The Consequences of Issuing Convertible Bonds:

Dilution and/or Financial Restructuring?[1]

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Abstract

Most convertible bond (CB) issues are historically intended to be converted to shares sooner or later. The announcement of a CB issue will bring about a future dilution of the firm's capital, and will normally be followed by a drop in share price. But a CB issue, by itself, creates future value for the shareholders if it enables the firm to make profitable investments. It can also constitute a positive signal regarding the restructuring of the firm's financial liabilities and its attempt to optimize its financial structure. These positive effects, if they exist, only become perceptible gradually after the issue and these cannot be addressed by a simple short-term event analysis of a CB issue announcement. In this paper, we test the significance of the dilution effect, coupled with a possible value creation effect, on the French stock market. We introduce a comparison between dilutive convertibles and non-dilutive exchangeable bonds. By integrating different corrections and by selecting a window of analysis over a longer term period after the announcement of the issue, we show that the negative cumulative average abnormal returns, generally observed in previous studies, become non-significant. This absence of global incidence is consistent with large differences in individual behavior by issuers of CBs, and leads us to take into account their effective intentions and strategic choices linked to the issue of a CB. Two goals, often described as "investment financing" or "financial restructuring", may exist when issuing and may appear in the firm's financial communication.

Introduction

Since the end of the 1960s, convertible bonds (CBs) have had great success, and today represent a significant part of stock exchange capitalization. However, the issuing of convertible bonds has often occurred in successive waves. At certain times, when the underlying share prices have risen, many CB issues have appeared. At other times, the market has been relatively inactive. Such was the case in 2001-2002 when the Internet stock market bubble burst, bringing about a general stock market correction. Alternatively, a situation of rising stock prices or more favorable forecasts may bring about a renewed interest in CB issues. This happened in 2003-4 with a significant surge of CB issues on the French and European stock exchanges. These timing and synchronic regularities explain the timing of CB issues by taking profit from high stock prices. Then, issues would give a short term signal of overvaluation.

Since the announcement of a CB issue will also bring a signal about a future dilution of the firm's capital, would the shareholders not be wary of the news of a CB issue? The share price will subsequently normally drop following the announcement of such an issue. Anticipating this drop could mean that it would be preferable to avoid purchasing a CB at its time of issue and instead to purchase the CB (or the shares) on the secondary market, after the expected dilution has taken effect.

Our focus is the need to investigate further into the motivation of the issuing firm and into the timing of an issue. Most CB issues have historically been intended to be converted to shares sooner or later. CBs are considered as deferred stocks considering the medium-term debt leverage ratio. Investors, through the issuing firm, generally gamble on a future rise in the

share price. A CB issue, by itself, creates future value for the shareholders if it enables the firm to make other profitable investments. It can also be a positive signal regarding the restructuring of the firm's financial liabilities and the optimization of its debt structure.

We can imagine three simple scenarios regarding a CB issue. In the first scenario, the CB issue is used only to reimburse an existing debt. In the case of a conversion, it will improve the debt ratio of the firm and keep its assets unchanged. Such a CB issue is then purely dilutive because the prospect of an increase in the firm's value is still the same but is shared between more stocks. The probability of conversion is then lowered due to dilution. The decrease in debt leverage is important because the transfer of funds to equity, in the case of conversion, plays heavily on the debt ratio[2]. Improvement of the financial structure creates some value for shareholders with a lower expected rate of return on equity, which may totally or partly balance the mechanical dilution effect. In the second scenario, the CB proceeds are invested and serve to enlarge the firm's assets and expected economic profits. Dilution is only immediate and appears more or less counterbalanced by profits in equity[3]. It depends on the unknown profitability of the new investments. Considered from a medium-term perspective after conversion, the leverage ratio is lowered and thus creates value for all shareholders. Finally, in the third scenario, the leverage ratio remains unchanged, as CBs are assimilated into capital equity and will induce new debts. The amount invested is then increased by the leverage factor and, if investments are profitable, the dilution effect may be null and a net creation of value may follow a CB issue[4]. In the no dilution scenarios, the expected economic return of new investments is the important figure. So, there may exist a balancing mechanism between dilution, on the one hand, and financial decisions linked with a CB issue in terms of both investment and/or debt restructuring, on the other hand. Outside shareholders are in a situation of asymmetry of information regarding which scenario is at stake. They can only

guess at the existence of a dilution effect and speculate as to the investment/financing policy behind the CB issue.

If CB effects are positive on the whole and take place in a context of asymmetry of information for the outside shareholders, they only become perceptible gradually as the firm evolves. What will the firm do with the funds received? Will the leverage ratio be lowered? These questions cannot be answered by a simple short-term impact analysis of a CB issue announcement. Rather than analyze the event over the near-term few days, it seems preferable to analyze the consequences over a longer period, say six months. This larger window allows for a passing beyond the strict and immediate mechanical dilution impact of a CB issue.

The main objective of this article is to introduce relevant correction mechanisms to go beyond the short term simple hypothesis of immediate signaling effect. We test the significance of a dilution effect coupled with a possible value creation effect on the French stock market. We also analyze how investors in the underlying stock market react to the effect of a CB issue, and whether the different aspects associated with the operation are taken into account. Finally, we provide a comparison between dilutive convertibles and non-dilutive exchangeable bonds (EBs).

The paper is structured as follows. Section 1 offers a synthesis of the literature covering the theoretical justifications of CB issues and the main empirical reactions of the underlying stock markets to this type of issue. Section 2 reviews the different steps and the results of an analysis of the French stock market reaction to CB and EB issues. Section 3 contains our conclusions.

1. CB Issues and Underlying Stock Market Reactions: Theoretical Justifications and Empirical Evidence

A. The Logic Behind a CB Issue

For the firm's management, as confirmed by the studies of Hoffmeister (1977) and Billingsley and Smith (1996), the main justification for a CB issue is to raise new equity capital. Nercy (1997) and Kenigswald (2003) also state that this motivation is stronger during an upward market: CBs issued during these periods benefit from higher price levels. During those periods when the stock market is moving downwards, the desire to defer a CB issue is at odds with the desire to lighten the debt load. This latter desire has two aspects. The first is to increase debt at a lower cost compared to the current cost of a standard bond. The second, compatible with the first, is to improve the debt structure because analysts are known to consider a CB issue to be a quasi-new form of capital in their assessment of the firm's financial structure. Bancel and Mittoo (2003) conducted a study among financial officers to determine the reasons why European firms undertake a CB issue. A very large majority of chief finance officers (CFOs) (86%) were shown to consider CBs to be a deferred issue of shares involving some dilution. At the same time, looking at the near future, 50% of these managers considered that a CB issue avoids short-term dilution for the shareholders, and only 23% of them considered that a CB issue improves the firm's debt ratio.

The financial literature identifies three major justifications for a CB issue: (i) reduction of agency costs, (ii) reduction of asymmetric costs of information, (iii) solving a problem of sequential financing.

(i) Firstly, consideration of agency costs appears as soon as one questions the usual framework of Modigliani and Miller (1958, 1963) (i.e. identical information and no conflict of interest). Here, we should make a distinction between the agency costs generated by the conflict of interest between shareholders and creditors and those generated by the conflict of interest between shareholders and management.

Following Galai and Masulis (1976), who emphasized the divergent interests of shareholders and creditors in the case of a variation of the firm's risk, Green (1984) highlighted the advantage of a CB issue over a standard loan. The conversion rights of CB holders enable them to become shareholders, if this is in their interest. Thus, a CB issue discourages excessive shareholder remuneration. In such a situation, CB holders may exercise their conversion rights, which would result in diluting the amount distributed to the shareholders. In addition, CB holders are better protected against the effects of any attempt to increase the firm's risk. The costs associated with the remuneration of a standard bond are higher in proportion to the importance of the market's perception of the firm's risk. Conversely, as a CB is equivalent to a debt combined with a share purchase option, if the market perceives an increase in the firm's risk, the reduction in the debt value is partly compensated for by the increase in the value of the call option due to higher volatility.

In the framework of asymmetry of information, Jensen and Meckling (1976) clearly showed the importance for shareholders of establishing a "costly" surveillance procedure to ensure that management really acts in their interest. Thus, increasing debt allows the firm not only to reduce "free cash flow", which might attract opportunist managers, but also forces the latter to be rigorous in assuming the loan's repayments[5]. In this context, a CB issue again appears to

be another way to reduce agency costs. The CB contributes to the reducing of the "free cash flow" as a standard debt. It also requires management to increase the share value for a limited period, thus inciting conversion by the debt holders so as to avoid reimbursing them at the term of the issue.

(ii) Secondly, concerning asymmetries of information, "signaling" theory (as introduced by Ross, 1977, or Leland and Pyle, 1977) is based on the idea that some choices made by management can be interpreted as a signal for the firm's outside investors. For example, a higher level of debt can represent a signal of management confidence in the firm's results and good health. In the context of asymmetry of information between management and shareholders, Myers and Majluf (1984) develop a hierarchical theory of the firm's financing choices ("pecking order"): first retained earnings, followed by the issue of standard debt, then risky debt and, lastly, the issue of equity capital. Management should privilege this sequence so as to minimize the transfer of value during these issues from the older shareholders toward the new investors. The firm's announcement of an equity issue would cause a negative market reaction, which is linked with an overvaluation of the stock on the market. A CB issue is considered as deferred capital and is then associated with a negative signal of overvaluation. Negative announcement effects, as identified on the stock market at the issue date, have largely been interpreted as consistent with an overvaluation explanation.

However, a CB issue can also result in the reduction of certain costs. Thus, Stein (1992) with his "backdoor equity" theory, presents the CB issue as a technique to raise indirectly new capital when the asymmetry of information is such that a direct share issue is unfavorable and the costs of failure are high. The underlying idea is relatively simple: the lower interest rate for CBs compared to the standard debt issue permits management (who anticipate a rise in the

share price) to reduce the cost of debt and, subsequently, to raise new capital at a more attractive price. With asymmetries of information about the firm's risk level, particularly between management and investors, Brennan and Schwartz (1988) indicate that the divergence can be reduced by a CB issue. When an increase in the firm's risk is anticipated by the market, CB holders should not require a higher remuneration of the debt. In fact, on the one hand, they will benefit from this eventual risk increase via the call option value incorporated into a CB. On the other hand, the existence of this option means that management is less motivated to increase the risk, as mentioned above with the hypothesis of reduction of agency costs (Green, 1984).

(iii) Finally, Mayers (1998) considers the solution that a CB issue can bring to the problem of sequential financing. His analysis is similar to Schultz's (1993), who justifies the consecutive issues of subscription warrants and new shares, or to that of Sahlman (1990), regarding the opportunity for the "venture capitalist" to subscribe to shares in a sequential manner. Mayers gives the example of a project A, which is ex ante profitable because of a growth option or a future investment in a later project B, whose profitability and eventual realization would not be known until the end of project A. The problem consists of financing the two projects by minimizing the issue costs as well as those associated with an over-investment in a situation of a useless "free cash flow". The conversion of a CB (with a maturity equal to that of project A) is interesting only if project B is realized. Such a CB issue is in fact superior to the strategy of issuing standard debt at the start of each project with maturity equal to the respective terms of the two projects (meaning two costly issues if the investment option is realized).

If project B is not realized due to market conditions, the investment option associated with project A becomes valueless, and thus non-profitable. The price of the firm's shares remains below the limit necessary for the CB conversion. At this point, the holders opt for reimbursement at face value, while being careful to avoid the risk of over-investment. If project B is realized, then project A becomes profitable due to the exercise of the investment option. The share price will then reach the limit for forcing the CB conversion, and the firm will keep the necessary cash to finance project B. In summary, the issue of a CB, by a careful choice of conversion opportunity, optimizes the sequential financing of profitable investment options.

B. Market Reactions to the Announcement of CB Issues

In the light of the above theoretical justifications for CB issues, we will now focus on the main results of empirical studies testing the reactions of some stock markets (specifically, the United States, Japan, the Netherlands, Great Britain, and France) to the announcement of CB issues.

