate Level

Due to limited availability of data, the weighted average swap rate of only the UK and Switzerland markets, being the 2nd and 3rd biggest¹⁵, was calculated. The weights were calculated according to their share of outstanding convertible bonds as of April 2001 (see Figure 3.2. in Section 3). Maturity of the swap rate is chosen to be 5 years to be similar with that of CBs.

8.4. Equity Volatility

As regards the *underlying asset*, Europe's EuroStoxx 50¹⁶ is chosen, as it is the most commonly used index in the European market. An alternative to take equity indexes of industries that are the dominant ones among convertible issues is not feasible because of the complexity of the necessary adjustments to be made for each year. The same argument fits the consideration of countries. An argument to support the choice of general index is that blue chip companies are often the ones that issue CBs in Europe, and there is a great chance that EuroStoxx 50 pool of equities might coincide with industries and countries represented in the CBs issuance market from year to year.

The *volatility* is defined as standard deviation, and two measures of 100 and 250 days are chosen for calculations, also being a common practice among investment banks advising CBs issuance. Calculation period ends on the last day of the previous month.

8.5. Equity Market Performance

Eurostoxx 50 index was chosen as representative to be consistent with assumptions of equity volatility. Selection reasoning follows the same arguments as above. Returns of 3 months, 6 months and 1 year were chosen to accommodate different preferences of investors.

8.6. Net Capital Inflow in Hedge Funds

Large capital inflow in convertible arbitrage funds ensures demand for CBs, and issuers can and supposedly do take advantage of it by timing their issues when liquidity of hedge funds is higher. European net capital inflow data are used, although one possible drawback could be that European data do not capture all investors. Also foreign investors invest in Europe and European investors might invest in foreign markets.

¹⁵ In some periods of time in the past, the UK market was the biggest in terms of CB issuance.

¹⁶ According to J. H. Grubben, the head of Research at Insinger de Beaufort, 60% of the constituents included in Dow Jones Euro Stoxx 50 have also issued convertible bonds.

Figure 8.1. Data Description

	CB Issue Volume \$mm	Issue Size \$ mm	Swap Rate %	Volatility %	Equity Returns 3 mo %	M&A Volume \$mm	CF* in Hedge Funds
<i>Max</i>	7 225	3 071	11,87	48,61	26,1	286 873	1 130
<i>Average</i>	1 153	248	7,18	15,35	2,4	61 055	82
<i>Min</i>	11**	1	4,13	3,59	-23,8	9 118	-327
<i>St. Dev</i>	1 398	393	1,98	12,41	8,6	48 586	190
<i>Start year to 2001</i>	1987	n.a.	1987	1987	1987	1995	1994
<i>Number of observations</i>	178	n.a.	166	167	175	82	91
<i>Source</i>	SSSB	SSSB	Data- stream	Data- stream	Data- stream	Dealogic	CSFB

* Implies Capital Flow in Convertible Arbitrage Hedge Funds in million USD.

** Excluding those months when there were no issues.

9. Analysis of Regression Results

The definitions of variables entering the regression are the following:

- Dependent variable – monthly volume of issued convertible bonds;
- Independent variables – M&A monthly deal volume, swap rate in %, stock volatility in %, equity returns as a % per period¹⁷ and net capital inflow in convertibles arbitrage funds.

Since the number of independent variables (7 variables) is much smaller than observations (lowest being 82), all variables were included in one regression. Five outliers were identified according to method of analyzing residuals¹⁸. Three of the outliers were due to significantly large amount of CB issues in June months of 1996, 1998 and 1999 and also April 1997¹⁹. Outliers were assigned a dummy variable in the regression²⁰. According to bankers, the possible reasoning for higher issue volume in June is that convertible markets seem to have been more active during the first half of the year with some deterioration in summer and autumn and that might motivate some issuers to tap the market before the summer starts. One of possible explanations mentioned was that institutional investors might be less active in second half of the year. As it can be seen in Figure 9.1. and Figure 9.2., it is significant at 1% and has the expected sign.

Another dummy assumption concerns Euro currency entering the market. The purpose is not to find whether it is a driver of CBs issuance, but rather to capture more factors that might have affected the increase in CB issuance. Euro, as already mentioned above, has created more liquidity in the market and has lowered the interest rate level that makes issuing fixed income securities more attractive. It is defined as dummy having value of 1 from the start of Euro introduction in the European market. As it can be seen in Figure 10.1., this dummy is also significant at 5% in the initial regression (Figure 9.1.) and at 1% in refined regression (Figure 9.2.) and has the expected sign. Euro importance is strengthened by the fact that 60% of CB issues outstanding in Europe as of April 2001 are in Euro currency (see Appendix II).

¹⁷ Equity return is calculated for defined period ending at the beginning of the month of the respective dependent variable.

¹⁸ Residual outliers method was chosen, as it includes the possibility that outlier of dependent variable can be actually explained by outlier of same trend among independent variables. Three standard deviation assumption is taken.

¹⁹ The outlier was due to one extraordinary deal of Roche Holdings for 3 billion USD.

²⁰ Fifth outlier was absence of CB issues in August 2000. Although no other explanation besides delayed summer effect has been found for that it still has been excluded to decrease the possible noise in data.

Below are results of the initial regression capturing all variables of hypotheses and the introduced dummy variables. None of the explanatory variables of hypothesis is significant except outliers and Euro introduction.

Figure 9.1. Expected and Observed Variable Effects, Initial Regression with All Variables

Variable	Expected effect	Observed effect	Coefficient	Significance level
H1: M&A Volumes	+	-	-0,221	0,127
H2: Swap Rate (lag 1 month)	-	-	-0,218	0,188
H3: Volatility 250 days (lag 1 month)	+	+	0,214	0,177
H4: Equity 3 Month Return	None	None	0,110	0,317
H5: CF in Hedge Funds	+	+	0,034	0,725
Outliers	+	+	0,356*	0,000
Euro Introduction	+	+	0,327**	0,031

R square = 0,421, Number of observations –78; F significant at less than 1% level

* Implies 1% level of significance; ** 5 % significance level

Problem might lie in the fact that such variables as M&A deal flow and capital flow in hedge funds are hard to measure due to couple of reasons like timing and expected dependence on other variables that are discussed further below. Different lag periods of 1-3 months for Hedge funds data and 1-6 months for M&A data were tried. However, no improvement in result was achieved. Therefore, another regression is run omitting these two variables. Stock volatility, swap rates and equity returns might have delayed effect because, according to bankers, it might take up to 6 weeks to arrange a deal. Different lags up to 2 months were chosen and the best regression results are presented below:

Figure 9.2. Expected and Observed Variable Effects, Refined Choice of Variables

Variable	Expected effect	Observed effect	Coefficient	Significance level
H2: Swap Rate (Lag 1 mo)	-	-	-0,263*	0,000
H3: Stock volatility (Lag 1 mo)	+	+	0,272*	0,002
H4: Equity 3 Month Return	No Effect	No Effect	0,082	0,133
Outliers	+	+	0,295*	0,000
Euro Introduction	+	+	0,215*	0,006

R square = 0,562, Number of observations –163; F significant at less than 1% level

* Implies 1% level of significance

R square of 0,562 is a good indicator of independent variables explaining the CB issuance volumes, as a common satisfactory measure would be even in a range of 10-20%. Also, all three remaining hypotheses have expected relationship or no relationship in case of equity returns.

