New evidence on the pecking order hypothesis: the case of French convertible bonds

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Abstract

Convertible bonds (CBs) are an important asset class but their analysis in function of the equity and bond components has received insufficient attention in France. This study investigates the relation between announcement effects and equity components for 141 French CB issues. We use the CB sensitivity to its underlying common stock as a proxy for the equity component. Our results indicate that CB issue announcements imply significantly negative market responses, which are negatively related to the equity component. This result supports the Myers and Majluf (1984) model [Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. J. Financial Econ. 13, 187–221]. A more detailed analysis reveals that the market reaction is significantly positive for the subset of 'mixed' CBs. Mixed CB issuers are characterized by high informational asymmetries about investment opportunities compared with informational asymmetries about assets-in-place. This finding supports the revised Myers and Majluf model, which predicts positive announcement effects under certain conditions. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

A major lacuna in the French empirical literature on convertible bonds (CBs) concerns their analysis by controlling for the equity and bond components. Such an analysis is important for understanding the reasons why managers use CBs as financing instruments and the nature of the information conveyed to outside investors by the decision to issue and the choice of issue terms. CBs have a confirmed hybrid nature and may be designed according to the firm interests by combining advantages of straight debt and equity.

Empirically, the higher the equity component embedded in a financing instrument, the more negative the information about the firm value. On the American market, Smith (1986) documents a negative and significant market response of −2.07% for CB issues, lower than for common stock issues, −3.14%, but higher then for straight bond issues, −0.26% (see Roon and Veld, 1998, for a résumé of studies on announcement effects at CB issues). Kuhlman and Radcliffe (1992), Brennan and Her (1993), Davidson et al. (1995) find a negative and significant relationship between announcement effects at CB issue and the equity component. Also, as reported by Smith, negative announcement effects for CB issues are more pronounced than for convertible preferred and even more than for straight preferred.

All these results support the Myers and Majluf (1984) model (hereafter ‘M&M model’) and its ‘pecking order hypothesis’. An implication of this model is that, under asymmetric information about the firm value, issuing equity, hybrid securities or risky debt conveys non-positive information about the firm value because managers may take advantage of their private information in order to sell overvalued securities. The stronger the equity component embedded into the financing instruments, the higher the probability that the firm is overvalued and, consequently, the more negative the market reaction.

The support for the M&M model is, anyway, controversial on the European and Japanese CB markets. Roon and Veld (1998) find significantly positive announcement effects at CB issues on the Dutch market and summarize studies reporting similar results on the Japanese domestic and offshore markets. In these countries,

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1 The M&M model concerns asymmetric information about the firm value. For CBs, Brennan and Kraus (1987), Kim (1990) models are based on asymmetric information about the firm risk. These models also predict a negative relationship between the announcement effect and the equity component at CB issues.

2 Issuing straight bonds may also be costly if there are bankruptcy costs or agency costs related to risk-shifting incentives. In order to turn away from costs related to equity and straight debt financing when managers need new investment capital and there is insufficient cash, they may optimally choose to issue CBs. In this case, they may adjust the issue terms (for example the face value and the conversion ratio) in order to minimize the negative effect on the shareholders’ wealth. Stein (1992) proves that callable CBs have the quality to resolve financing problems for firms having high financial distress and adverse selection costs. Green (1984) demonstrates that managers of firms having high risk-shifting and managerial discretion agency costs may also optimally choose CBs.
firms are strongly controlled by the banking sector, implying that the M&M model assumption of managers acting only in the interest of existing shareholders is questionable. But, surprisingly, the authors’ analysis confirms that positive announcement effects are found even for CB issues by firms verifying the M&M model assumptions (as large Dutch firms or Japanese ‘non-keiretsu’ firms). On the French market, empirical results about the market response are contrasting and depend on the sample size and the methodology used. Bah (1997) uses a market adjusted returns model and finds a significantly negative market response the day before the announcement \((t = -1)\) for a sample of 51 issues. Anyway, Hamon and Jacquillat (1992) find a similar result for a sample of 73 issues but on the day after the announcement \((t = 1)\). Maati (1998), using a sample of 177 CB issues, does not find any significant announcement effect using the previous approach. The use of a market and risk adjusted returns approach reveals a negative announcement effect at \(t = -1\) for the estimation window \([-480, -241]\) relative to the announcement day \(t = 0\) (no significant results are found for estimation windows around or after the announcement). These contrasting results accentuate the necessity of a more detailed analysis of CB issues on the French market.