In the same way as studies have measured the stock market effects of the dilutive/overvaluation signal of new share issues (for example, Asquith and Mullins, 1986, highlighting a negative reaction of -3% between the day prior to the announcement and the day of the announcement), many empirical studies have also been devoted to CB issues. In fact, this hybrid form of financing often causes a negative reaction in the underlying share market, but one that is less significant than in the case of a standard share issue.

Thus, even though these empirical studies differ in time periods, choice of announcement date, size of the CB issue, chosen event methodology, window around the announcement date, and placement techniques for each market, significant negative statistical reactions are observed in most studies. Most of the previous results are obtained from the calculation of abnormal short-term returns (a few days) and most often from the announcement date of a CB issue (cf. Table 1).

Country	Author(s)	Market reaction to announcement
U.S.	Dann and Mikkelson (1984) Eckbo (1986) Smith (1986) Hansen and Crutchley (1990) Kim and Stulz (1992) Lee and Loughran (1998)	-2.31% -1.90% -2.07% -1.45% -1.66% and -1.07% -1.30%
Japan	Kang, Kim, Park and Stulz (1995) Kang and Stulz (1996) Christensen, Faria, Kwok and Bremer (1996) Mollemans (2002)	0.50% 0.83% 0.18% -4.50%
Netherlands	De Roon and Veld (1998)[6]	0.23%
U.K.	Abhyankar and Dunning (1999)	-1.21%
France[7]	Bah (1997) Hachette (1991, 1994) Burlacu (2000) Ducassy (2003)	-0.44% -0.56% -0.23% -0.88%

Table 1 - Empirical studies on convertible bond issue announcements

In addition to the above surprising and contradictory results from the Netherlands and Japan, the market's negative reaction to CB issues appears more closely related to a reaction caused by share issues than one caused by standard bond issues. This underperformance remains significant most of the time when considering long-run analysis of stock returns following CB issues. It has been highlighted in Spiess and Affleck-Graves (1999) for the U.S.; Kang, Kim and Stulz (1999), and Cheng, Visaltanachoti and Kesayan (2005) for Japan; and Abhyankar

and Ho (2006) for the U.K. When significant, underperformances (calculated on a yearly basis) range from -3 to -8% (for a summary of main results in recent studies using American and Japanese data, see Abhyankar and Ho (2006), Table 1 pp. 100). Even if this tends to confirm the motivation of "raising deferred capital" inherent in most CB issues, Ho and Abhyankar (2006) point out that the significance of the negative abnormal performance decreases or vanishes when using a conditional asset pricing model rather than a classical buy-and-hold abnormal performance returns analysis. Thus, estimates of long-term abnormal returns seem to be very sensitive to the methodology selected to adjust for risk and are not necessarily a stylized feature of the data. At the same time, frequent use of early reimbursement clauses (or call provisions) underlines the importance of "raising deferred capital" for the firm's management. In this context, Davidson, Glascock and Schwarz (1995) observe that, generally, the conversion prices used in the American convertibles market are not high and that the expected conversion period is short, less than 18 months.

At first glance, this negative market reaction conforms to the hypothesis of asymmetry of information, as well as to the Myers and Majluf (1984) "pecking order theory" and to the Stein (1992) theory of "backdoor equity". However, several empirical studies lead to more discriminating results from samples considering any type of issue (stocks, CBs, etc.) or from samples identifying only CBs. These studies include those carried out by Smith (1986), Kuhlman and Radcliffe (1992), Brennan and Her (1993), Davidson, Glascock and Schwarz (1995), Jung, Kim and Stulz (1996) and Lewis, Rogalski and Seward (1999) for the American market and by Burlacu (2000) and Ducassy (2003) for the French market. First, the market reactions for all issues (shares, CBs and standard debt) confirm, in particular, the "pecking order theory". Second, specific reactions to CB issues are all the more negative when the "conversion to shares" component is strong in the market. With a sample that differentiates

standard CB issues from those of OCEANE bonds, Ducassy (2003) observes that the French market's negative reaction on the day of issue for OCEANEs (i.e. bonds when at exercising the conversion option, borrowers can either issue new shares or buy existing shares in the market became positive after a few days[8]. It highlights the fact that the dilution effect appears to be more important than the standard overvaluation explanation.

The market's negative reaction to a CB issue also conforms to the agency theory stemming notably from Green (1984), concerning the conflict between shareholders and bondholders. In fact, the dilution effect linked to the CB holders' exercise of the conversion option can explain this reaction. By contrast, it is much more difficult to justify the negative market reaction to a CB issue referring to the logic of sequential financing or to the reduction of agency costs generated by the conflict of interest between management and shareholders. However, the evidence that the negative reaction to CB issues is generally lower than the one observed with the issue of shares can also be seen as a positive perception by shareholders of the disciplinary effect of the debt component of CBs (Jensen and Meckling, 1976).

In parallel with the generally negative market reaction to CB issues, we can also highlight other results of empirical studies to differentiate this reaction according to various specific criteria. Following Eckbo (1986), and Mehta and Kahn (1995) for the American market, Ducassy (2003) points out that the French market reaction depends on the use of funds received from the CB issue. It is very negative where future investments are announced, but it becomes non-significant where it is a matter of financial restructuring (lowering the debt ratio). This suggests that the use of CBs to raise capital equity is a favorable signal for the market (i.e., management expects a quick conversion following a forecasted rise in the share value).

The firm's size does not appear to be a significant factor in the reaction to a CB issue (see, in particular, Lewis, Rogalski and Seward (1999) for the American market, Abhyankar and Dunning (1999) for the U.K. market, and Ducassy (2003) for the French market). The firm's risk, whether it is measured by the beta (Mehta and Kahn, 1995) or by the volatility of return (Lewis et al., 1999), results in a reaction that is respectively more or less favorable for the American market and non-significant for the French market (Ducassy, 2003). Just as Lewis et al. (1999) observe for the American market, Ducassy (2003) observes that a high level of debt in the year preceding the issue has a positive effect on the size of the French market reaction. This result conforms to Stein's (1992) theoretical contribution, which shows that an indebted firm has interest in a CB issue only if its management is optimistic about the evolution of its share value, and the subsequent reduction in debt after conversion. Finally, by verifying the theoretical contribution of Lucas and McDonald (1990), who state that the market reaction to an issue is more unfavorable when the prior rise in the share price is significant, Ducassy (2003) observes that CBs issued during a rising market result in more severe negative reactions in the French market. In that context investors are more sensitive to a fear of overvaluation of stocks.

2. The French Market Reaction to the Issue of Convertible and Exchangeable Bonds

In the light of previous studies, our empirical study intends to focus more on the motivations and the consequences of convertible and exchangeable bond issues. In particular, its aim is to analyze the French stock market reaction to the issue of these types of financial instrument. Previous studies have usually focused on events in the short-term, before and after the issue,

and have often identified abnormally negative results. However, by taking into account possible corrections within a larger window of investigation around the issue date, we can expect to capture the presence of multiple effects, sometimes positive but often negative (dilution, overvaluation signaling, etc.), which are not foreseen at the time of the issue. It is therefore important to determine which of the underlying effects is dominant. This last point underlines all the richness and complexity of this problematic question, and also leads to implications concerning portfolio management.

A. Sample and Methodology

A sample of 59 CBs issued on the French market between 1996 and 2003 were studied. They were selected from Exane's convertible database, each with a minimum outstanding amount of 100 million euros to avoid liquidity problems. Two sub-samples were created by separating convertible bonds (CBs) from exchangeable bonds (EBs). The first are bonds that allow conversion into shares of the issuing firm itself according to a contractual conversion ratio. The 43 CB issues entail a potential effect of capital dilution. In order better to analyze dilution, 16 exchangeable bonds (EBs) were considered. These are bonds that are issued by a firm and that can be converted into shares of another firm. The latter is usually linked to the former, either within a group (parent firm, associated firm, affiliate, etc.), or outside the group[9]. Under such circumstances, the issue is "backed" by the existence of a controlling block of shares. Furthermore, there is no dilution effect because there is no issue of new shares. EB issues, although there are only a few of them in the sample, can be used as a benchmark to test the importance of the dilution effect for CB issues.

The characteristics of the sample are shown in Table 2. The average outstanding value is high and amounts to 739 million euros. Also shown are the characteristics of the firms from which stocks can be obtained (i.e., the issuing firms for CBs and "target" firms for EBs). These show comparatively high book leverage ratios (on average, 1.57). However, the debt leverage calculated on the market equity value at issue is of a more standard value, with an average of 0.82. The issue of CBs/EBs results in a potential strengthening of the equity capital and, therefore, involves a subsequent reduction in the debt leverage. It decreases by -0.49 for the book debt ratio and by -0.10 for the market value-based debt ratio[10].

Insert Table 2

Our sample shows that, through an EB issue, a controlling investor will place an average 5% capital on the market. For CBs, the mechanical dilution following the issue and the creation of new shares represents an average 10% of the capital, resulting in an average dilution ratio of 0.91.

The daily share values, as posted by Bloomberg, were recorded around the announcement date for the CB issue[11]. Eliminating holidays, we took the closing prices of the 164 preceding days (approximately seven calendar months) before the CB issue. We then followed the share prices for six months after the issue. We considered a total period [d-163, d+122] (d being the date of the announcement of the issue) for the stock returns.

We used an estimation window L1 of 146 daily returns for the market model (i.e., d-163 to d-18, approximately six and a half months). The daily returns were calculated as the differences in the price logarithms. We did not select too long an estimation window L1 in order to avoid

the problem of the variability of beta coefficients in the market model over a longer period (Simon, 1986). Different lengths of estimation period were also tested besides the L1 window of 146 days: a longer period of 219 days (10 months) and a shorter period of 73 days (3 months). Too long a period can yield out-of-line beta parameters because the firm's strategy and risk can change over time. Too short a window before the event can lead to an insufficient number of observations and low quality estimates. The problem of the stability of beta estimates is addressed by considering the cumulative average abnormal returns according to the three different estimation windows. These are all very similar. Although we favored the L1 window of 146 days, the results from the longer and the shorter windows will also be presented below.

By choosing a six-and-a-half month period to estimate the beta coefficients, this study differed from others that were based on shorter periods and that had a lower number of estimate points. It was deemed preferable to interrupt the period of estimate 17 days before the official announcement of the issue, so as to counterbalance a minimum period of three weeks before the opening of the issue. Organizing a large issue of CBs is somewhat long and complex. There is a risk that, in the final days before the issue becomes public, the financial press or analysts will learn of it. We estimated the market model parameters as:

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{Mt} + \varepsilon_{it} \qquad \forall t = d-163,\ldots,d-18 \qquad (1)$$

The CAC 40 market index[12] was used, and the market model estimated for the period L1 was then used to generate the abnormal daily returns over test period L2. The six months for test period L2 is similar to the one of L1 and it enabled us to measure the consequences over a longer horizon. The idea was to integrate the possible anticipation by the market regarding

changes in the firm's behavior. For example, we took into account the forecast of new investments that may result from the use of the funds raised by the CB issue. Shorter-term windows of a few days after the issue cannot take into account a firm's future financing or investment decisions. A medium term abnormal performance analysis was performed.