Hypothesis 2 is accepted at 1% level of significance, thus, suggesting that the lower the interest rate level, the higher the CB issuance volumes. The best estimate was achieved when swap rate of 1 month lag was introduced that means that it takes around 1 month for issuers to react to lower interest rates in the market. When switching swap rate to corporate yield, very similar relationship and significance was found that was also supported by high correlation between them and with dependent variable.

Hypothesis 3 is accepted at 1% of significance level, thus, suggesting that the larger the equity volatility, the larger the CB issuance volumes. Lag of 1 month was chosen as it improved total explanatory power of the model, although the variable without lag was of similar significance.

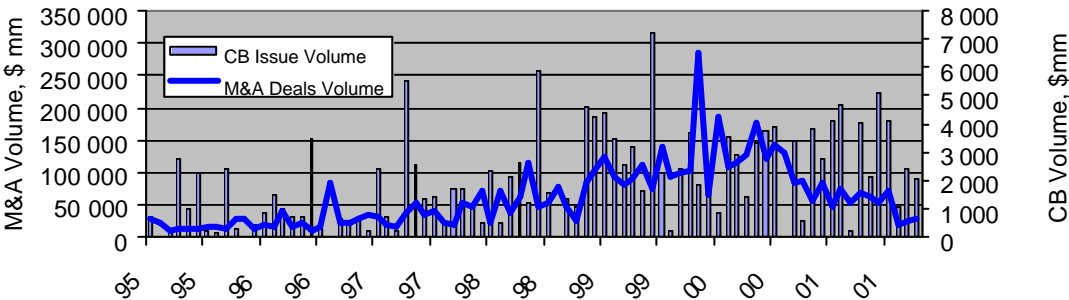
Hypothesis 4 was accepted, thus, implying equity market returns having no influence on CB issuance volumes. This is a plausible outcome because it suggests that CBs market does not depend on whether the stock market is bullish or bearish although in theory it should matter to some of the investor groups. Thus, flow of new CB issues might be rather constant that is important for security class to be lasting. The stability of volumes, however, remains under risk of falling equity volatilities.

Referring back to initial model with all the variables, **Hypothesis 1** on M&A volumes was not accepted and it is supposedly due to different drawbacks discussed further. Relationship was strongly expected because many M&A deals are financed by convertible bonds, and exchangeable bonds are very often used in selling of cross-holdings. Possible aberration reasons are timing of financing, differences in case-by-case, possible correlation with other variables and shorter time span, namely, since 1995.

As it was stated before, M&A is often pre-financed with short-term funds (so called bridge financing) and only afterwards it is refinanced with convertible debt. The time interval from M&A deal announcement to its refinancing can vary a lot case by case. Lag assumptions of 1 to 6 months have been taken, but none of them proved to have explanatory power. Another drawback is negative correlation with swap rates (see Appendix VII) and possible relationship with equity market since equity market performance has also indirect effect on the M&A activity. According to banking professionals, many of M&A deals are paid with stock in rising equity markets. In an economic downturn payment by stock is less likely to be exercised as stock is considered to be undervalued, and companies that do not have enough cash will not involve in M&A, thus will not require financing.

Due to the high possibility of these data being case-by-case type, it should be worthwhile to look at trends of M&A deals and CB issuance in the Figure 9.3. below. The relationship can be easily noticeable except the last two years. It might suggest that other variables like high equity volatility and higher demand from hedge funds have kept up the issuance levels. M&A deals might have been as a catalyst for the market growth and now its role has been taken over by higher equity volatilities and larger demand that in turn could suggest higher familiarity with the CBs and interest in the market.

Figure 9.3. CB Issuance vs. M&A Volume



Source: SSSB, Dealogic, November 2001

Another variable omitted after no explanatory power was observed in the initial regression model of all variables is net capital flow in hedge funds, i.e., **Hypothesis 5**. Possible reasons are: capturing the right demand pool, timing and shorter period of data.

Not only European funds are buying European issues, but also global funds represent investors. However, taking global data would have noise in terms of these funds investing all over the world.

Also longer period than 1994 shall be more appropriate, but it is not possible in this study due to data unavailability. Another drawback is timing, as it is unclear how quickly supply reacts to demand. Also, it is unclear how quickly new capital inflow in hedge funds is invested in new issues; it depends on hedge funds' management or shareholders' decisions. As a result, this variable can also have flaws. Lag variables of 1-3 months were derived and used in regression to capture the timing effect, but no significant results were achieved. Larger inflows of funds in later years are cited by bankers as drivers of CB issuance through creating larger demand (see Appendix V).

According to Tremont Partners, many interest rate cuts, a healthy supply of issuance and sustained high equity volatility have supported the net inflow of assets into arbitrage strategy up to now. Thus, this variable also could have cross-sectional correlation in some way.

Description on tests taken and their results are found in Appendix VII. According to tests of unit root, co-integration, multicollinearity, autocorrelation and heteroscedasticity, no adjustments were necessary.

Conclusions to Regression Results

To conclude, four of the variables discussed above are believed to have influence on CB issuance. Higher equity volatility, lower interest rates, higher M&A volumes and larger funds flowing into convertible arbitrage hedge funds affect the growth of convertible bonds market positively. Due to variety of investors and their investing patterns, equity market movements, the fifth variable, are found to be unable to affect CB issuance significantly.

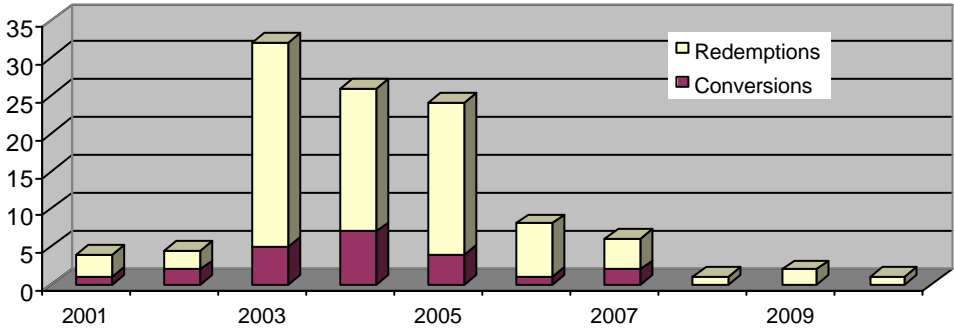
10. Future Prospects

Having determined the main forces behind the CBs market development, this section gives a brief insight into the future outlook. Since September 11th events had an enormous effect on the global economy, besides a short-term outlook, also the impact of these events will be discussed. Finally, a variety of estimates for the future market size will be discussed.