In line with this conclusion, this study provides a more detailed analysis of investors reaction at announcement of CB issues on the French market by controlling for the equity signal sent to the market. The CB sensitivity to its underlying common stock (DELTA \((\Delta)\)) is used as a measure for the equity component. We find a significantly negative announcement effect for CB issues and also a significantly negative association between this effect and the equity component, this finding being similar to results concerning the American market and giving support to the M&M model. An interesting result is that this association is mostly driven by strong negative abnormal returns for equity-like CBs. For mixed CBs (for which the equity and debt components are equivalent) we find positive and significant announcement effects. For debt-like CBs the announcement effect is not significant.

The surprising finding of a positive reaction for mixed CBs is similar to results concerning the Japanese and the Dutch market, the difference being that for these markets the positive market response concerns the entire CB issue and not only a certain type of CBs. The positive announcement effect for mixed CBs rejects the M&M model under its original form but supports the M&M model in its revised form (Cooney and Kalay, 1993). If the M&M model is revised by allowing the existence of potential negative NPV projects, positive signaling is possible under certain conditions, as for firms having a high uncertainty about the project value relatively to that of assets-in-place. Our results show that French mixed CB issuers have many tangible assets, therefore the uncertainty concerning the value of assets-in-place is low. On the other hand, these firms have relatively uncertain projects, they are rapidly growing firms, with a high stock price over-performance before and after the issue and high market-to-book and research and development/sales ratios. Consequently, mixed CB issuers satisfy the conditions required for positive signaling in the revised M&M model.
Our research contributes to the empirical literature on capital structure in several ways. We provide a more detailed study of announcement effects at CB issues on the French market by controlling for the equity and debt components. A new measure is used for classifying CBs, that is the CB sensitivity to the evolution of its underlying common stock (Δ) and we find that mixed CB issues are associated with significantly positive announcement effects while for the total sample announcement effects are significantly negative. Also, we find that the premium is an important predictor of issue announcement effects and signals the ability of managers to force the conversion.

This article is organized as follows. In Section 2, we discuss some problems related to the dichotomization of CBs into their standard components and introduce our proxy for the equity component. In Section 3, we describe our sample, data sources and discuss results concerning some univariate tests on the difference between characteristics of CB issuers. In Section 4, we describe our empirical methodology, perform the event-study and interpret our empirical results. Section 5 deals with the cross-sectional analysis. Conclusions are presented in Section 6.

2. The equity component of convertible bonds

Measuring the debt and equity components of CBs is subject to complexity and subjectivity. Theoretically, only non-callable discount CBs, without dividend payments to the common stock, can be separated into an ordinary discount bond (the debt component) plus a warrant (the equity component) entitling the owner to purchase common stock upon an exercise payment equal to the principal of the bond. More complex CBs, with embedded puts and calls, cannot be to the fullest extent unbundled in a set of standard instruments because the different components generally interact (see Ingersoll, 1977; Casson, 1998). Brennan and Schwartz (1977) use a numerical method for determining the value of complex CBs, which is often used for calculating the value of their standard components. Table 1 summarizes results obtained by different authors in separating CB components.

Even if these studies concern CBs on the same market (American) and for similar periods, these results are contrasting, thus revealing the difficulty of separating the

<table>
<thead>
<tr>
<th>Authors</th>
<th>Period</th>
<th>Number of observations</th>
<th>Equity component (%)</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>King (1984)</td>
<td></td>
<td>103</td>
<td>18</td>
<td>Numerical method</td>
</tr>
<tr>
<td>Billingsley et al. (1986)</td>
<td>1977–1983</td>
<td>95</td>
<td>39</td>
<td>Two-equation model</td>
</tr>
</tbody>
</table>
Table 2
Proxies used in the literature for approaching the equity component of CBs