Long-term analysis of abnormal performances was questioned by Fama (1998) because using extrapolated values to estimate expected returns will lead to a poor description of the patterns of average returns. Risk premiums can change and statistical inference can be biased over a long-term horizon of three to five years after the event. This problem can be handled either by using a long-term comparison with a paired sample of similar stocks and calculating buy-and-hold abnormal returns, or by using an asset-pricing model to estimate expected returns. Long-term horizons were specifically developed to analyze the consequences of seasoned equity offerings (SEOs). They have previously been used on U.S. data, for example, by Eckbo et al. (2000) and Jegadeesh (2000), and on U.K. data by Levis (1995) and Ho (2004). Long-term horizons are also necessary to see the consequences of mergers or acquisitions on performance. Agrawal et al. (1992) considered a time horizon of five years after the public offering. Gregory (1997) used a period of two years on U.K. market data, and Pecherot-Petit (2005) considered a period of three years on French data. Our medium-term horizon of six months is far beyond the long horizons identified in the literature. In particular, we consider that the standard deviation of residuals from the estimated market model window remains the same over the subsequent window L2. Using that time period, we calculated the abnormal returns in the usual manner:

$$AR_{it} = R_{it} - \left(\hat{\alpha}_i + \hat{\beta}_i R_{Mt}\right) \qquad \forall t \; d-17 \le t \le d+122$$

The average abnormal return, AAR, on the number N of considered events is

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \quad \forall t \; d-17 \le t \le d+122 \qquad (2)$$

We calculate the cumulative average abnormal returns (CAARs) from the lower bound of L2.

$$CAAR(t_1,t) = \sum_{j=t1}^{t} AAR_l \qquad \text{for d-17}\le\text{t}\le\text{d+122} \qquad (3)$$

The variance of cumulative returns is obtained[13]:

$$Var\left(CAAR(t_1,t)\right) = \frac{1}{N^2}(t-t_1+1)\sum_i \sigma_i^2 \qquad (4)$$

σ_i: estimate of the standard deviation of stock *i* returns, which results from the market model (1) on the L1 period.

In order to test the hypothesis of null cumulated abnormal returns, we calculated the following statistic, which asymptotically follows a normal distribution:

$$\frac{CARR(t_1,t)}{\left(Var\left(CAAR(t_1,t)\right)\right)^{1/2}} \sim N(0,1) \qquad (5)$$

For smaller samples, the previous statistic is a t-Student of N-1 degrees of freedom. The estimation of abnormal returns based on the market model is exposed to possible errors of estimation resulting from using an incorrect model. We also used the constant mean-return model to get abnormal returns over the L2 window. That model simply states that the returns

are constant, so equation (1) becomes: $R_{it} = \mu_i + \varepsilon_{it}$. The abnormal returns over the L2 window are estimated using $\hat{\mu}_i$. The CAAR tests are the same as the previous ones. Brown et al. (1985) highlights the fact that the results from the constant mean model are often similar to those arising from more sophisticated ones[14]. This complementary specification of normal returns would allow us to check the problem of specification of the normal returns model. We also crossed the previous parametric tests with a non-parametric statistic, as suggested by Campbell, Lo and McKinlay (1997)[15]:

$$\left[\frac{N^+}{N} - 0.5\right]\frac{N^{\frac{1}{2}}}{0.5} \sim N(0,1) \qquad (6)$$

N^+: number of case of positive abnormal returns

This statistic tests the hypothesis that the percentage of positive cumulated abnormal returns is 0.50 (assuming independent abnormal returns across stocks). A rejection of the null hypothesis of a 0.5 (or lower) percentage shows a positive impact of the issue on the abnormal returns. The sign test statistic is asymptotically normally distributed. The assumption of normality of the abnormal returns is important because the sign test is not adapted to an asymmetrical distribution of data. We checked the skewness and verified whether the series of abnormal returns over the L2 window followed a normal distribution. The Bera-Jarque test confirmed that the distribution of abnormal returns did not differ from normality (cf. Annex 1).

Finally, we checked the no clustering condition. The aggregation of variance above stocks using equation (4) assumes that there is no cross correlation between the abnormal returns of individual stocks. Such a situation can occur when the event windows of individual securities

overlap. We calculated the number of overlapping pairs of abnormal returns series. Considering the EB sample (16 stocks), there were 17 pairs of partially overlapping ARs compared to a total of 120 pairs (i.e., 14.6%). Looking at the CB sample (43 stocks), we obtained 117 pairs of partially overlapping data over a total number of 903 pairs of stocks (13.9%). Assuming that the overlapping pairs would overlap halfway through the L2 period, we have an average of only 7% of individual ARs showing overlap with another. The conclusion that can be drawn is that our data were not heavily exposed to a clustering problem[16].

B. Results

The cumulative average abnormal returns of shares for each type of bond (convertible and exchangeable) are presented respectively in Figure 1 and in Figure 2.

Insert Figure 1

The cumulative average abnormal returns are clearly negative. The stocks related to EBs show a 20% underperformance over a six-month period. The CBs show a similar profile and result in a 9.7% abnormal negative return[17]. Before the issue date, there is only a limited drop of -1.5 to -2% between d-6 and d-3[18]. This abnormal drop is not significantly negative in this very short window. This can probably be explained by the fact that the information is known in the market before the public announcement. Financial analysts know that the firm plans an issue and financial officers disseminate the information. The banks responsible for launching the issue contact partners to set up a syndicate. The delay in the issue and handling of the operation allows for information to circulate and for the market to adapt. The negative effects, possibly

linked with dilution or overvaluation signal, are taken into account as soon as the market becomes aware.

The date of the official announcement comes only at the end of this process. The initial drop in return is of short duration, since the abnormal returns become positive for EBs and increases from a relative minimum of -2% at [d-6] to -1% for CBs in the ten days following the issue. Examining the short-term window, we have no abnormal return for EBs, which rejects the overvaluation hypothesis because by definition dilution cannot be observed with theses issues. For CB issues, the negative short-term reaction is not significant. As a whole, dilution or overvaluation reaction following (or identified before) the announcement of an issue is rejected. Using comparison with the EBs sample, the average negative drop seems to rely largely on the dilution effect. The signaling overvaluation hypothesis is clearly not confirmed by the analysis of the short-term reaction of the market. The -1% abnormal return ten days after the issue is in line with previous studies in the French market. Looking ahead, both EBs and CBs become increasingly negative within 20 days (or one calendar month) after the issue and stand then around a -1,6% CAAR.

1. Analysis of Exchangeable Bonds (EBs)

The overall drop in EB returns is important, which means that this type of operation, even though not exposed to dilution, will probably result in reduced value to investors. Most of this can be explained by the fact that contractual conversion ratios are fixed at a high level by the controlling shareholders, who can then sell their shares at a good price. The average EB conversion premium at issue is 26.1%[19]. The diffusion of capital resulting from the potential placement on the market of a block of shares does not appear important enough for the

dominant shareholder to lose control. The average diffusion rate of capital linked to 16 EB issues was calculated, and it represents only 5% of the equity capital. We can hypothesize that EBs are operations within the logic of adjustment of ownership by the majority shareholder, who cashes in part of his ownership by selling it at a price considerably higher than the market price. The abnormal six-month return closely equals the conversion premium at issue.

However, we note that the cumulative average abnormal return remains non-significant before 68 days after the issue and before reaching an average of -9%. This can be explained by the existence of large variations in the evolution of abnormal returns. Of the 16 stocks, we notice two issues for which the abnormal returns are positive (Rallye exchangeable with Casino and Agache with LVMH). These two issues do not prevent the average of abnormal returns from becoming significantly negative after three months. Concurrently, the sign test shows a significant cumulative negative return (at the 5% level) from the 37th day after the EB issues and from the 45th day (at the 99% level). The values of the cumulative average abnormal returns and the CAAR test are presented in Annex 2. The values of the sign test over the L2 period are shown in Annex 3.

2. Analysis of Convertible Bonds (CBs)

The raw results obtained above must be placed in context: the cumulative average negative abnormal returns of 10% over the six-month period are only superficially impressive (see Annex 2). They become statistically significant at the 10% level only after the 110th day after issue (at 5% after 118 days, never at the 1% level). The sign test remains non-significant (see Annex 3). The calculation used to determine the excess returns has a weakness because it is based on beta coefficients for the normal stock returns calculated before the issue for firms

with a given financial structure. The CB issue results in a reduction in the firm's debt leverage if and when the conversion takes place. Therefore, the beta coefficient, and the expected normal return, would drop following the CB issue. The cumulative average abnormal returns shown in Figure 1 are therefore systematically biased in favor of accepting the hypothesis of an abnormal return. This problem does not exist for EBs: the firm's debt structure is not changed.

If we consider a CB issue as pure debt, no conversion, and conversely no dilution, should be taken into account. This very short-term approach is too simplistic as we must analyze CBs as a medium/long-term choice of financing policy. In case of a very strong likelihood of conversion, a dilution effect is also anticipated by investors who will be faced with a larger number of shares. All other things being equal, the dilution causes a loss in share value for the firms issuing CBs. This dilution must, for rational investors, result in a normal return now based on the number of new shares compared to the number outstanding. Investors would take into consideration the firm's investment prospects. A CB issue will change the debt structure of the firm, but it can be used to finance new investment. So the dilution effect is not linked only to mechanical change in the debt leverage, but must be mixed with the profitability perspectives of the firm.

- Correction for Debt Leverage

The first correction takes into account the mechanical effect of a CB issue, which is to reinforce the financial structure by increasing the firm's net equity due to future conversion. Here, at the issue date, we consider a CB issue as net equity. The accounting debt leverage ratio (calculated from the equity accounting value) moves on average from 1.57 to 1.08 after the issue (for 34 firms issuing a CB). The debt leverage ratio calculated from the market value of

equity moves from 0.82 to 0.72. The investors can calculate the correction based on the characteristics of the issue and of the firm at the issue date. This correction results in a new value for the beta coefficient of the market model. It takes into account the expected return based on the new debt leverage ratio. The adjustment coefficient is therefore:

$$Coef = (1+l_2)/(1+l_1) \quad (7)$$

l_1= debt leverage before issue

l_2= debt leverage after issue

On average, the adjustment coefficient applied to beta values is 0.90 (using accounting debt data) and 0.96 (market based leverage). So, while reducing the beta risk premium, it also results in a reduction of the expected normal return and, thus, leads to a lower negative abnormal profitability[20].

We obtain a cumulative negative profitability of 8.4% over six months for the CB issues. The gap between CBs and EBs widens (see Figure 2). The average cumulative return of CBs only becomes punctually negative the 121st day after issue (at the level of 10%, see Annex 2). This test is unsatisfactory because the return becomes non-significant the next day. The non-parametric test that aims to show cumulative negative abnormal returns never satisfies the usual levels. This means that the average of returns hides a very strong dispersion of individual abnormal returns. At the end of the period, we obtained 20 shares out of 34 with a negative cumulative return and 14 shares with a positive cumulative return. This means that, after correction, one firm in three shows a significant positive cumulative return. On average, there is nothing to allow the assertion of the existence of a negative cumulative abnormal return after a CB issue. Around the issue, the immediate negative market reaction that appears

on day d-6 is non-significant and rapidly disappears. The drop in the required return linked to a lower beta diminishes the temporary drop of return just when the issue is announced. Over the period [d-17, d] before the issue, the average cumulative return does not differ significantly from zero, with an average value of -0.8% as against -1.8% previously without correction (see Annex 2). It becomes null 10 days after the issue.

The necessity of taking into account an adjustment in the market model to obtain the normal return is infrequently highlighted in the current literature, which generally focuses on the very short period around the issue date. However, taking into account the mechanical effect of a change in leverage, as well as a longer investigative period, leads us to results that contrast with those usually presented in the literature, which reveal significant negative abnormal short-term returns after CB issues.

The result obtained notably contradicts the recent study by Ducassy (2003) for CBs on the French market. That study showed an abnormal negative return of 5% in the window [d-10, d+10] (with d=0 corresponding to the announcement day of issue) for issues announcing an investment goal. We noticed that Ducassy concluded with no effect of abnormal return for CB issues designed for "financial restructuring". Therefore, it seems that the financial communication from the issuing firm can explain the reaction to the announcement. It is normal for the issuing firm to state the goal of a CB issue in its financial communication. It is in the interest of such rational firms, whenever they issue a CB, to communicate a particular message corresponding to a desire to manipulate the stock price. According to Ducassy, the announcement effect is negative in the case of future investments. If the goal is to avoid loss of value for existing shareholders, the issuing firm will tend to announce a goal of financial restructuring. Conversely, if, for other reasons related to the existence of a dominant

shareholder, the firm wishes to lower its market price (for example, to buy shares on the market at a lower cost and to reinforce its own control), it will advertise its motivation for investment.