10.1. Short-Term Outlook

At present, there are two time bombs hanging over the convertibles market because of the pattern of the historical issues. First, it is the possibility that a small volume of conversions and redemptions in 2002 can cause a collapse in valuations, as well as insufficient funds for new issues. The second issue relates to the refinancing risk associated with the TMT issues likely to be redeemed in 2003-05 (UBS Warburg, August 2001). The graph below illustrates the European CB market by profiling redemptions and conversion in a case of 0% equity growth.

Figure 10.1. The European Convertibles Market: Profile Assuming 0% Equity Growth



Source: UBS Warburg, August 2001

However, even taking into account the probable future development, there are no expectations that the issue volumes would drop. Many existing funds are still having cash positions with which to

buy new issues. Plus, many new outright convertible funds and hedge funds are being set up willing to invest in 2002. Thus, the gap between redemptions and conversions and new issues will find funding. As regards refinancing risk of TMT issues, the market can expect exchangeable refinancing, convertible refinancing or TMTs turning to other sources such as via debt or equity markets.

According to UBS Warburg professionals, not only convertibles are expected to sustain the existing issue level, but at the current moment CBs are seen as likely market leaders because: hedge funds have got good cash inflows lately and are expected to be leading the demand for new CBs, as they are not interested in “busted” convertibles that do not offer many hedging opportunities and represent most of the outstanding CBs. Next, secondary convertible market lacks liquidity, and new issues can fix it. And thirdly, because of the numerous “busted” convertibles, many issuers most likely will not get them converted in equity and will need to refinance them later.

10.2. Development after September 11, 2001

After September 11th events absence of global CB issuance was observable in the marketplace: issuers chose to wait instead of issuing convertibles with more generous terms. Given uncertainties, most companies became cautious about debt exposure. Subsequent decline in stock prices pushed conversion premiums to higher levels creating the lowest equity-sensitive European convertible market in years. The average conversion premium for the European convertible index exceeded 140% of par value (UBS Warburg, September 2001).

Nevertheless, researchers claim that the tragic US events had only limited strategic consequences for the overall convertibles market (UBS Warburg, September 2001). Even though investors were more quality aware and sensitive to protection from various possible scenarios, the political and economic uncertainty made the defensive nature of convertible assets particularly attractive.

10.3. Equity-Linked Market Size Estimation

Different approaches have been used to estimate the future size of the CBs market. Few of the reference measures used by investment bankers are: equity market capitalization and turnover, equity issuance volumes in recent years and possible share of the company’s balance sheet. Surprisingly, debt outstanding or issued is not a common reference to use for these estimates.

According to Goldman Sachs (2001), convertibles market size is equivalent to *1.6% of European equity capitalization* and 1.8% of global equity capitalization in 2001 that seems to be too low to support a view that CBs are a separate asset class. When judging about the potential of this market, one can refer to late 1980s in France and Japan when CBs were 7-8% of capitalization of respective equity markets.

Another approach used by investment banking professionals is market estimation based on *equity issuance levels*. Convertibles issuance as a share of equity issuance in 1999 and 2000 was respectively 22% and 15%. Last two years, however, are biased due to falling equity prices. According to their assumption that in 10 years the CBs’ share of the European equity market will grow from 1.5% to 3% and taking into account projections of European equity market capitalization growing from 6 trillion Euros to 24 trillion Euros, convertibles market will grow from 90 billion Euros in the beginning of 2001 to 720 billions in 10 years that implies massive increase in issuance levels.

Figures on proceeds from convertibles issuance in 2001 are even more striking suggesting relationship with other market activity measures under specific market circumstances. From the beginning of year 2001 up to the end of May, CB issuance proceeds were more than has been raised from junk bonds or initial public offerings suggesting that there might be specific market

circumstances when it is optimal for companies to issue convertible debt that makes convertibles being different from debt and equity.

Another measure of the CBs market development is secondary market turnover. According to SSSB, CBs market turnover was 552 billion Euros in 1999 implying turnover of 5 times the capitalisation (~100 billion Euros). It is very high comparatively to equity market turnover/capitalization that is 0.8 times. Estimate of turnover of 1 trillion Euros is expected by 2005 that certainly is a large amount.

One more approach to estimate the CBs' market size is to measure CBs as a part of companies' balance sheets. An estimate of 10-25% of balance sheet can be CBs: it is assumed that such an amount is value adding and not risky. However, due to uncertainty of CBs market, adjusted 5-15% (not all companies at all times will need it) of financial assets might be CBs (Goldman Sachs, 2001). Unfortunately, no data on assets of European companies are available.

10.4. Other Convertibles Market Estimates

The allocation of convertibles among various European countries seems to be remaining the same, at least in the nearest future. The main markets will be France, Switzerland, the Netherlands and Germany. The issuance from the UK and Italy should continue, and such countries as Spain and Portugal will be increasing their share. In France and Germany the convertibles presence is robust since CBs are used to finance continuous restructuring activities, plus in Germany the capital gains tax law will be removed from January 2001. In Spain, Portugal and Italy companies are becoming more active at a global level and, thus, also require more financing.

As regards industry sectors, the same tendency is expected to continue with a predominance of telecommunications and financial institutions. Large bets are also put on biotech companies. In general, most of the other sectors will be also represented to some extent. The most probable CB issuers will be companies with steady earnings and companies within growth sectors with proven track records.

Currently there is a discussion about the potential of high yield bonds in Europe. At the moment it is still not developed because the companies issuing high yield bonds involve smaller deals, thus, the investment bank fees are smaller, and they are focusing on larger clients ignoring the high yield sector. However, once the current market stumbles revenues for investment banks will fall and might pressure the banks to look at high yield issuers. Competition among hedge funds and also between advisors possibly eroding abnormal profit opportunities in high-grade market and also possibility that high yield issuers might have higher volatility are supportive arguments for increase in issuance in high yield market. But due to such problems as lower liquidity in equity market and credit protection market of high yield securities in Europe, rapid development in volumes is not expected soon.

11. Summary and Conclusions

The rise in convertible securities issuance in Europe in 1990s has been remarkable and attracted considerable attention from a variety of issuers, investor groups and intermediaries, leading many market insiders to consider CBs a new asset class. Taking into consideration this development, the aim of the thesis has been to determine the forces driving the convertibles issuance growth, benefits and drawbacks facing issuers and investors, as well as trying to estimate the future of this high growth market. Both quantitative and qualitative researches have led to the following findings:

Convertible securities seem to have *something for everyone*. These financial instruments can offer a powerful way for companies to raise cheaper funds in terms of lower coupon, lowering tax liabilities, decreasing dilution costs, increased diversity of shareholders, higher flexibility by quicker execution and larger customisation opportunities. For investors CBs have offered high risk-

adjusted returns, diversification opportunities, less risk, upside potential for fixed income funds and higher safety for equity investors, and often at lower cost than combination of other securities.