<table>
<thead>
<tr>
<th>Authors</th>
<th>Proxy for the probability of conversion</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beatty and Johnson (1985)</td>
<td>Call price/conversion value</td>
<td>Measure the potential to force conversion for callable CBs</td>
</tr>
<tr>
<td>Kuhlman and Radcliffe (1992)</td>
<td>Conversion price/stock price</td>
<td>Measures the potential of managers to motivate bondholders to convert soon after the issue</td>
</tr>
<tr>
<td>Davidson et al. (1995)</td>
<td>Time to conversion $T = \left[ \ln(CP) - \ln(P) \right]/\mu$</td>
<td>It is the expected time the CB will be 'at the money'. CP, conversion price; $P$, current price of common stock; $\mu$, rate of stock price appreciation</td>
</tr>
<tr>
<td>Janjigian (1987)</td>
<td>$N\left[ \left( \ln(CP) - \ln(P) \right)/\sigma T \right]$</td>
<td>CP, conversion price; $P$, current stock price; $\sigma$, volatility of the underlying stock; $T$, time to maturity; $N$, cumulative probability under a standard normal distribution</td>
</tr>
</tbody>
</table>

CB equity and bond portions. The numerical method of Brennan and Schwartz (1977) relies on the restrictive hypothesis of optimal call strategy by managers and therefore underestimates the equity component. Billingsley et al. (1986) describe the empirical problems caused by interdependencies between variables determining the equity and bond portions of CBs. Empirically, CBs are often classified by their ‘probability of conversion’. This is the probability that the CB will be exchanged for common stock before or at maturity\(^3\). The various proxies used in the empirical literature are summarized in Table 2.

The ‘time to conversion’ used by Davidson et al. (1995) reflects the ratio between the firm’s signaled growth rate and the market a priori expected growth rate. A low ‘time to conversion’ indicates a high equity component because the CB may rapidly be at-the-money implying a high probability that bondholders will convert under some given economic incentives. Kuhlman’s proxy also quantifies the ability of management to force the conversion after the CB issue. The proxy used by Janjigian for the debt component takes into account the volatility of the underlying stock and the CB maturity. All these proxies have been used to determine the relationship between the CB equity component and announcement effects at CB issues for the American market. Results are generally identical, this relationship being significantly negative and confirming the negative information sent by the equity component of CBs.

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\(^3\) For non-callable pure discount CBs, with common stock not paying dividends, this is the probability that the conversion value will be higher than the balloon payment at the maturity, because in this case the bondholder has no incentive to convert before the maturity. If coupons and dividends are not nulls, the probability of conversion depends on their relative importance. For example, bondholders may prematurely convert if dividends are high enough. For callable convertible discount bonds, Ingersoll (1977) has provided an analytical expression for the probability of conversion (p. 306) under the hypothesis that managers call the CB if the conversion value become higher than the call price (optimal call policy). This is the probability that the conversion value will be higher than the call price at least one time before the maturity.
In this study, we classify CBs by their $\Delta$, that is the sensitivity of the CB value to its underlying common stock. Under the restrictive assumption that a CB may be considered as the sum between a standard bond and an European warrant entitling the owner to purchase a fraction of the equity upon an exercise payment equal to the principal on the bond, the $\Delta$ of a CB equals the $\Delta$ of the embedded warrant. Under the Black–Scholes assumptions, the value of $\Delta$ is:

$$\Delta = e^{-\delta T}N\left(\frac{\ln(S/B) + (r - \delta + \sigma^2/2)T}{\sigma T^{1/2}}\right)$$

where $S$ is the current price of the underlying stock, $B$ the conversion price, $r$ the continuously compounded yield estimated from a 10 year French treasury bond on the issue date, $\sigma$ the standard deviation of the continuously compounded common equity returns, $T$ the number of years to maturity, $\delta$ the continuously compounded dividend yield, and $N(.)$ is the cumulative probability under a standard normal distribution function.

Like proxies summarized in Table 2, $\Delta$ measures the likelihood that bondholders will convert the CB (voluntarily or forced by managers) under certain economic incentives, as managers call for redemption (for callable CBs) or the distribution of a high dividend yield. The advantage of our proxy is that it gives an accurate measure of the equity component, by taking into account more variables influencing the debt- and equity-portions of CBs, as the dividend yield, the risk free rate of return, the common stock volatility and the time to maturity. A high $\Delta$ (approaching 1) means that the CB is very sensitive to its underlying common stock and consequently has a high equity component. Inversely, when $\Delta$ approaches 0, a convertible turns into a straight debt.