In the event of a clear communication by the issuing firm of its intentions, the results of Ducassy and other authors (Burlacu [2000], Hachette [1991, 1994] and Bah [1997] for the French market reaction) could very well be reversed. After correcting for the simple effect of leverage for firms that declare an investment motive, temporary abnormal returns can become non-significant, like those we obtained for the window [d-8, d-6]. Similarly, if we consider the case of firms that admit using CBs to improve their financial structure, it is necessary to make a double correction of the beta, because the CB will first raise the net equity and will then serve to reduce debt. In this case (always supposing that the announcement reflects the firm's real policy), it is possible in the end that null abnormal returns become positive abnormal returns.

Of course, it is very difficult to believe the published intentions of the issuing firm. Nevertheless, the study by Ducassy revealed that 1/3 of the firms studied (22 of 60) intended to carry out a financial restructuring. In their study of a sample of European firms, Bancel and Mittoo (2003) mentioned such an intention in 23% of cases. The two objectives of financial restructuring and of undertaking investments are not mutually exclusive. Both can be pursued jointly. Under these conditions, it seems to us preferable, in our analysis of CB issues, not to take into consideration the objectives published by the issuing firm, as we are aware that the communication policy of these firms may pollute their announced intent. This prudence explains why it seems necessary to judge the effects of abnormal returns over a period longer than 10 or 20 days after the announcement of the issue. In effect, during the six months

following the event date, the market can progressively observe the true behavior of the issuing firms: a policy of financial restructuring or of developing investments. The effective ex post decisions are then integrated into the market values. The large variations in forecast behaviors or strategies can explain the non-significant results before or at the time of issue.

After correcting for the debt leverage effect, we observe after four months (at d+88) abnormal cumulative negative returns of -3%. It is only after a much longer period (six months) that we see an average cumulative negative return of approximately -8%. The sign test confirms the non-significant character of these abnormal cumulative returns up to d+122. In fact, the -8% figure makes it scarcely convincing that this average should cover many different situations. In addition, the figures are based on a market model estimated over a period that has already become quite old. From now on, we take into account the risk of additional error when estimating the beta coefficients.

- Correction for the Dilution Effect

Another correction could be made to "neutralize" any possible dilution effect. In fact, a drop in the stock market price several days before the issue can result from investor sensitivity to the fear of dilution of the overall share value. Is this dilution certain? Nothing leads us to confirm this. If, as in the announcement, we integrate a pure dilution effect into the market value of the shares, we make a completely pessimistic hypothesis of the use of raised funds, that is, these will reimburse payable debts, improve the financial structure and have a null effect on the economic profitability of the firm. Considering a CB issue which has the only consequence of mechanically enlarging equity and diluting, the existing shareholders will see their investment value drop by an average of 9.1% in the sample. In the event that investors'

pessimism is justified, the market value following an issue fully integrates the dilution effect. Thus, we assume that the market value covers a drop of 9.1% resulting from a pure dilution effect. An investor who considers the contrary hypothesis (i.e. that no dilution effect exists) may reconstruct the market value by canceling the hypothetically integrated dilution effect. In order to reconstruct the market value without a supposed total dilution effect, it is necessary only to raise the market value by about 10% by dividing it on the day of issue by a certain coefficient. In fact, we used the discounted factor of dilution: the shareholders know that the conversion of shares occurs throughout the length of the CB life, in particular at the date of its maturity. Thus, we considered the dilution to be null during the life of the CB, only intervening at its maturity date. Therefore, the real dilution is less. The correction coefficient thus calculated is on average 0.933^{21}. We used this correction when considering the dilution rate for each issue.

Figure 2 takes up again the abnormal profits now doubly corrected (accounting for debt leverage and "totally pessimistic" discounted dilution). The cumulative abnormal profit is positive for the investors who estimate the dilution effect to be null. The abnormal positive return in the event of absence of dilution is +5.6% on the day of the announcement. It increases to 7%, then decreases to finish at a cumulative return over six months at an average -2%. At no time is the cumulative return significantly negative (see Annex 2). The non-parametric sign test also confirms such a result. Table 3 summarizes the cumulative average abnormal returns at d+122 for different sizes of the L1 window and when referring to the constant mean model to estimate the normal returns. In every case, the results converge. They confirm that a market model used without correcting the beta could lead to apparently significant and negative abnormal returns, but that taking into account a modification of the levered betas for CBs shows non-significant CAARs (except for the shorter estimation

period). The reference to an alternative constant mean return model also leads to similar results: the cumulative average abnormal return moves from -14% to -10% and turns from a significant value at the 99% level to a weak 90% level, when correcting the betas for leverage.

INSERT Figure 2

INSERT Table 3

We must point out that a total correction to take account of a "subtractive" dilution effect is based on a totally pessimistic assumption of unchanged firm's current profit and increased net equity capital. In this extreme case, the dilution effect corresponds to a strategy of "debt reimbursement and strengthening of the financial structure". We could suppose that the collected funds replace existing debt without diminishing its net cost and, thus, that they have no effect on the profit due to shareholders. This case is placed in the framework of an unfavorable agency relationship with an important "free cash flow" and an absence of a disciplinary role of debt. It corresponds also to a similar situation where all the operating profit linked to any new investment financed by the CB is just sufficient to cover the cost of the CB. If this is the context, the issue of a CB is an unfavorable signal and should result in significantly negative cumulative average abnormal returns. Our results do not confirm this hypothesis of an overall negative long-term effect.

A strategy of "profitable investments" can also be mentioned when the reinvested funds produce perspectives of improved results and thereby support a rise in the share value. If the investments show profitability greater than the cost of the CB, their dilution effect on the firm's profit and on market value varies according to the creation of value for all shareholders. It may even be cancelled. Similarly, looking at a strategy of the type

"reinforcement of the financial structure", the operation, even when diluted in appearance, can create value for the shareholder because it reduces the cost of capital and/or places the firm at its optimum level of debt, if it is not already in that position. In such a case, the incidence in terms of net dilution effect may be null or reversed. We can even imagine a combination of these two financial strategies.

It is better to assume an uncertain future dilution effect between the two extreme cases of (i) a 100% dilution effect without any value creation and of (ii) a null (positive) net dilution effect because of the creation of balancing (greater) economic value compensating dilution. Under the latter optimistic hypothesis, the creation of value would be positive, thus compensating for the dilution effect. Therefore, the average market reaction would cover a wide variety of situations specific to each firm's strategy. In summary, it is not really surprising that, in such a context, the sign of cumulative average abnormal returns becomes non-significant.

3. Analysis of CAARs Explaining Variables

It is also interesting to see which variables explain the size of cumulative negative returns in EB and CB samples over the L2 period [d-17, d+122]. We performed a cross-sectional regression to verify whether some firm's characteristics would explain the direction or the magnitude of the abnormal market returns. The CAAR of each EB was regressed against the rate of diffusion of capital involved by the EB issue, the conversion premium at the time of issue (in %), the amount of the issue (in %), the accounting value of the firm's net worth, the accounting debt leverage and the maturity of the EB at its issue. We added two other variables to take into account the firm's investment policy. First, the variation of the beta coefficient compares the beta values of the market as estimated before and after the issue, the beta after

the issue being calculated during the second window of six months, L2. Second, the market-to-book ratio represents the ratio of the market value to the book value of equity. It corresponds to the existence of potential profitable investment projects. Individual OLS regressions were used because of possible collinearity between some variables: for example, diffusion ratios and issued amounts are correlated (the same for dilution ratios). Table 4 shows the results obtained for the EBs. No variable appears to explain the individual abnormal negative returns.

INSERT Table 4

The same simple linear regressions were carried out for the CB sample. The independent variables were the same as those used to analyze the CAARs of EBs. We modified the first one and we chose as explanatory the dilution rate of initial equity due to the CB issue (cf. Table 5). None of the variables corresponding to the characteristics of the issue or of the firm had any significant effect on the size of the abnormal returns. Only the beta variation was shown to play an explanatory role (significant at a 99% level) in the individual abnormal negative returns. An increase in the beta between the periods before and after the issue is related to an abnormal negative return. All things being equal, after the issue, an increase of 10% in the beta caused an abnormal negative return of 4.8% for the stock.

INSERT Table 5

The previous result illustrates that the ultimate determining factors of excessive or insufficient performance must be analyzed in view of the financial policy linked to the CB issue: profitable investment perspectives or strategy of financial restructuring. We are led to a case-

by-case analysis in a situation of information asymmetry because investors in the market do not have access to private economic information, nor do they know the true intentions of the issuer. Investors in the market know only the current beta at the moment of issue. The future behavior of the firm is marked by decisions that will cause a decline in beta (decrease of the debt leverage, financial restructuring, investment of received amounts in projects with low economic risk), or conversely an increase in beta (high risk investments, increase in debt following a CB issue to maintain the initial leverage ratio).

These decisions can be cumulative. In a market characterized by a high degree of information efficiency, investors will, during the six months following a CB issue, appreciate, or perhaps sanction, the firm's new decisions. The significant variations in the beta prove this.

Consequently, it is useful to see if significant differences in beta exist between the two six month sub-periods. Under the null hypothesis of beta stability, these must on average remain constant. The average estimated beta goes from 0.89 to 0.80 in the six months following a CB issue for the 43 firms in the sample. In 33 of the 43 cases, they do not differ significantly over time. In four cases, they are significantly higher and, in six cases, significantly lower. Thus, a small number of firms proceed toward strategic changes that lead to an increased risk for them. Others lower their risk, for example, by reducing their debt. Thus, we observe a strategic ex post financial dimension, which was not apparent at the initial announcement date. This fact largely explains the cumulative negative returns, which can thus be redefined as normal and no longer abnormal. A firm need only reduce its debt and its risk after the issue for the former beta to lead to expected returns that are too high and to produce wrongly, negative excess returns. This explanation is consistent with the significant character of the relationship between abnormal returns and beta variations as previously highlighted. On

average, the change in beta corresponds to the application of the average adjustment coefficient linked to the decline in debt leverage previously estimated at 0.91 (and based on the assimilation of the CB issues to new equity). By applying this to the average beta before issue, we find an average provisional beta of 0.81 (0.89 multiplied by 0.91). The average provisional beta is effectively the one observed six months after the CB issue in the market (0.80).

Therefore, it is possible to conclude that it is rational for investors to expect, on average, a new corrected beta value equal to the initial beta, but modified by the variation of the leverage effect. Thus, investors are generally justified in nullifying the voluntary choices of investment policy and debt strategies, which can result in either an increase or a decrease in the beta. On average, the two possibilities seem equal. The choices are thus made according to the real surplus returns, which are abnormal if we apply the former betas, but which are totally justified by the firm's ultimate decisions. These positive and negative surplus returns, linked to beta correction, make the abnormal returns estimated from previous data null, if we consider ex ante any CB issue.

4. Consequences for Portfolio Management

In the case of a CB issue, the previous developments can justify the better performance of a CB investment as opposed to that of underlying stocks. At the time of issue, the higher cost of convertibles is due to a stock price increased by conversion premiums. However, underlying stocks are generally affected during the CB life by a return that is mechanically lowered to its new equilibrium, which integrates an average financial restructuring behavior. In addition, compared with stocks, convertible bonds have the advantage of an interest coupon.

INSERT Table 6

Table 6 shows, over a 12-year period, the average annual returns of the Exane 25 index of the most significant European convertible bonds with a clear hybrid character (delta around 50%). It also shows the Sharpe ratio for this type of asset[22], which has an average of 0.065. The return of a basket of underlying shares is concurrently calculated. To be strictly comparable, we must add the stock dividends in order to be consistent with CB performance as this includes the interest coupons. The average Sharpe ratio for the basket of underlying stocks then becomes 0.018. The comparison of performance by the Exane index of underlying CB stocks and of the CAC 40 market index shows similar results. This result is normal because the most significant CB issues are carried out by large firms, which belong to the CAC 40 index[23]. In the light of our results, the superiority of CBs as a class of assets in comparison with stocks can be explained by the inconvenience of holding the stocks of firms that, having issued a CB, are exposed to an additional hazard related to the use of the received funds. In fact, during a CB issue, the investors in underlying shares are in a situation of information asymmetry with regard to the issuing firm's financial communication policies and future strategies. This risk leads the average investor to protect him or herself by discounting a mechanical decline in the debt leverage, but this rational ex ante attitude is exposed to the uncertainty of the issuing firm's financial or economic strategies. The global over-performance of a CB portfolio can find part of its explanation in these specific risks in comparison with a simple stock issue, where the choice is clear in terms of financial structure.