However, there should be no illusion about the instrument offering a free lunch. Although it is attractive to many issuers and investors, it is also important to encounter *the possible drawbacks*. Issuers' largest risks are refinancing risk and hurting existing shareholders. The main drawbacks that investors face arise from adverse movements in equity prices and interest rates, lack of liquidity in secondary market, complexity and in some cases unfavourable terms of the contract. The main investor group, namely, hedge funds also have a stock-borrow risk and lowering liquidity in credit protection market.

The main drivers of the growth in convertibles issuance as detected by regression model are:

- High equity volatility – increasing the value of convertible bond due to more valuable equity option component, thus, enhancing the benefits outlined above. Most of all, higher volatility is believed to be the main driver of demand from convertible arbitrage funds, the main investor group. Presence of hedge funds develops many positive market externalities that make high equity volatility a very significant force.
- Low interest rates – by allowing more funds to be raised, decreasing opportunity cost of investment in straight bonds, encouraging investors to look for upside potential through embedded equity option.

Such factor as equity market performance was found to have no effect on CB issuance growth.

CBs market insiders consider this asset class to sustain in the future and grow that is also supported by a number of factors observable in the European market. In the future, Europe is seen to move more *towards equity culture* that might elevate the risk tolerance of investors. Also competition among investment banks has been very significant factor in boosting the issuance.

With the *regulative environment* becoming more favourable, there will be an even stronger incentive for companies to issue equity-linked debt. As a result of continuing deregulation, more mutual funds, retirement schemes and hedge funds will boost the investor funds increasing demand for convertible issues. As the convertible bond market increases in size, and diversification effect that convertible bonds provide becomes more recognised, asset managers will seek to apportion part of their portfolios to convertibles. This will result in growing demand for this product as an asset in its own right. Awareness of the convertible securities is believed to have been increasing significantly.

Another considerable demand driver will be a continuing *merger and acquisition activity* and *unwinding of cross holdings* that will be maintaining certain amount of issue flows. CBs contribution to *market's completion*, as well as *introduction of Euro* are believed to have contributed to higher liquidity in European capital markets and decreased interest rates.

There are also factors to be cautious about that can potentially cause difficulties for the convertibles market participants. Some of these factors include likelihood of eventual declines in equity market volatilities, falling liquidity in convertibles market, continuous segmentation of issues by specific industries, and regulative environment becoming more unfavourable. It might also come from aspects, where investors and companies disagree on what they are willing to give away.

To sum up, currently it looks like convertible securities are perceived as having more benefits than drawbacks, and there have been more drivers than constraints in the CBs market. It suggests that convertibles market might grow to even higher volumes and involve more actors on every level. However, one of the factors that is believed to be the main force behind the rapid growth in this market, namely, equity market volatility, can possibly diminish to the levels where CBs are not such a valuable investment anymore. In a case volatility level goes back to the one in 1980s, there

would be no abnormal profits for hedge funds, and their demand would vanish. Consequently, other investors could lose interest in these securities because of their lower value and absence of hedge funds that have contributed significantly to determining fair pricing levels, as well as the secondary market liquidity needed for other investors to carry out their asset management strategies effectively. Thus, although at this point it seems that the CBs market is on the right track to achieve the critical mass to be recognized as a distinctive asset class by more market participants, its further development depends on uncertainty level, which in itself is uncertainty.

12. Suggestions for Further Research

The theme about drivers behind the development of convertible bonds market has not been widely researched in academic literature, especially in Europe. This topic covers a variety of aspects, thus, there would be many angles for a prospective study. Those topics suggested below have the closest relationship with this master thesis and would offer value-adding analysis.

Since hedge funds represent the main investor group and are expected to have an enormous effect on the further development of convertibles market, it would be valuable to study their motivation and strategies more closely, as well as their behaviour in different market circumstances. Also, behaviour of other investors under different market circumstances might be researched.

Another research could delimit this study's scope and focus on one country only. It would be beneficial for determining the effect of hardly measurable aspects like, for example, institutional setting. Likewise, an interesting paper would cover aspects of harmonization of the European financial regimes and their impact on the CBs market.

Since the main factor behind the CBs market growth was found to be stock market volatility, another study could focus on factors that have affected the volatility levels historically. Also a finding that one of the reasons for a CB issue has been management's decision to capitalize on high volatility of their company's underlying stock, it would be interesting to investigate if management can intentionally affect volatility of the underlying stock.

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14. Appendices

Appendix I: Definitions of Terms

Investment Value (Bond Value or Bond Floor): The fixed-income component of the convertible. It is estimated by calculating an equivalent bond value based on the assumption that the bond is not convertible.

Conversion Price: The price at which shares are effectively bought upon conversion, thus, security price implied by conversion ratio.

Conversion Ratio: The number of shares of common stock for which a convertible can be exchanged. The ratio is determined upon issuance of the security and typically remains fixed throughout the life of the instrument (might be adjusted to account for stock splits, special dividends or other dilutive events).

Conversion Value (Parity): The equity portion of the convertible bond. It represents the market value of the equity into which the bonds can be converted and is calculated by multiplying the number of shares into which the bond converts (conversion ratio) by the market price of shares.

Conversion Premium: The difference between the price of the convertible instrument and the conversion value as a percentage of the latter.

Callable Feature: A callable feature gives the issuer the option to buy back the instrument at a specified price prior to maturity. The price is known as the call price and is subject to change, as the security gets closer to maturity. Each successive period closer to maturity, the call price will usually decline. Call prices are usually presented on the face or indenture agreement of the bond or preferred share. Since the callable feature is an option owned by the issuer, securities with a callable feature are priced to yield more than the same security without the feature.

“Hard” Call Protection: Most convertibles are issued with a period of call protection during which the issuer might not call the bonds early, and “hard” call protection is the period during which the issuer cannot call the bonds under any circumstances.