In a first classification, CBs for which $\Delta$ is included in the intervals [0, 0.33]; [0.33, 0.66]; [0.66, 1] will be, respectively, considered as ‘debt-like’, ‘mixed’ and ‘equity-like’ CBs (hereafter ‘D-CBs’, ‘M-CBs’ and ‘E-CBs’). In a second classification, these three types correspond to fractals of a three-part division of the CB sample by increasing equity components.

3. Data and sample description

3.1. Data sources

Our sample consists of public French CB issues between January 1981 and February 1998. From 193 CB issues on the Paris stock exchange for the specified period only 141 issues were considered in our sample after imposing restrictions as follows. For each CB issue, two announcement dates must be identifiable, the date at which the Commission des Opérations de Bourse (COB, that is the French Stock Exchange Committee) appends a ‘VISA’ on the information notice delivered by the issuer, and the date at which the announcement is published in the French daily official financial newspaper, Bulletin des Annonces Légales Obligatoires (BALO). The BALO must give information on the issue but not news about the firm (as
annual results, provisional results or future prospects). Also, no other securities (as common stock or warrants) are permitted to be offered concomitantly with the CB issue or in the event window, ranging from \( t = -6 \) to \( t = 6 \) days relatively to the announcement date \((t = 0)\). Finally, only those CBs for which data is available for 500 days before and 276 days after the two announcement dates were considered.

The sample was assembled by searching in the annual report published by the COB and summarizing all security issues on the French market for a given year. For each identified issue, the annual ‘Table du Bulletin des Annonces Légales Obligatoires’ (BALO index) provides information allowing to identify the reference of the daily financial newspaper BALO which contains all the relevant data about the issue. Stock price data was extracted from the Association Française de Finance (AFFI) database. For more recent issues, we have used data from Datastream. Other information concerning the issuer, as the number of outstanding shares before the issue or accounting data, was derived from Diane and Disclosure databases and issuance prospectuses.

The ‘true’ announcement date is the date when the issue is announced in BALO. This is the first time issue characteristics are available for all investors in a public financial newspaper (the law prohibits any other disclosure of this information before publication in BALO). Anyway, in our study we also consider the date at which the COB appends a ‘VISA’ on the information notice delivered by the issuer, because this is the first time most of investors are informed about the decision to issue. Anyway, at this date the issue is not ‘official’ and there is no assurance that a VISA from the COB will be obtained. Generally, French studies of announcement effects at security issues use the two announcement dates.

3.2. Description of the sample and discussion

Summary statistics for CB issues and issuers are presented in Table 3 while pairwise differences in mean values (with their significance level) are given in Table 4. CBs are classified as described in the previous section.

The median CB issuer is a medium-sized firm, the value of its total assets being 9.2 million FF. CB issuers have high growth opportunities (the mean market-to-book value is 1.54) and issue CBs after a period of sustained cumulative stock price performance in excess to the French CAC index, this performance diminishing after the issue (from 7.43 to 3.06% over the specified periods). CBs sell at a high premium (12% of the CB value). The median amount issued is 19% of the market value of common stock. These overall results change when considering CB-issuers accordingly to the type of CB issued.

D-CBs are issued by firms with low growth opportunities, having significantly lower market-to-book ratios and distributing high dividends. On the other side,

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4 We call ‘premium’ the difference between the CB value and the bond or equity floor, whichever is greater, this difference being divided by the CB value. The bond floor is estimated by discounting the promised coupon and principal payments by the yield of an equivalent straight bond at the issue time; the equity floor is the conversion value, that is the stock price at issue multiplied by the conversion ratio.
Table 3