3. Conclusion

The literature devoted to convertible bonds is already rich in information, both theoretical and empirical. First, an analysis of the justifications for issuing this form of a firm's financial instruments has highlighted three major motivations: the reduction of agency costs between shareholders and creditors and between shareholders and management, the reduction of asymmetry of information between management and shareholders (involving notably the "pecking order theory" of the firm's financing decision and the theory of "backdoor equity"), and the solution to the problem of sequential financing (Mayers, 1998).

The reaction of the prices of underlying stocks to a CB issue on major international stock markets has been regularly tested in recent years and has been interpreted in the light of theoretical contributions. The majority of empirical work, except for studies carried out in Japan and the Netherlands, indicates a negative market reaction, mostly from the announcement date of a CB issue in the context of short-term window measures of abnormal returns. This negative market reaction appears to be linked with an overvaluation signal in the context of information asymmetry.

In the light of these results, our contribution was intended to investigate the consequences of issuing convertible or exchangeable bonds on the French stock market. More precisely, our aim was to review the market reaction to the issue of this type of financial instrument by integrating different corrections and by selecting a window of analysis over a longer term, that is, seven months before and six months after the issue date.

Methodologically, taking into account a correction linked to the variation in the debt leverage ratio following a CB issue appeared significant considering the results empirically obtained. Such an effect can explain the negative signs often observed in previous studies, a point that does not seem to have been raised in the existing literature. For its part, our study showed cumulative abnormal returns that were, on average, negative for EBs and non-significant following CB issues. This absence of global incidence is compatible with considerable differences in individual behavior by issuers of CBs, which needs to take into account their effective intentions and strategic choices linked to the CB issue. The two goals, described as "investment financing" or "financial restructuring", are not alternatives but may both exist when issuing. They may both be used by the issuer as elements of his or her financial communication. However, if they exist, the two goals only become perceptible gradually as the firm evolves.

Therefore, these motivations are not revealed in the context of short windows of observation regarding the abnormal returns resulting from a CB or EB issue. The analysis of the dilution effect and that of the different explanatory variables of cumulative average abnormal returns does not enable us to identify a clear common determining factor for the firms in the sample. This leads to give less weight to explanations based on overvaluation signals and pure dilution. For this reason, it seemed justified to study the post-issue financial behaviors as identified through the variations of beta calculated before and after the issue. This method, apparently infrequently used in the available literature, also enabled us to confirm the large divergence of effective behavior, which is perfectly consistent with abnormal returns that are non significant on average.

The previous empirical results were then put into perspective within the context of portfolio management by analyzing CB performance as a class of assets compared to other classes of related assets, such as stocks and bonds. The EB issuing firms appear to benefit from a transfer of value because their participation is sold at a price clearly above the market value. The gain in value should then benefit the shareholders of the issuing firm. The positive effects counterbalancing dilution and resulting from the investment/financing decisions linked with a CB issue take place in a context of asymmetry of information for the outside shareholders. Under these conditions, the question of the interest for investors in non-dilutive OCEANE bond issues arises. These bonds are an intermediary between EB and CB. They do not guarantee systematic protection for investors because the future behavior of the issuing firm (whether issuing or purchasing shares) is uncertain.

Finally, we showed that the investor should not a priori fear the dilution effect during a CB issue. A CB issue, on its own, creates future value for the shareholders if it enables the firm to make other profitable investments. It can also constitute a positive signal regarding the restructuring of the firm's financial liabilities and the optimization of its debt structure. Outside shareholders facing an OC issue cannot say with any degree of certainty whether a future dilution is likely certain in its principle but uncertain in its amount. The size of the dilution results from an unknown investment/financing policy at the firm's level of which a CB issue is just one element.

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	average	minimum	maximum	standard deviation	N
maturity	6.07	2.50	16.88	2.96	59
coupon	2.20	0.00	7.92	1.42	59
amount (M€)	738.98	121.51	3492.00	630.14	59
long term debt	6748.66	5.38	35767.00	7551.26	35
book leverage	1.57	0.02	15.67	2.61	34
market leverage	0.82	0.01	6.42	1.28	24
new eq. book value (M€)	7504.52	204.14	38685.00	7383.86	49
new equity mkt. value (M€)	11355.43	978.05	57832.38	13002.39	39
new book leverage	1.08	0.01	6.34	1.12	34
new market leverage	0.72	0.01	5.20	1.04	24
var. book leverage	-0.49	-9.33	-0.01	1.59	34
var. market leverage	-0.10	-1.22	0.00	0.24	24
new shares (M)	16.24	1.44	120.79	19.94	59
outsd. shares (M)	359.04	5.20	1452.66	442.53	56
diffusion ratio (OE)	0.05	0.00	0.09	0.03	16
dilution ratio (OC)	0.91	0.54	0.99	0.08	40
conv. premium (%)	25.00	-20.50	102.25	18.52	59
corr. book beta	0.90	0.44	0.99	0.12	34
corr. market beta	0.96	0.84	1.00	0.03	24

Table 2 – Characteristics of the sample (M: million; LT debt: estimated long and medium term book value debt; book leverage: debt leverage ratio using the accounting value of equity; market leverage: debt leverage ratio using the market value of equity; new shares: number of potentially created shares; outsd. shares: number of existing shares; corr. book beta: beta coefficient corrected on the basis of the book value leverage; corr. market beta: beta coefficient corrected by the market value leverage)

	EB sample	CB sample (without correction)	CB sample (with one correction)	CB sample with two corrections)
Market model				
L1 [d-90,d-18]				
CAAR at d+122	-0.177	-0.110	-0.141	-0.142
test	-2.65***	-2.31**	-2.80***	-1.50
first significant day	d+87	d+97	d+108	ns
L1 [d-163,d-18]				
CAAR at d+122	-0.198	-0.097	-0.084	-0.018
Test	-3.19***	-1.99**	-1.59	-0.35
first significant day	d+68	d+119	ns	ns
L1 [d-236,d-18]				
CAAR at d+122	-0.134	-0.105	-0.081	-0.016
t-test	-2.02**	-2.18**	-1.55	-0.30
First significant day	d+122	d+116	ns	ns
Constant mean return model L1 [d-163,d-18]				
CAAR at d+122	-0.257	-0.139	-0.100	-0.035
t-test	-4.15***	-2.84***	-1.90*	-1.18
first significant day	d+40	d+92	d+120	ns

Table 3 – CAAR tests according to different length of estimation period L1
(CAAR at d+122 in decimal; level of confidence of the significativity test: *:90%, **:95%, ***:99%; first day of the event period L2 evidencing a non-zero cumulative average abnormal return at 95% level; N are respectively for each sample: 15, 42, 34 and 34)

Independent Variables		b	a	F	N
Diffusion ratio		-0.65207	-0.14406	0.07118	14
		(2.44416)	(0.12530)		
Premium (%)		-0.00418	-0.08479	1.45009	14
		(0.00347)	(0.09313)		
Issued Amount		-0.54692	-0.06820	0.54407	13
		(0.74147)	(0.11629)		
Book leverage		-0.01263	-0.12951	0.04414	13
		(0.06014)	(0.08865)		
Maturity		0.03710	-0.36366	0.87715	14
		(0.03962)	(0.21126)		
Variation in beta (β_0-β_1)		0.27764	-0.16158	2.41617	14
		(0.17861)	(0.05586)		
Market-to-book ratio		-0.03810	-0.00532	0.50756	7
		(0.05348)	(0.18472)		

Table 4 – Analysis of determinants of the CAARs of EBs (b: estimated regression coefficient; a: estimated constant, F: F-Fisher; N: number of degrees of freedom, standard deviation is shown in parentheses)

Independent variables		b	a	F	N
Dilution ratio		0.07464	-0.15369	0.00630	32
		(0.94069)	(0.88474)		
Premium (%)		-0.00375	0.01554	2.20049	32
		(0.00253)	(0.08450)		
Issued Amount		0.04274	-0.10012	0.25694	32
		(0.08432)	(0.06239)		
Book leverage		-0.02577	-0.04314	1.61043	32
		(0.02031)	(0.06113)		
Maturity		-0.00449	-0.05393	0.09205	32
		(0.01479)	(0.11145)		
Variation in betas (β_0-β_1)		0.47768	-0.07658	6.08257*	32
		(0.19368)	(0.04907)		
Market-to-book ratio		0.00822	-0.09373	0.83235	22
		(0.00901)	(0.07622)		

Table 5 – Analysis of determinants of the CAARs of CBs (b: estimated regression coefficient; a: estimated constant, F: F-Fisher; N: number of degrees of freedom, standard deviation is shown in parentheses)

	Exane convertibles index			Underlying stocks index (incl. dividends)			Underlying stocks index (excl. dividends)			French CAC 40 index		
	Av. return	Std. dev	Ratio	Av. return	Std. dev	Ratio	Av. return	Std. dev	Ratio	Av. return	Std. dev	Ratio
1991-2003 average	0.00038	0.00576	0.06557	0.00025	0.01380	0.01804	0.00021	0.01318	0.01594	0.00026	0.01406	0.01836
2003	0.00036	0.00158	0.22451	0.00081	0.01580	0.05101	0.00076	0.01578	0.04790	0.00059	0.01609	0.03644
2002	-0.00001	0.00449	-0.00268	-0.00169	0.02034	-0.08320	-0.00173	0.02034	-0.08511	-0.00161	0.02238	-0.07199
2001	-0.00035	0.00586	-0.05923	-0.00121	0.01614	-0.07470	-0.00124	0.01839	-0.06739	-0.00106	0.01675	-0.06299
2000	-0.00011	0.01148	-0.00989	-0.00036	0.01610	-0.02216	-0.00038	0.01498	-0.02535	0.00006	0.01465	0.00385
1999	0.00061	0.00635	0.09555	0.00129	0.01114	0.11558	0.00126	0.01091	0.11547	0.00160	0.01207	0.13233
1998	0.00117	0.00911	0.12801	0.00165	0.01513	0.10883	0.00158	0.01367	0.11560	0.00108	0.01660	0.06517
1997	0.00061	0.00520	0.11647	0.00147	0.01218	0.12061	0.00143	0.01194	0.11974	0.00100	0.01396	0.07148
1996	0.00056	0.00252	0.22171	0.00045	0.01552	0.02871	0.00040	0.00690	0.05859	0.00084	0.00788	0.10670
1995	0.00057	0.00323	0.17639	0.00027	0.00983	0.02753	0.00024	0.00983	0.02442	0.00000	0.01104	-0.00041
1994	-0.00039	0.00453	-0.08519	-0.00102	0.01145	-0.08915	-0.00095	0.01074	-0.08876	-0.00077	0.01106	-0.06948
1993	0.00103	0.00367	0.28192	0.00103	0.00882	0.11681	0.00090	0.00898	0.09988	0.00082	0.00977	0.08356
1992	0.00041	0.00424	0.09634	0.00005	0.01056	0.00437	0.00000	0.01067	0.00039	0.00026	0.01209	0.02149
1991	0.00045	0.00485	0.09230	0.00045	0.01140	0.03986	0.00041	0.01136	0.03591	0.00050	0.01234	0.04069

Table 6 – Average return, standard deviation and return-risk ratio of convertible bonds, of underlying shares and of the CAC 40 index (daily data; period 1991-2003; source Exane)