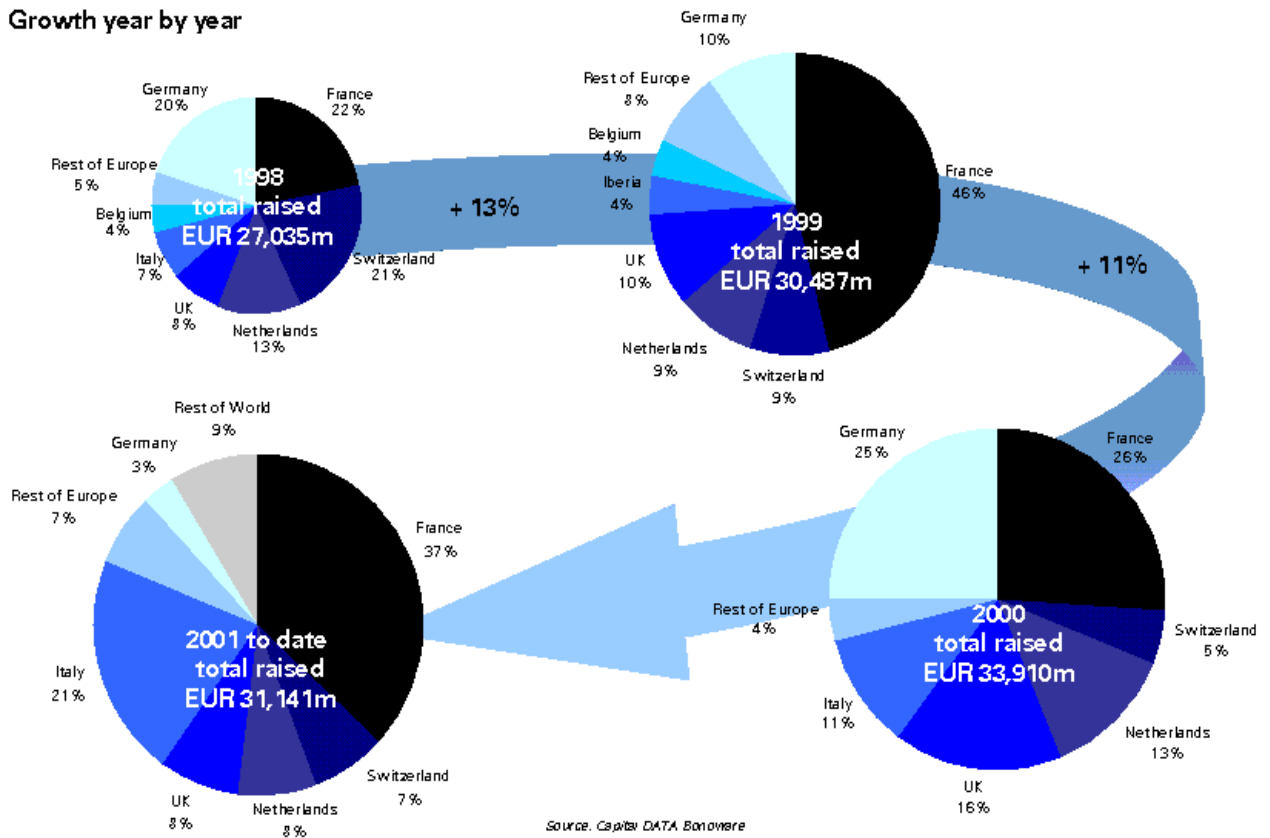
Provisional Call Protection: Provisional call protection implies that the bond cannot be called unless the stock trades above a certain pre-specified level for a certain period of time.

Redeemable Feature: A redeemable feature gives the holder the right to redeem the security at a specific price prior to maturity. Redeemable prices are fixed and are stated on the face of the instrument or in the indenture agreement. Since the redeemable feature is an option owned by the security holder, securities with a redeemable feature are priced to yield less than the same security without the feature.

Appendix II: The European Convertibles market by Currencies, Credit Ratings and Countries

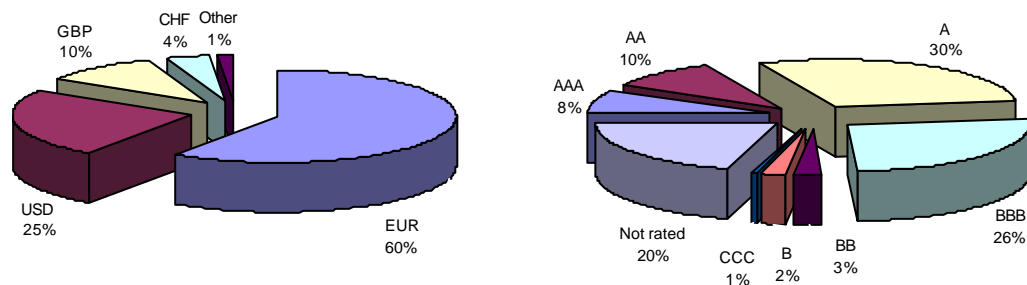
Figure A1: The European CB Market by Countries from 1998

Growth year by year



Source: West Panmure, 2001

Figure A2: Currency and Credit Rating Breakdown of the European CB market.



Source: GS Convertible Research, 2001

Appendix III: CBs vs. Equity and Bond with Warrant from Issuers' Perspective

Table A1: Convertible Issue vs. Equity Issue

Advantages	Disadvantages
<ul style="list-style-type: none"> • In the event of a company's share price moving above the conversion price, it sells its shares at a premium compared to the price prevailing at the time of launch • The issuer might have influence over the time of conversion if it is stated in the terms of the bond • Depending on the company, CBs may offer access to substantially more funds by widening the range of investors • Unlike an equity issue where the level of discount to market price is usually the only variable, CBs have many variables that the company may alter according to their preferences and needs • Easier access to international markets • For some structures, a considerable influence over maturity of the funds • Tax advantage since convertible coupons are tax deductible whereas dividend payments are not • In a case of conversion, exchangeable allows an issuer to utilise stakes held in other companies as a means of raising lower cost funds 	<ul style="list-style-type: none"> • Higher cost in case if expected conversion of the bonds into the ordinary shares does not take place • Uncertainty over conversion with an implication to continuously make allowance for coupon payments, plus, readiness to fund the repayment • In the case of a need for a larger retail investor base, straight share offer could raise more funds • More complex nature • In many cases, CBs may not offer the promised broadening of the investor base since conversion may simply end at selling the resulting shares back to the dominant investor base (e.g., in domestic market) • The risk of redemption • Higher coupon payment than the respective dividend level • In cases of IPOs share issue is more appropriate

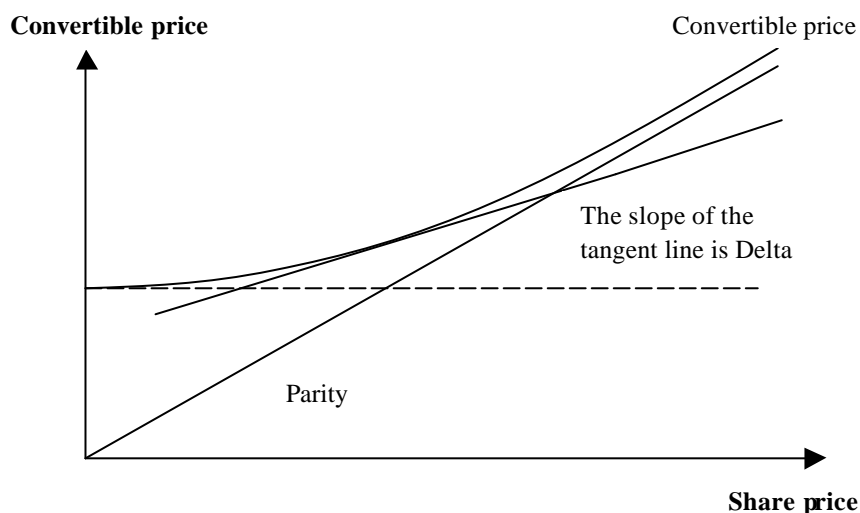
Table A2: Convertible Issue vs. Bond with Equity Warrants

Advantages	Disadvantages
<ul style="list-style-type: none"> • Warrants have less flexibility with regard to influencing the investor to exercise them into shares • The specialist nature of warrants make them unlikely to raise as much funds as CBs can • Also bonds are usually held until final maturity and their illiquidity discourages non-specialist investors, plus, maturity of CBs might be considerably longer than for bonds with warrants • CBs have a number of safety features that allow wider the investor base (e.g., interest payments, principal at maturity date) 	<ul style="list-style-type: none"> • As a method of raising equity, bond with warrant package offers greater certainty with regard to timing • Long maturities might have some risks, e.g., in terms of decreasing interest rates • Warrant issues are better to attract a special investor group

Appendix IV: Description of Hedge Funds Arbitrage Strategies²¹

Convertibles, like other derivative instruments, are good arbitrage investing, as two assets, the CB and the underlying share, trade with predictable correlations, at least theoretically. A typical investment position is to buy a convertible and short the common stock of the company trying to isolate undervalued equity options.