<table>
<thead>
<tr>
<th>Descriptive measure of the issuer and the CB issued</th>
<th>First classification</th>
<th>Second classification</th>
<th>All convertibles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D-CBs (n = 35)</td>
<td>M-CBs (n = 63)</td>
<td>E-CBs (n = 43)</td>
</tr>
<tr>
<td>Total assets (millions FF)</td>
<td>24.2 (12.8)</td>
<td>35.2 (5.64)</td>
<td>3.16 (3.25)</td>
</tr>
<tr>
<td>Tangible assets/total assets</td>
<td>0.47 (0.39)</td>
<td>0.64 (0.68)</td>
<td>0.58 (0.28)</td>
</tr>
<tr>
<td>Research and development/sales</td>
<td>0.023 (0.021)</td>
<td>0.095 (0.101)</td>
<td>0.046 (0.051)</td>
</tr>
<tr>
<td>Market-to-book</td>
<td>0.803 (0.411)</td>
<td>1.67 (1.25)</td>
<td>1.94 (2.30)</td>
</tr>
<tr>
<td>Issue Proceeds/MVCS</td>
<td>0.73 (0.47)</td>
<td>0.38 (0.19)</td>
<td>0.25 (0.16)</td>
</tr>
<tr>
<td>Premium (%)</td>
<td>10.2 (9.01)</td>
<td>16.4 (17.02)</td>
<td>7.08 (10.21)</td>
</tr>
<tr>
<td>Long-term debt/total assets</td>
<td>0.25 (0.24)</td>
<td>0.26 (0.25)</td>
<td>0.20 (0.25)</td>
</tr>
<tr>
<td>Dividend yield (%)</td>
<td>9.81 (4.74)</td>
<td>3.55 (2.83)</td>
<td>1.01 (1.44)</td>
</tr>
<tr>
<td>Pre-issue stock performance (%)</td>
<td>1.95 (2.04)</td>
<td>13.24 (16.47)</td>
<td>3.37 (8.01)</td>
</tr>
<tr>
<td>Post-issue stock performance (%)</td>
<td>-2.14 (–6.24)</td>
<td>12.05 (11.99)</td>
<td>-5.87 (2.14)</td>
</tr>
<tr>
<td>Stock return volatility (%)</td>
<td>1.79 (1.32)</td>
<td>1.84 (1.76)</td>
<td>1.97 (1.97)</td>
</tr>
</tbody>
</table>

a CB issuers are categorized by type of convertible issued. ‘Debt-like’, ‘mixed-type’, and ‘equity-like’ CBs are abbreviated as D-, M-, and E-CBs, respectively.
b In the first classification, the type of convertible is determined by its belongingness to the intervals [0, 0.33]; [0.33, 0.66]; and [0.66, 1] while in the second classification the type is determined by its position relative to the 33rd and the 66th percentile of the sample’s probability of conversion. See Section 2 for more details.
c Given statistics are the mean followed by the median in parentheses.
d Accounting data are for the end of the fiscal year preceding the issue. The value of the debt is calculated in terms of book value. Tangible assets are property, plant, equipment plus inventories.
e This is the ratio between, on one hand, MVCS plus book value of long-term debt and, on the other hand, total assets.
f MVCS, market value of common stock. This is the product of the number of shares outstanding at the issue date and the stock price. This latter is the closing price at the end of the month preceding the month of the offering.
g This is the difference between the value of the CB and the maximum between its bond floor and equity floor, all this being divided by the value of the convertible.
h The pre-issue stock performance is the cumulative abnormal return estimated over the period [–250, –2] before the issue, where 0 is the issue date, while the post-issue stock performance is the cumulative abnormal return calculated over the period [1, 250]. The abnormal return is the difference between the normal return and the return of the French CAC index.
i This is the S.D. of raw returns over the period ranging from day −250 to day −2, where 0 is the issuance day.
Table 4: Pairwise differences in mean values of descriptive statistics for CB issuers