	CAAR EB sample	CAAR CB sample (without correction)	CAAR CB sample (with one correction)	CAAR CB sample (with double correction)
Skewness	+0.445	+0.302	+0.327	+0.321
Excess kurtosis	+0.715	-0.487	-0.062	-0.050
Bera-Jarque test	0.815	1.053	0.613	0.586
N	16	43	34	34

Annex 1- Characteristics of the distribution of CAARs over the L2 window
(d-17 to d+122, N: number of individual stock returns, B-J test follows a chi-two statistic with 2 ddf)

day	CAAR (EBs)	Nb EBs	Test. CAAR	CAAR (CBs without correction)	Nb CBs	TestSign. CAAR	CAAR (CBs one correction)	Nb CBs (one correction)	Test. CAAR	CAAR (CBs two corrections)	Nb CBs (two corrections)	Test CAAR
-17	-0.004	16	-0.774	0.006	43	1.546	0.005	34	1.032	0.005	34	1.032
-16	-0.007	16	-1.033	0.002	43	0.395	0.002	34	0.288	0.002	34	0.288
-15	-0.011	16	-1.247	0.008	43	1.119	0.007	34	0.971	0.007	34	0.971
-14	-0.003	16	-0.303	0.013	43	1.646	0.014	34	1.599	0.014	34	1.599
-13	-0.002	16	-0.163	0.006	43	0.708	0.011	34	1.097	0.011	34	1.097
-12	-0.002	16	-0.164	0.008	43	0.822	0.014	34	1.258	0.014	34	1.258
-11	-0.002	16	-0.120	0.013	43	1.203	0.016	34	1.358	0.016	34	1.358
-10	0.000	16	-0.021	0.013	43	1.093	0.018	34	1.414	0.018	34	1.414
-9	-0.001	16	-0.088	0.002	43	0.200	0.008	34	0.602	0.008	34	0.602
-8	-0.002	16	-0.130	-0.004	43	-0.336	0.005	34	0.389	0.005	34	0.389
-7	-0.003	16	-0.176	-0.013	43	-0.928	-0.007	34	-0.472	-0.007	34	-0.472
-6	-0.015	16	-0.839	-0.023	43	-1.619	-0.015	34	-0.947	-0.015	34	-0.947
-5	-0.019	16	-1.026	-0.017	43	-1.169	-0.009	34	-0.562	-0.009	34	-0.562
-4	-0.015	16	-0.791	-0.019	43	-1.274	-0.009	34	-0.531	-0.009	34	-0.531
-3	-0.016	16	-0.797	-0.015	43	-0.932	-0.008	34	-0.463	-0.008	34	-0.463
-2	-0.014	16	-0.700	-0.016	43	-0.984	-0.009	34	-0.529	-0.009	34	-0.529
-1	-0.006	16	-0.275	-0.016	43	-0.941	-0.008	34	-0.421	-0.008	34	-0.421
0	-0.011	16	-0.520	-0.018	43	-1.045	-0.008	34	-0.423	0.057	34	3.044
1	-0.013	16	-0.581	-0.016	43	-0.918	-0.009	34	-0.467	0.056	34	2.907
2	-0.013	16	-0.566	-0.016	43	-0.859	-0.007	34	-0.351	0.058	34	2.938
3	-0.014	16	-0.626	-0.010	43	-0.552	-0.008	34	-0.395	0.057	34	2.815
4	-0.009	16	-0.374	-0.011	43	-0.552	-0.004	34	-0.183	0.061	34	2.953
5	-0.008	16	-0.337	-0.008	43	-0.424	-0.001	34	-0.042	0.064	34	3.025
6	-0.003	16	-0.111	-0.010	43	-0.507	-0.001	34	-0.025	0.065	34	2.977
7	-0.008	16	-0.322	-0.007	43	-0.323	0.002	34	0.074	0.067	34	3.016
8	-0.001	16	-0.039	-0.008	43	-0.368	-0.001	34	-0.051	0.064	34	2.833
9	0.003	16	0.127	-0.010	43	-0.466	-0.001	34	-0.044	0.064	34	2.787
10	0.011	16	0.417	-0.014	43	-0.673	-0.004	34	-0.162	0.061	34	2.617

11	0.009	16	0.321	-0.012	43	-0.540	0.000	34	-0.008	0.065	34	2.723
12	0.013	16	0.457	-0.013	43	-0.599	0.000	34	-0.015	0.065	34	2.670
13	0.015	16	0.551	-0.012	43	-0.540	0.003	34	0.115	0.068	34	2.757
14	0.006	16	0.211	-0.012	43	-0.525	0.003	34	0.135	0.069	34	2.735
15	0.003	16	0.091	-0.013	43	-0.550	0.003	34	0.109	0.068	34	2.670
16	-0.002	16	-0.052	-0.016	43	-0.674	-0.001	34	-0.029	0.065	34	2.493
17	-0.001	16	-0.042	-0.015	43	-0.632	0.001	34	0.041	0.066	34	2.528
18	-0.002	16	-0.068	-0.015	43	-0.634	-0.002	34	-0.081	0.063	34	2.371
19	-0.007	16	-0.239	-0.019	43	-0.750	-0.003	34	-0.126	0.062	34	2.292
20	-0.016	16	-0.512	-0.018	43	-0.735	-0.001	34	-0.044	0.064	34	2.342
21	-0.015	16	-0.482	-0.017	43	-0.670	-0.003	34	-0.108	0.062	34	2.247
22	-0.015	16	-0.472	-0.014	43	-0.539	0.000	34	0.006	0.065	34	2.332
23	-0.021	16	-0.652	-0.019	43	-0.727	-0.003	34	-0.090	0.063	34	2.207
24	-0.026	16	-0.807	-0.018	43	-0.669	0.003	34	0.105	0.068	34	2.374
25	-0.034	16	-1.032	-0.018	43	-0.666	-0.001	34	-0.041	0.064	34	2.202
26	-0.035	16	-1.042	-0.016	43	-0.587	0.003	34	0.092	0.068	34	2.310
27	-0.027	16	-0.799	-0.021	43	-0.776	-0.002	34	-0.052	0.064	34	2.141
28	-0.024	16	-0.690	-0.025	43	-0.899	-0.003	34	-0.098	0.062	34	2.071
29	-0.031	16	-0.890	-0.023	43	-0.825	-0.005	34	-0.179	0.060	34	1.966
30	-0.033	16	-0.950	-0.021	43	-0.729	-0.002	34	-0.079	0.063	34	2.044
31	-0.034	16	-0.949	-0.028	43	-0.975	-0.007	34	-0.209	0.059	34	1.892
32	-0.030	16	-0.845	-0.031	43	-1.078	-0.010	34	-0.321	0.055	34	1.759
33	-0.030	16	-0.842	-0.026	43	-0.896	-0.006	34	-0.178	0.060	34	1.881
34	-0.035	16	-0.959	-0.024	43	-0.814	-0.002	34	-0.068	0.063	34	1.971
35	-0.040	16	-1.088	-0.021	43	-0.699	-0.001	34	-0.023	0.065	34	1.997
36	-0.043	16	-1.152	-0.021	43	-0.690	0.001	34	0.025	0.066	34	2.026
37	-0.045	16	-1.203	-0.020	43	-0.662	0.003	34	0.094	0.068	34	2.078
38	-0.049	16	-1.291	-0.014	43	-0.453	0.007	34	0.223	0.073	34	2.189
39	-0.055	16	-1.450	-0.012	43	-0.399	0.008	34	0.236	0.073	34	2.184
40	-0.058	16	-1.517	-0.014	43	-0.459	0.006	34	0.178	0.071	34	2.109
41	-0.058	16	-1.508	-0.020	43	-0.640	-0.002	34	-0.050	0.064	34	1.865
42	-0.057	16	-1.451	-0.026	43	-0.818	-0.007	34	-0.197	0.059	34	1.702
43	-0.054	16	-1.363	-0.020	43	-0.616	-0.002	34	-0.058	0.063	34	1.825

44	-0.071	16	-1.777*	-0.016	43	-0.508	0.003	34	0.086	0.068	34	1.954
45	-0.072	16	-1.786*	-0.016	43	-0.494	0.001	34	0.017	0.066	34	1.870
46	-0.066	16	-1.641	-0.022	43	-0.669	-0.007	34	-0.183	0.059	34	1.655
47	-0.068	16	-1.663*	-0.021	43	-0.632	-0.005	34	-0.135	0.060	34	1.689
48	-0.069	16	-1.695*	-0.022	43	-0.676	-0.005	34	-0.137	0.060	34	1.674
49	-0.067	16	-1.621	-0.020	43	-0.615	-0.004	34	-0.106	0.061	34	1.691
50	-0.061	16	-1.472	-0.024	43	-0.716	-0.008	34	-0.223	0.057	34	1.561
51	-0.063	16	-1.499	-0.027	43	-0.788	-0.013	34	-0.363	0.052	34	1.407
52	-0.062	16	-1.480	-0.028	43	-0.816	-0.017	34	-0.450	0.049	34	1.308
53	-0.061	16	-1.447	-0.030	43	-0.885	-0.021	34	-0.556	0.045	34	1.190
54	-0.062	16	-1.447	-0.031	43	-0.901	-0.022	34	-0.579	0.043	34	1.154
55	-0.063	16	-1.472	-0.032	43	-0.907	-0.023	34	-0.610	0.042	34	1.112
56	-0.070	16	-1.610	-0.032	43	-0.917	-0.021	34	-0.543	0.045	34	1.167
57	-0.067	16	-1.527	-0.035	43	-1.007	-0.023	34	-0.588	0.043	34	1.110
58	-0.070	16	-1.585	-0.034	43	-0.964	-0.024	34	-0.629	0.041	34	1.059
59	-0.075	16	-1.690*	-0.036	43	-1.007	-0.028	34	-0.712	0.038	34	0.964
60	-0.081	16	-1.817*	-0.036	43	-1.000	-0.029	34	-0.751	0.036	34	0.914
61	-0.076	16	-1.684*	-0.034	43	-0.931	-0.029	34	-0.724	0.037	34	0.931
62	-0.077	16	-1.704*	-0.036	43	-0.982	-0.031	34	-0.772	0.035	34	0.872
63	-0.083	16	-1.824*	-0.032	43	-0.868	-0.027	34	-0.666	0.039	34	0.968
64	-0.080	16	-1.745*	-0.031	43	-0.847	-0.027	34	-0.665	0.039	34	0.959
65	-0.083	16	-1.809*	-0.025	43	-0.679	-0.019	34	-0.464	0.047	34	1.150
66	-0.090	16	-1.949*	-0.028	43	-0.761	-0.020	34	-0.485	0.046	34	1.120
67	-0.088	16	-1.900*	-0.039	43	-1.034	-0.028	34	-0.681	0.037	34	0.914
68	-0.095	16	-2.030**	-0.037	43	-0.995	-0.027	34	-0.654	0.038	34	0.932
69	-0.098	16	-2.088**	-0.039	43	-1.022	-0.030	34	-0.716	0.036	34	0.861
70	-0.095	16	-2.013**	-0.036	43	-0.948	-0.028	34	-0.667	0.038	34	0.901
71	-0.098	16	-2.050**	-0.038	43	-0.987	-0.029	34	-0.697	0.036	34	0.862
72	-0.096	16	-1.998**	-0.041	43	-1.065	-0.034	34	-0.804	0.031	34	0.746
73	-0.097	16	-2.018**	-0.039	43	-1.019	-0.031	34	-0.735	0.034	34	0.807
74	-0.097	16	-2.011**	-0.042	43	-1.083	-0.034	34	-0.795	0.031	34	0.738
75	-0.098	16	-2.021**	-0.045	43	-1.153	-0.034	34	-0.799	0.031	34	0.726
76	-0.107	16	-2.197**	-0.054	43	-1.381	-0.036	34	-0.837	0.029	34	0.680