First, to understand the strategies utilized by hedge funds, it is important to understand such terms as delta and gamma. By utilizing delta value (the bond's price sensitivity to movements in the underlying share price), hedge funds can determine how many shares must be shorted to isolate the arbitrage portfolio from small movements in the underlying stock. However, convertible delta does not remain constant and changes together with convertibles profile, see the graph below.



The rate of change in delta, when stock price changes, is known as gamma. Thus, for large moves in stock value convertibles are affected by gamma.

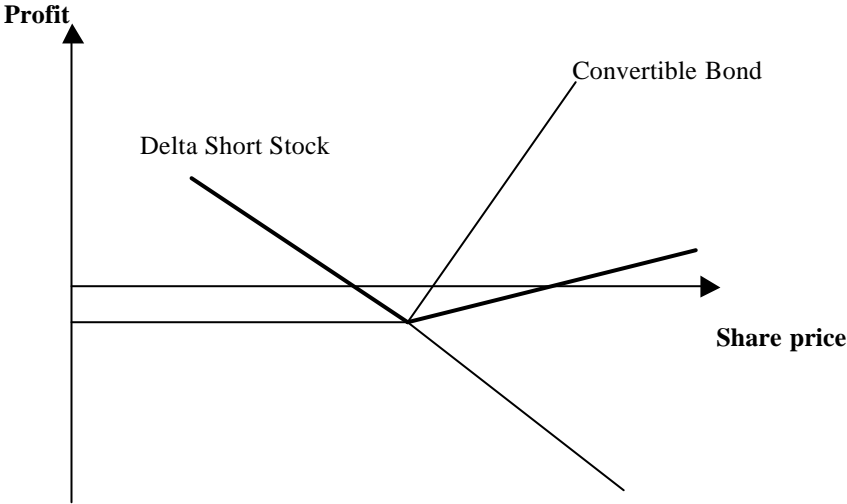
In order to make money with hedged portfolios, it is necessary to “capture” stock volatility by trading the portfolio. “Gamma trading profits” are made when hedge funds are selling stock high and buying it back low. High gamma is good because large changes in delta even for small moves in the stock price give the arbitrageur the possibility to re-hedge more often and more shares, thus, potentially giving the arbitrageur more opportunities to capture any profits.

If the arbitrageur captures exactly the volatility implied by the convertible, the return will be exactly risk free rate. However, to make profits, hedge funds are hoping for three possible scenarios:

- They will capture more than the implied volatility over a longer time period, since convertibles are issued and often trade below the level of volatility that hedge funds can capture by gamma trading.
- They will capture a short-term volatility event if they expect one.
- They will capture “Vega richening” of the convertible (where Vega is the sensitivity of the convertible price to changes in implied volatility). Assuming that bonds that have been artificially depressed usually go back to their “natural” level, a potential for arbitrage exists. The richening or cheapening of CBs with changes in underlying stock volatility is estimated by Vega.

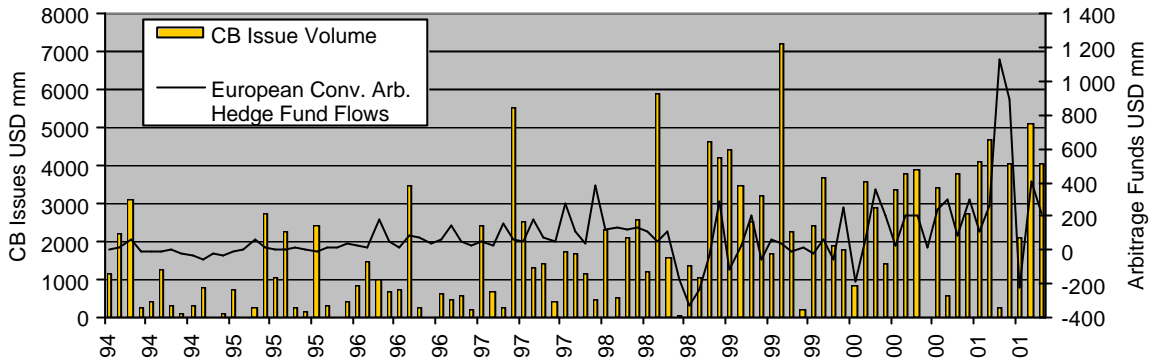
²¹ Based on materials from several investment banks convertibles research.

Thus, hedge funds have two possible schemes for involving in convertibles market. First, they profit immediately from creating a “risk-free” portfolio by buying CBs with lower implied volatility and second, they expect to profit from volatility of the underlying stock by buying a certain number of convertibles and shorting a delta amount of the underlying shares, thus, creating a position with payoff similar to “straddle”.



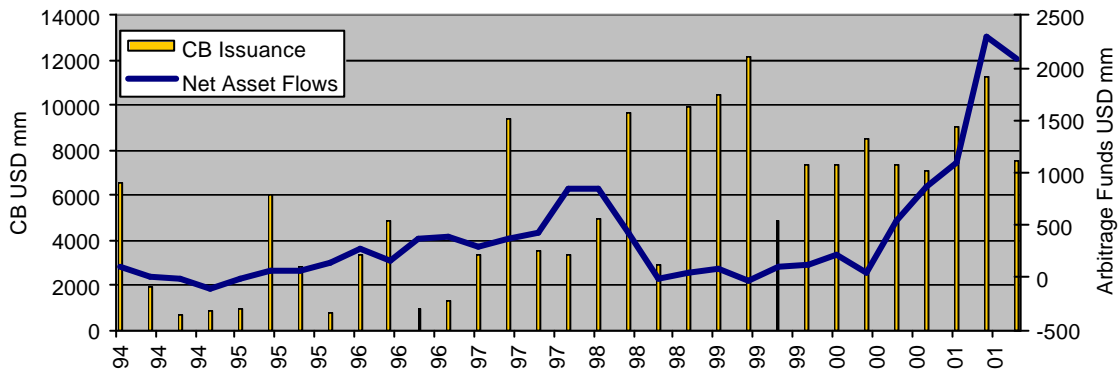
Appendix V: Charts for Regression Analysis

Figure A3: CB Issuance vs. Net Asset Flows in European Convertible Arbitrage Hedge Funds



Source: SSSB, CSFB

Figure A4: CB Issuance vs. Net Asset Flows in Global Convertible Arbitrage Hedge Funds, (Quarterly Data)