<table>
<thead>
<tr>
<th>Descriptive measure of the issuer</th>
<th>First classification</th>
<th>Second classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M-CBs vs. D-CBs (n = 35)</td>
<td>M-CBs vs. E-CBs (n = 63)</td>
</tr>
<tr>
<td>Total assets (millions FF)</td>
<td>11</td>
<td>32.04**</td>
</tr>
<tr>
<td>Tangible assets/total assets</td>
<td>0.17*</td>
<td>0.06</td>
</tr>
<tr>
<td>Research and development/sales</td>
<td>0.072***</td>
<td>0.049**</td>
</tr>
<tr>
<td>Market-to-book</td>
<td>0.867**</td>
<td>-0.27</td>
</tr>
<tr>
<td>Issue proceeds/MVCS</td>
<td>-0.35*</td>
<td>0.13</td>
</tr>
<tr>
<td>Premium (%)</td>
<td>6.2*</td>
<td>9.32**</td>
</tr>
<tr>
<td>Long-term debt/total assets</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>Dividend yield (%)</td>
<td>-6.26*</td>
<td>2.54</td>
</tr>
<tr>
<td>Pre-issue stock performance (%)</td>
<td>11.29***</td>
<td>9.87***</td>
</tr>
<tr>
<td>Post-issue stock performance (%)</td>
<td>14.19***</td>
<td>17.92***</td>
</tr>
<tr>
<td>Stock return volatility (%)</td>
<td>0.05</td>
<td>-0.13</td>
</tr>
</tbody>
</table>

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- **a** One hundred forty-one offerings on the French market between January 1981 and February 1998 are concerned. CB issuers are categorized by their type (see Section 2 for more details). 'Debt-like', 'mixed type', and 'equity-like' convertibles are abbreviated as D-, M-, and E-CBs, respectively.
- **b** In the first classification, the type of convertible is determined by the belongingness of the 'probability of conversion' in the intervals [0, 0.33]; [0.33, 0.66]; and [0.66, 1] while in the second classification the type is determined by the position of the 'probability of conversion' relative to the 33rd and the 66th percentile of the sample's probabilities of conversion.
- **c** Given statistics are mean differences with their significance in a t-test (*, **, *** means significant at 10, 5, and 1% level, respectively).
- **d** Accounting data are for the end of the fiscal year preceding the issue. The value of the long-term debt is calculated in terms of book value. Tangible assets are property, plant, equipment plus inventories.
- **e** This is the sum between MVCS and the book value of long-term debt, all this being divided by total assets.
- **f** MVCS, market value of common stock. This is the product between the number of shares outstanding and the stock price. The stock price is the closing price at the end of the month preceding the month of the offering.
- **g** This is the difference between the value of the CB and the maximum between its bond floor and equity floor, all this being divided by the value of the convertible.
- **h** The pre-issue stock performance is the cumulative abnormal return calculated on the period [−250, −2] before the issue, where 0 is the issue date, while post-issue stock performance is the cumulative abnormal return calculated on the period [1, 250]. The abnormal return is the difference between the normal return and the return of the French CAC index.
- **i** This is the S.D. of raw returns over the period ranging from day −250 to day −2, where 0 is the issuance day.
E-CBs issuers have strong market-to-book values and low dividend yields, therefore the expected profitability of future growth opportunities is high. This supports the underinvestment hypothesis (Myers, 1977), firms having a higher part of their value in form of investment opportunities issue equity or 'equity-like' securities in order to diminish underinvestment costs. Concerning the size, results indicate that D-CB issuers are large firms (the median size equals 12.8 million FF) while E-CB issuers are significantly smaller (the median size is 3.25 million FF). To the extent that large firms are more vulnerable to managerial discretion and free cash flow costs, this result supports models based on 'equity' agency costs (Jensen, 1986), large firms issue debt or 'debt-like' securities and distribute high dividends in order to diminish agency costs between shareholders and managers. Results concerning the amount of the offering are consistent with the hypothesis that adverse selection costs are positively related to the amount offered (Krasker, 1986). In line with this hypothesis, E-CB issuers issue small amounts of CB, which is not the case for D-CBs issuers, the median 'issue proceeds/market value of common stock' is 16% for E-CB issuers compared with 47% for D-CB issuers. Concerning the stock price abnormal performance before and after the issue, E-CB and D-CB issuers are similar to American CB issuers (Spiess and Affleck-Graves, 1996), there is a strong over-performance before the issue and under-performance afterwards. This result is the most remarkable for E-CB issues (the cumulative abnormal returns in excess over the French CAC index drop from 3.37 to −5.87%) and supports the M&M model, the higher the firm overvaluation, the stronger the managers motivation to issue securities having high equity components.