77	-0.099	16	-2.013**	-0.055	43	-1.391	-0.035	34	-0.818	0.030	34	0.691
78	-0.109	16	-2.202**	-0.062	43	-1.554	-0.034	34	-0.788	0.031	34	0.713
79	-0.115	16	-2.306**	-0.058	43	-1.449	-0.028	34	-0.638	0.037	34	0.855
80	-0.109	16	-2.174**	-0.055	43	-1.378	-0.028	34	-0.631	0.038	34	0.854
81	-0.104	16	-2.063*	-0.055	43	-1.358	-0.029	34	-0.651	0.037	34	0.828
82	-0.114	16	-2.254**	-0.062	43	-1.536	-0.037	34	-0.824	0.029	34	0.647
83	-0.113	16	-2.233**	-0.069	43	-1.690*	-0.042	34	-0.931	0.024	34	0.532
84	-0.115	16	-2.251**	-0.069	43	-1.686*	-0.043	34	-0.956	0.022	34	0.500
85	-0.114	16	-2.220**	-0.069	43	-1.667*	-0.042	34	-0.941	0.023	34	0.508
86	-0.128	16	-2.483**	-0.068	43	-1.643	-0.039	34	-0.860	0.026	34	0.583
87	-0.133	16	-2.569**	-0.062	43	-1.478	-0.030	34	-0.668	0.035	34	0.768
88	-0.130	16	-2.495**	-0.059	43	-1.413	-0.028	34	-0.619	0.037	34	0.810
89	-0.132	16	-2.520**	-0.053	43	-1.272	-0.027	34	-0.598	0.038	34	0.823
90	-0.135	16	-2.567**	-0.058	43	-1.366	-0.033	34	-0.705	0.033	34	0.710
91	-0.134	16	-2.541**	-0.061	43	-1.443	-0.037	34	-0.801	0.028	34	0.608
92	-0.137	16	-2.595***	-0.063	43	-1.467	-0.037	34	-0.786	0.029	34	0.616
93	-0.140	16	-2.644***	-0.062	43	-1.440	-0.032	34	-0.678	0.034	34	0.718
94	-0.137	16	-2.572**	-0.063	43	-1.465	-0.034	34	-0.726	0.031	34	0.664
95	-0.137	16	-2.551**	-0.064	43	-1.487	-0.033	34	-0.692	0.033	34	0.692
96	-0.136	16	-2.517**	-0.071	43	-1.640	-0.036	34	-0.753	0.030	34	0.624
97	-0.146	16	-2.701***	-0.069	43	-1.573	-0.034	34	-0.718	0.031	34	0.654
98	-0.151	16	-2.771***	-0.067	43	-1.531	-0.034	34	-0.717	0.031	34	0.649
99	-0.152	16	-2.795***	-0.066	43	-1.493	-0.033	34	-0.679	0.033	34	0.680
100	-0.148	16	-2.709***	-0.066	43	-1.498	-0.037	34	-0.776	0.028	34	0.578
101	-0.151	16	-2.747***	-0.064	43	-1.450	-0.034	34	-0.701	0.031	34	0.647
102	-0.144	16	-2.614***	-0.067	43	-1.516	-0.036	34	-0.731	0.030	34	0.611
103	-0.137	16	-2.477**	-0.071	43	-1.588	-0.041	34	-0.845	0.024	34	0.492
104	-0.131	16	-2.358**	-0.073	43	-1.628	-0.042	34	-0.865	0.023	34	0.467
105	-0.138	16	-2.465**	-0.071	43	-1.571	-0.041	34	-0.823	0.025	34	0.503
106	-0.143	16	-2.551**	-0.067	43	-1.481	-0.038	34	-0.766	0.027	34	0.555
107	-0.146	16	-2.595***	-0.067	43	-1.474	-0.038	34	-0.772	0.027	34	0.544
108	-0.150	16	-2.656***	-0.071	43	-1.559	-0.042	34	-0.847	0.023	34	0.463
109	-0.150	16	-2.639***	-0.072	43	-1.580	-0.043	34	-0.860	0.022	34	0.446

110	-0.155	16	-2.708***	-0.068	43	-1.479	-0.040	34	-0.787	0.026	34	0.513
111	-0.159	16	-2.774***	-0.080	43	-1.725*	-0.057	34	-1.122	0.009	34	0.173
112	-0.162	16	-2.821***	-0.081	43	-1.747*	-0.059	34	-1.168	0.006	34	0.122
113	-0.161	16	-2.792***	-0.082	43	-1.763*	-0.062	34	-1.212	0.004	34	0.073
114	-0.164	16	-2.833**	-0.082	43	-1.750*	-0.063	34	-1.226	0.003	34	0.054
115	-0.166	16	-2.858***	-0.085	43	-1.813*	-0.067	34	-1.316	-0.002	34	-0.041
116	-0.171	16	-2.924***	-0.090	43	-1.915*	-0.072	34	-1.409	-0.007	34	-0.139
117	-0.170	16	-2.908***	-0.093	42	-1.941*	-0.078	34	-1.516	-0.013	34	-0.250
118	-0.176	16	-2.994***	-0.090	42	-1.874*	-0.072	34	-1.395	-0.007	34	-0.133
119	-0.177	16	-3.000***	-0.096	42	-1.981**	-0.080	34	-1.532	-0.014	34	-0.275
120	-0.177	16	-2.982***	-0.100	42	-2.056**	-0.084	34	-1.619	-0.019	34	-0.367
121	-0.173	16	-2.916***	-0.103	42	-2.117**	-0.091	34	-1.730*	-0.025	34	-0.482
122	-0.198	15	-3.193***	-0.097	42	-1.988**	-0.084	34	-1.592	-0.018	34	-0.349

Annex 2 – Cumulative average abnormal returns (CAARs: Cumulative average abnormal returns from d-17 to the final day; Number of shares: number of underlying shares of CB and EB issues in the samples; simple correction: abnormal returns of shares corrected by the debt leverage; two corrections: abnormal returns corrected by the debt leverage and a supposed total dilution; Test CAAR: relation (5) statistic from d-17 to the final day; *, **, ***: significant at the 90%, 95%, 99% level)

	Samples			
Day	EB sample	CBs (without correction)	CBs (one correction)	CBs (two corrections)
-17	-1.500	0.762	0.343	0.343
-16	-2.000*	0.152	0.000	0.000
-15	-1.500	1.677	1.715	1.715
-14	-0.500	2.592**	2.744**	2.744**
-13	0.500	1.982*	2.744**	2.744**
-12	0.500	1.677	2.401**	2.401**
-11	0.500	1.372	2.058**	2.058**
-10	0.500	1.067	1.029	1.029
-9	-0.500	0.457	0.686	0.686
-8	0.000	1.067	2.058*	2.058
-7	0.000	-0.152	0.343	0.343
-6	-0.500	-1.982**	-1.372	-1.372
-5	-1.000	-1.982**	-1.715	-1.715
-4	-0.500	-1.982**	-2.058**	-2.058**
-3	0.500	-1.372	-1.029	-1.029
-2	0.500	-0.762	-0.686	-0.686
-1	0.500	-1.067	-1.029	-1.029
0	-1.000	-1.677*	-0.686	3.430***
1	-0.500	-0.762	-0.343	3.087***
2	-0.500	-0.762	-0.686	3.773***
3	-0.500	-0.762	-1.029	2.401**
4	-0.500	-1.372	-1.029	3.430***
5	-0.500	-1.372	-1.029	3.430***
6	0.500	-1.372	-1.029	3.773***
7	-0.500	-1.677	-1.029	3.430***
8	0.500	-0.762	-0.686	3.087***
9	-0.500	-1.677*	-1.029	3.087***
10	0.500	-1.677*	-0.686	2.744***
11	0.000	-1.372	-0.343	2.401**
12	0.500	-1.372	-0.343	2.401**
13	0.500	-1.677*	-0.686	2.058**
14	0.000	-1.372	-0.343	1.715*
15	0.000	-1.677*	-0.343	1.715*
16	0.500	-1.372	-0.343	2.058**
17	0.000	-1.372	-0.686	2.058**
18	0.500	-1.372	-0.343	2.058**
19	0.500	-1.677*	-0.686	2.058**
20	-0.500	-0.762	-0.343	2.401**
21	0.500	-0.457	0.000	2.401**
22	0.000	-0.457	0.000	2.058**
23	-0.500	-0.762	-0.343	2.058**
24	-0.500	-1.067	0.000	2.401**
25	-1.000	-1.372	-1.029	2.058**
26	-1.000	-1.067	-0.343	2.401**
27	0.000	-1.067	-0.686	2.058**
28	0.000	-1.067	-0.686	2.058**
29	-0.500	-1.372	-1.029	2.058**
30	-1.000	-0.457	-0.343	2.058**
31	-1.000	-0.762	0.000	1.372
32	-1.000	-1.067	-0.343	1.029
33	-1.000	-0.762	-0.343	1.715*
34	-1.000	-0.762	0.000	2.058**
35	-1.000	-0.762	-0.343	2.058**
36	-1.500	-1.067	-0.686	1.715*

37	-2.000**	-1.067	-0.343	1.715*
38	-2.000**	-1.372	-0.686	1.372
39	-2.000**	-1.372	-0.686	1.372
40	-1.500	-1.372	-1.029	1.029
41	-2.000**	-1.372	-0.686	0.686
42	-2.000**	-1.067	-0.686	0.686
43	-2.000**	-0.762	-0.686	0.686
44	-2.000**	-0.762	-0.686	1.372
45	-3.000***	-1.067	-0.343	1.029
46	-2.500**	-1.067	-0.343	1.029
47	-2.000**	-1.677	-1.029	0.686
48	-2.000**	-0.457	0.000	0.343
49	-2.000**	-0.762	-0.343	0.686
50	-2.000**	-0.762	-0.686	0.343
51	-3.000***	-0.457	-0.343	0.686
52	-3.000***	-0.762	-0.686	0.686
53	-2.000**	-0.457	-0.343	0.343
54	-1.500	-0.762	-0.343	0.343
55	-2.500**	-0.762	-0.343	0.686
56	-2.000**	-0.762	-0.343	0.686
57	-2.500**	-0.457	-0.343	1.029
58	-2.500**	-0.762	-0.343	0.686
59	-3.000***	-0.762	-0.343	0.343
60	-3.000***	-0.762	-0.343	0.343
61	-3.000***	-0.762	-0.343	0.343
62	-3.000***	-0.762	-0.343	0.686
63	-3.000***	-0.457	0.000	0.343
64	-2.000**	-0.762	-0.343	0.686
65	-2.000**	-0.457	-0.343	1.029
66	-1.500	-0.152	0.000	0.686
67	-3.000***	-0.762	0.000	0.686
68	-3.000***	-0.762	-0.343	0.686
69	-3.000***	-0.762	-0.343	0.686
70	-3.000***	-0.762	-0.343	0.686
71	-2.500**	-0.457	0.000	0.686
72	-2.500**	-0.762	-0.343	0.686
73	-2.500**	-0.762	-0.343	0.686
74	-2.500**	-0.457	-0.343	0.686
75	-2.500**	-0.457	-0.343	0.343
76	-2.500**	-0.457	-0.343	0.343
77	-2.000**	-0.457	-0.343	0.343
78	-3.000***	-0.762	0.000	0.343
79	-2.500**	-0.762	-0.343	0.000
80	-2.500**	-0.762	-0.343	1.029
81	-2.500**	-1.067	0.000	0.343
82	-3.000***	-0.762	0.000	0.343
83	-3.000***	-1.067	-0.343	0.686
84	-2.500**	-0.762	-0.343	0.343
85	-2.500**	-0.762	0.000	0.343
86	-2.500**	-0.762	0.000	0.686
87	-2.500**	-0.762	0.000	0.343
88	-2.500**	-0.457	0.000	1.029
89	-2.500**	-0.457	0.000	0.686
90	-3.000***	-0.762	0.000	0.343
91	-3.000***	-0.762	0.000	0.343
92	-3.000***	-0.762	0.000	0.343