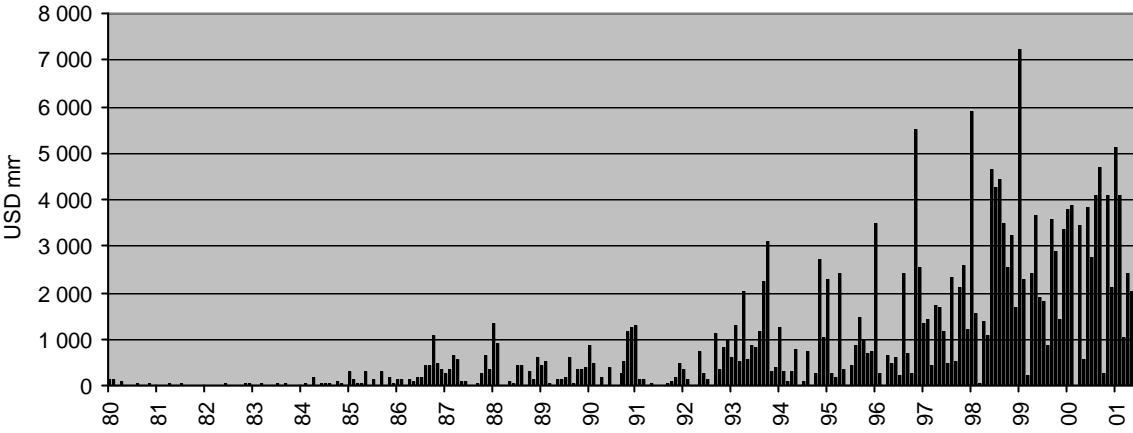


Note: Global convertible arbitrage funds are of interest as well because foreign investors domiciling in for example the US also are buying European CB issues.

Source: SSSB, Tremont Partners

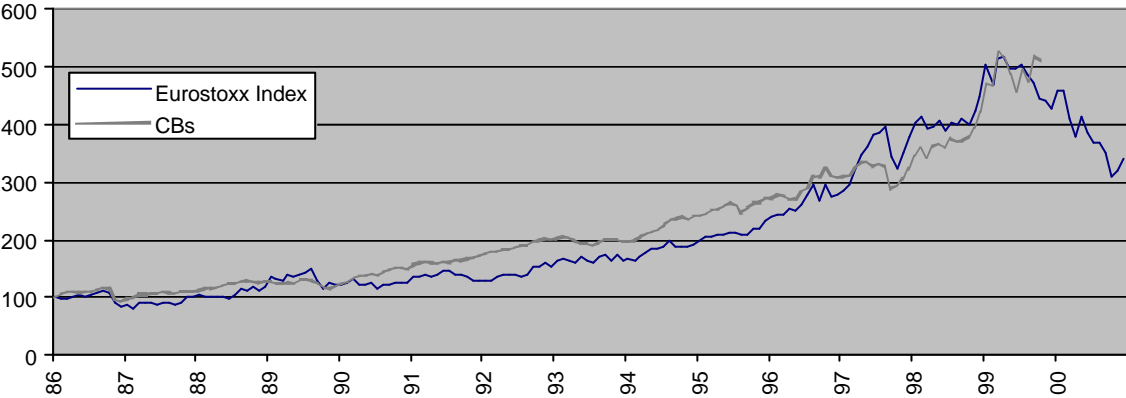
Appendix VI: Other Data

Figure A5: CB Issue Volumes 1980-2001



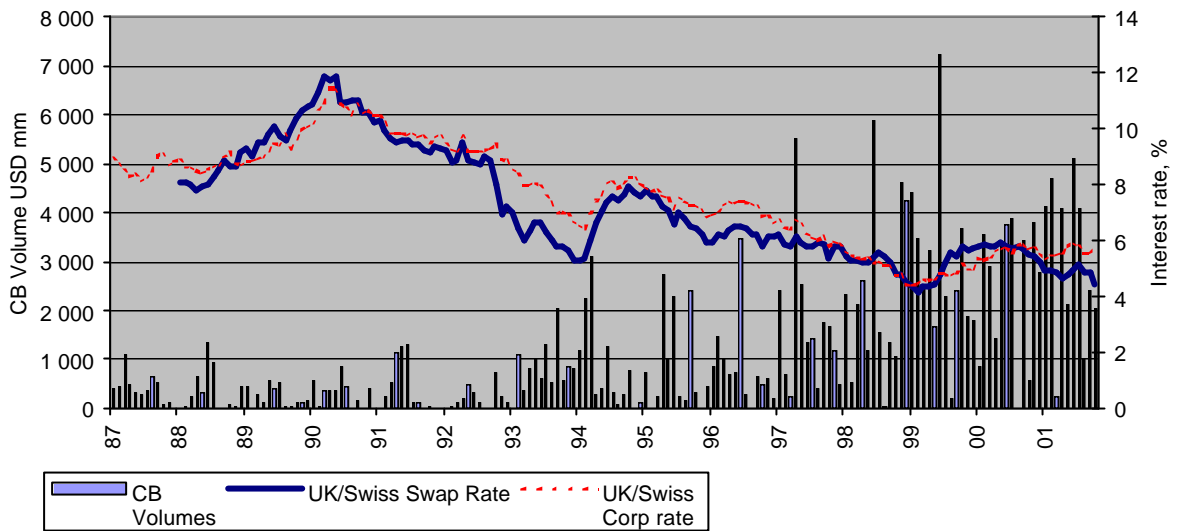
Source: SSSB

Figure A6: Convertible Bond Performance vs. EuroStoxx 50



Source: Datastream, Ibbotson

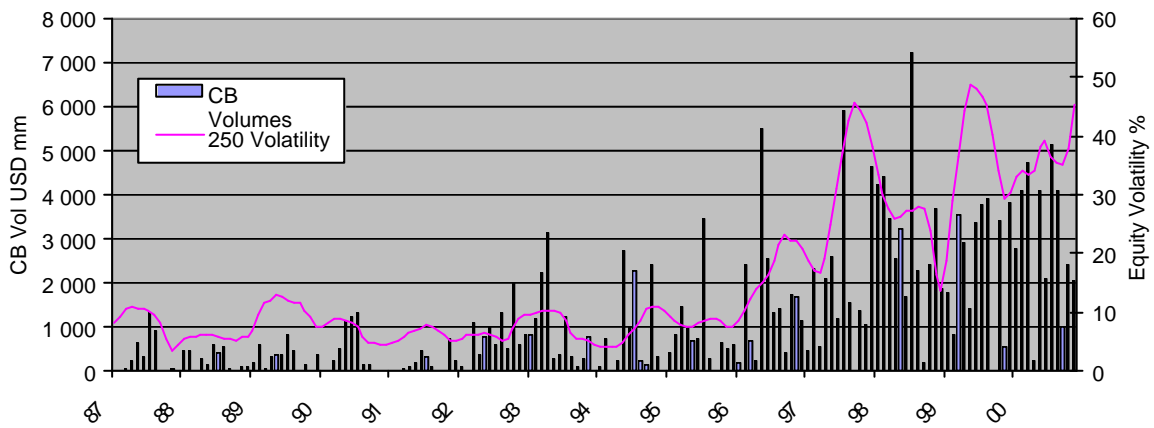
Figure A7: Swap rate, Corporate Bond Yield vs. CB Issue Volumes