93	-3.000***	-0.762	0.000	0.343
94	-3.000***	-1.067	-0.343	0.343
95	-3.000***	-1.067	-0.343	0.343
96	-3.000***	-1.067	-0.686	0.343
97	-3.000***	-1.067	-0.686	0.686
98	-3.000***	-1.372	-0.343	1.029
99	-2.500**	-0.762	-0.343	0.686
100	-2.500**	-0.152	-0.343	1.029
101	-2.500**	-0.457	-0.343	1.029
102	-2.500**	-0.152	0.343	1.029
103	-2.500**	-0.762	-0.343	0.686
104	-2.500**	-0.762	0.000	0.343
105	-2.500**	-0.457	0.000	0.343
106	-2.500**	-0.457	0.000	0.686
107	-2.500**	-0.762	0.000	0.686
108	-2.500**	-1.067	-0.686	0.343
109	-2.500**	-1.067	-0.686	0.343
110	-2.500**	-1.372	-0.686	0.343
111	-2.500**	-1.372	-1.029	0.000
112	-2.500**	-1.067	-0.686	0.000
113	-2.500**	-1.372	-0.343	0.000
114	-2.500**	-1.067	-0.686	0.000
115	-2.500**	-1.067	-1.372	-0.343
116	-2.500**	-1.372	-0.686	-0.343
117	-2.500**	-1.249	-1.029	0.000
118	-2.500**	-1.234	-1.029	0.343
119	-2.500**	-1.234	-1.029	0.343
120	-2.500**	-1.543	-1.372	-0.343
121	-2.500**	-1.543	-1.372	-0.686
122	-2.933***	-1.234	-1.029	-0.343

Annex 3 - Sign test on cumulative average abnormal returns
(Relation (6) statistic from d-17 to the final day; *, **, ***: significant at the 90%, 95%, 99% level)

	ACCOR 5.75% 07/06 Corp	ALAFP 7% 12/06 Corp	BSNSA 6.5% 06/04 Corp	FRTEL 5.75% 11/04 Corp	FRTEL 5.75% 11/04 Corp	PRTP 5.2% 05/27/05 Corp	ALAFP 7% 12/06 Corp	PRTP 5.2% 05/27/2005 Corp	
R^2	0.041	0.080	0.051	0.019	0.004	0.058	0.076	0.001	average
Beta	-0.031	0.208	-0.019	-0.016	-0.051	-0.012	0.185	-0.008	0.032
Std. dev	0.011	0.052	0.006	0.008	0.057	0.003	0.048	0.022	
T	-2.816	4.001	-3.145	-1.885	-0.907	-3.377	3.892	-0.387	

Annex 4 – Estimated bond beta coefficients (regression of bond returns over the CAC 40 index returns; beta: estimated beta coefficients; std. dev: standard deviation; t: t-Student)

Figure 1 – CAARs of stock for the CBs and EBs samples
(EBs: plain black line, non-corrected CBs abnormal returns: discontinued black line).

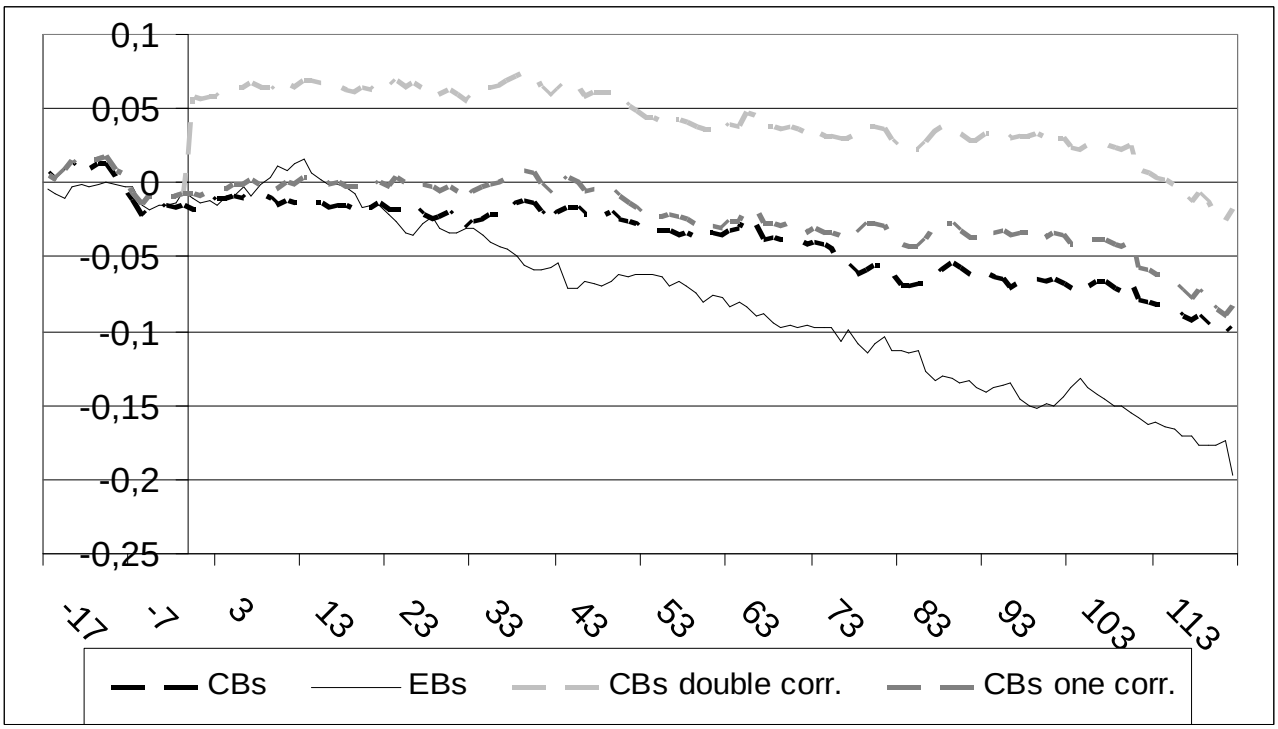

Figure 2 – CAARs of stocks for CBs and EBs samples (EBs: plain line; non-corrected CBs abnormal returns: discontinued black line, CBs with a correction corresponding to the debt leverage effect: discontinued grey line, CBs with a double correction of returns for the debt leverage and the supposed total dilution: discontinued light grey line)

[1] This paper was presented at the 2004 AFFI international meeting at Cergy. The authors are also indebted to E. Dor for his valuable methodological comments and suggestions.

[2] The effect is in fact doubled in a no investment scenario. For example, in a firm with 500 in equity capital and 500 in debt, a pure CB issue of 100, which is assumed to reimburse a current debt and is later converted, lowers the leverage ratio from 1 to 0.67. The net worth of the firm is diluted by 20%.

[3] In that scenario, considering the example given in the previous footnote, the leverage ratio declines from 1 to 0.83 as far as the net worth of the firm after conversion is 600 and the debt remains at 500.

[4] Taking the same example, in that scenario, the firm maintains its leverage ratio at 1 and invests 200 in new assets through a CB issue of 100 and a new debt of 100.

[5] The debt also results in agency costs brought on by the increase in the risk of bankruptcy, by taking into account the risk of asset substitution (Jensen and Meckling, 1976), and even by the possibility of underinvestment (Myers, 1977).

[6] The authors also summarize the available literature on the effects of a CB announcement and the incidence of the "conversion to shares" component in the observed reactions.

[7] For a synthesis of empirical studies of the French market reaction to a CB issue, refer to Hachette (1991), Hamon and Jacquillat (1992), Gajewski and Ginglinger (1998), and Ginglinger (2000). Ginglinger (2000) proposes, in addition, a synthesis of studies related to the long-term performance of CB issuers, and underlines the difficulty of interpreting the results, which are generally unfavorable. According to Eckbo, Masulis and Norli (2000), one of the explanatory factors would be the "timing" of the issue, which is often launched after a sharp rise in the share price.

[8] Typically, an OCEANE contains an option on dilution.

[9] For example: with a view toward reducing blocks of participation, particularly in Germany.

[10] The largest reduction in book ratios is due to the fact that a CB issue is based on the market value of shares at the moment of issue plus a premium. The price of shares being higher than their balance sheet value, the firm's accounting net worth is thus re-valued after the issue.

[11] We checked the sample of issues in order to verify that prices were not affected by parasite information published during the period of investigation around the issue date.

[12] Most firms in the sample were or are still part of the CAC 40. In general, they are large firms. Thus, our use of the CAC 40 index seems justified, as confirmed in further tests when the CAC 250 index was used.

[13] The estimate (4) is only valid if L1 is large enough. Then the sampling error effect of the parameters disappears. Here we have a medium term window of 146 observations.

[14] See Campbell et al., (1997), p.154.

[15] See reference, pp. 160-172.

[16] The assumption that the distribution of abnormal returns has the same characteristics before and after the event is also important. Without any theoretical explanation, we do not see why an issue of convertible bonds could induce a larger or a smaller variance. A priori, there are as many reasons for the variance to increase as there are for it to decrease: if a CB issue strengthens the financial structure of the firm, the risk to the economic cash flow can be lower. If the CB issue helps to launch new risky investments through debt financing, the future variance may increase. The event does not yield in itself a "one way" induced increase in the variance. On a large sample of stocks, the two phenomena may compensate for each other. However, the limited size of our EB sample exposes these data to a risk of induced variance.

[17] We also calculated the abnormal returns according to normal returns based on a weekly estimated market model. This one was estimated five times starting on different days of the week (i.e. Monday, Tuesday, etc.). We obtained five estimates of weekly betas for each stock. The weekly-based CAARs were then calculated for all stocks. At day d+122, the five "weekly" CAARs were respectively -9.7%, -8.8%, -22.3%, -3.4% and -9.9%, giving an average value of -10.8%. These data are very similar to the CAAR of -9.7%, resulting from a daily estimate of the betas in the market model. The daily estimates of betas will be favored hereafter because of the higher number of observations (145 versus 29 for weekly betas).

[18] This remark does not reflect precisely the results of most of the empirical studies mentioned. These identify a significant drop immediately at or after the issue and not before.

[19] Two EBs, which had a negative bonus at issue, were excluded from the calculation of this average.

[20] In fact, the value of the beta coefficient after an issue should take into account the beta of the firm's debt. We then have:

$$\beta_a = \frac{D}{S+D}\beta_D + \frac{S}{S+D}\beta_e ,$$

with: β_a, beta of assets, β_D, beta of debt, β_e, beta of stocks, D, market value of debt and S, market value of equity. For a given economic beta of assets, the correction for the stock beta is equal to that of equation (7) only if the debt beta is zero. We validated this hypothesis by analyzing for CB issues the parallel evolution of returns of standard fixed income bonds of the same issuing firm within the same window as in L1.We had only an eight firm sample. The test of the market model applied to these eight bonds is unclear. In three cases, the bond beta is significantly negative, in two cases, it is significantly positive and, in four cases, it is not significantly different from zero. The average value of the estimated bond betas is 0.032 and is statistically negligible. Annex 4 shows these results. Under these conditions, we are led to the hypothesis of null bond betas, a hypothesis that was confirmed by a regression of the JP Morgan euro bonds index on the French stock index. The estimated value of the beta coefficient of the bond index was 0.0145 for the period 1995-2003. Thus, we consider the effect of bond betas to be negligible.

[21] This calculation is based on an arbitrary discount rate of 5% for all CBs. We wanted to choose the stock's annual return as revealed in the market model to discount. This choice was not possible because, historically, the year preceding the issue is characterized by negative returns for many firms linked to the bad timing of the market during the years 2000-2002.

However, the choice of discount rate is of limited importance in the value of discounted dilution coefficients. For example, taking a discount rate of 8% will give an average of 0.943 to discounted dilution coefficients.

[22] The CBs have an asymmetric return because of the presence of a purchase option, which makes it rather difficult to use the Sharpe ratio. However, in this case, the Exane index is based on convertible bonds, which are renewed, and remains on average “at the money”. Thus the Sharpe ratio here constitutes an acceptable approximation.

[23] It seems there is no long period “sector” effect of CB issues compared to the rest of the market, the average daily return and standard deviation being very close in the two indexes.