Note: Interest rates are those of UK and Switzerland weighted according to representation of countries in outstanding CB issues as of November 2001

Source: Datastream, SSSB

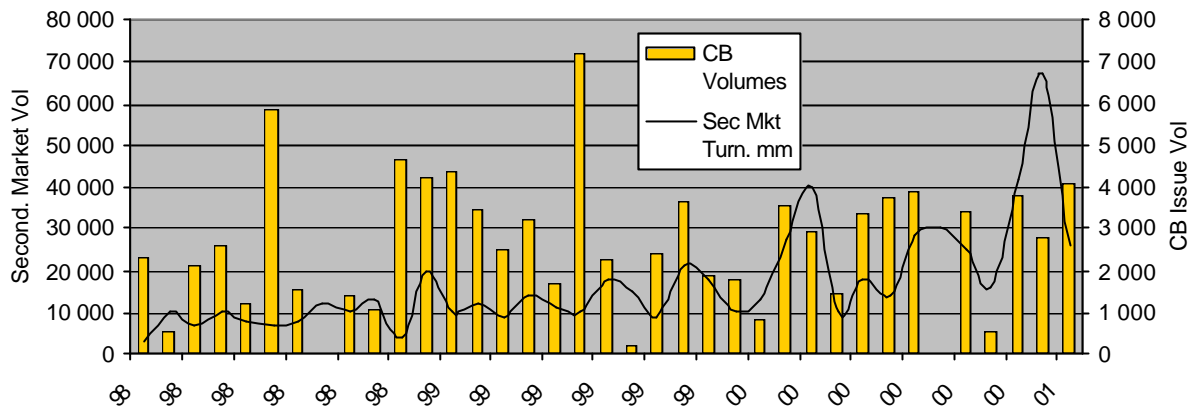
Figure A8: Equity Volatility vs. CB Issue Volumes



Note: Equity volatility is calculated based on Eurostoxx 50 Index

Source: Datastream, SSSB

Figure A9: CB Secondary Market Turnover vs. CB Issue Volumes



Source: UBS Asset Management, SSSB

Appendix VII: Statistical Tests

Unit Root and Cointegration

One of the assumptions in empirical work is that the underlying time series is stationary, i.e. its mean value and variance do not vary systematically over time. Second, non-stationary data can lead to spurious regression which is the case of very high R square that is due to both variables, dependent and explanatory, having strong sustained trends that coincide but in reality there is no relationship. DF test was carried out to detect unit root and cointegration test of Engle-Granger was performed to determine if combination of both variables is stationary (cointegration) in which case similar trend in variables is not a statistical problem. Below is a table of test results showing there are now signs of possibility of spurious regression, although equity volatility was found to be non-stationary.

Variable	Hypothesis of Non-Stationarity: <i>t</i> value	Signif. Level	Hypothesis of no Cointegration: <i>t</i> value	Signif. Level
Volatility 250 days (lag 1 month)	-0,023	0,982	-12,009*	0,000
M&A Volume	-4,660*	0,000	n.a.	n.a.
Capital Flow in Hedge Funds	-6,548*	0,000	n.a.	n.a.
Swap Rate (lag 1 month)	-0,457	0,649	-11,308*	0,000
Equity 3 Month Return	-5,826*	0,000	n.a.	n.a.

* Rejected at 1% level of significance

Note: Critical values for test: Reject hypothesis if *t* value exceeds -3.5073 at 1% level of significance

N.A. implies cointegration test is not necessary as data are stationary

Multicollinearity

Another statistical problem is multicollinearity, correlation between explanatory variables, in which case it is hard to get coefficient estimates with small standard error. Larger standard errors may lead to larger confidence intervals and that in turn can lead to same data being compatible with a diverse set of hypotheses, hence higher probability of accepting a false hypothesis (type II error). Below are results of tests: Three tests are performed: VIF, Condition Index and Correlation Table.

Since VIF does not exceed value of 10 that is a rule of thumb for threshold of multicollinearity, variables of the model above do not have this problem.

Next method is that of Condition Index.

A rule of thumb is that if Condition Index is between 10 and 30 there is moderate to strong multicollinearity and it is severe exceeding 30. Since observed measure is 13,6 that is close to 10 multicollinearity is believed to very moderate. Also as a problem²².

Variable	VIF value
Swap Rate (lag 1 month)	1,637
Volatility 250 days (lag 1 month)	2,562
Equity 3 Month Return	1,060
Outliers	1,034
Euro	2,183

Maximum Eigenvalue	3,148
Minimum Eigenvalue	0,02
Condition Index	13,6

only severe multicollinearity can be considered

²² Here and other statistical assumptions regarding test have been based on source of Damodar N.Gujarati, Basic Econometric, 3d Edition. McGraw-Hill, 1995

Third approach is correlations between explanatory variables:

	CB Volume	Volatility	Swap Rate	M&A Volume	CF in Hedge Funds	Equity Return 3mo
<i>CB Volume</i>		0,611*	-0,578*	0,267**	0,176***	0,052
<i>Volatility</i>			-0,607*	0,490*	0,232**	-0,095
<i>Swap Rate</i>				-0,367*	-0,263**	0,012
<i>M&A Volume</i>					-0,002	0,144
<i>CF in Hedge Funds</i>						-0,169

* Correlation is significant at the 0.01 level; ** Correlation is significant at the 0.05 level; *** Correlation is significant at the 0.1 level (2-tailed)

According to the rule of thumb that correlation coefficient above 80% is a sign of multicollinearity none of the variables meet this rule and thus there is no sign of this problem.

Autocorrelation

One of the assumptions underlying the method of least squares in regressions is no presence of autocorrelation. If there is one OLS estimators are no longer efficient. As a result the usual t and F tests of significance cannot legitimately applied. Durbin-Watson d Test is used as autocorrelation detection measure. Durbin Watson figure is 2,189, and having 163 observations and 5 explanatory variables.

	du	Actual d	$4-du$
Significance points at 1% level of sign.	1,701	2,189	2,299

According to data observed in the table Durbin Watson d statistic lies in the area of not rejecting the Hypothesis of no autocorrelation. Thus there is no autocorrelation.

Heteroscedasticity

Next crucial assumption of least squares method is that disturbances (residuals) all have the same variance, i.e. they are homoscedastic. In case of heteroscedasticity i.e. when residuals variance is not constant, t and F tests can be highly misleading leading to erroneous conclusions. White's general heteroscedasticity test was carried out. Resulting auxiliary regression R square is 0,112, that multiplied by number of observations, 164, becomes 18,38 and is lower than respective 5% critical value of Chi Square of 23,59, thus suggesting hypothesis of no heteroscedasticity is accepted.