Concerning M-CB issuers, it is not unusual that they have intermediate size, dividend yields and issue proceeds in comparison to extreme-CB issuers. But it is interesting to see that M-CB issuers are peculiar in some points. First, the underlying common stock price strongly outperforms that of the other issuers and does not significantly change after the issue (for the specified periods, cumulative returns in excess over the French CAC index are 13% before the issue and 12% afterwards). Therefore, the hypothesis of managers issuing after a period on which the firm is overvalued is not supported. Persistent positive stock price performance around the issue and high market-to-book and research and development/sales ratios confirm the high profitability of investment opportunities for M-CB issuers. Expenses for research and development attain 9% of the net sales, being significantly higher than for extreme-CB issuers. On the other hand, M-CB issuers have more tangible assets than the other issuers (the median value is of 68% of the total assets, compared with 28% for E-CB issuers and 39% for D-CB issuers). Therefore,

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3 The positive abnormal performance before the issue is generally explained by the fact that managers choose to issue during a period called 'windows of opportunity', that is when they perceive that shares are overpriced. The poor post-announcement price behavior is puzzling and presumed to be caused by market inefficiencies. Spiess and Affleck-Graves (1996) explain this by the market underreaction at the time of the offering, the full impact being realized over a longer period of time. Another hypothesis in the literature is that CB issues are underpriced and the post-issue stock price decline is caused by wealth transfers from shareholders to bondholders. This hypothesis is not supported by empirical results (Dann and Mikkelson, 1984).
the uncertainty concerning assets-in-place is low. These results are consistent with the revised M&M model in which the decision to issue may, under certain conditions, inform outside investors that the firm has good projects and not only that the firm is overvalued. These aspects will be detailed in the next section by means of an event-study.

4. Event study

In this section, common stock abnormal returns around CB issue announcements are analyzed. This analysis is accomplished on the entire CB sample and also on each subset of D-, M- and E-CBs. Only results obtained with the first CB classification are reported because with the second classification results remain qualitatively the same. Two announcement dates will be considered in our study, as previously explained: the ‘VISA COB’ date and ‘BALO’ date. The BALO date is situated, on average, 6 days after the ‘VISA COB’ date. We do not consider the issuance day in our study because no more important information is disclosed then.

The event-study methodology is used to compute abnormal returns. The abnormal return is the difference between the observed return and the normal return derived from a market and risk adjusted returns model approach. The model parameters are estimated over the period \([-500, -276]\) before the announcement date \((t = 0)\). This period seems to be accurate in order to eliminate the bias (underestimation of abnormal returns) due to a significantly positive pre-issue stock price performance on the French market (Maati, 1998). The test statistics incorporates standardized abnormal returns for each firm (Patell, 1976). This methodology is widely used for security issue announcements and therefore will not be detailed in this paper.

4.1. Event study results

Table 5 reports abnormal returns (AR) for days surrounding the announcement date \(t = 0\) and average abnormal returns (AAR) for some periods around the announcement date. Results are given for the two considered announcement dates (‘VISA COB’ and ‘BALO’) and, at each of these dates, we provide results for the entire sample and also for each of the three CB subsets (D-, M- and E-CBs).

For the two announcement dates, the market reaction for the whole sample is negative and significant. Concerning the VISA COB date, the negative announcement effect (significant at 1% level) is strong and concentrated at \(t = 0\). For the BALO announcement date, the negative impact at day \(t = 0\) is smaller but remains significant at 10% level. Results obtained after splitting the sample according to the

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6 On the American market, some specific offering terms as the coupon interest rate or conversion ratio are announced just prior to the issuance, that is why some authors consider also the issuance date in their studies.
Table 5
Common stock daily AR for the event window \([-6, 6]\) and AAR for three periods around the VISA COB and BALO announcement dates, concerning 141 French public CB issued between January 1981 and February 1998.

<table>
<thead>
<tr>
<th>Day</th>
<th>Announcement date</th>
<th>VISA COB&lt;sup&gt;b&lt;/sup&gt;</th>
<th>BALO&lt;sup&gt;b&lt;/sup&gt;</th>
<th>All CBs (1)</th>
<th>Debt-CBs (2)</th>
<th>Mixed-CBs (3)</th>
<th>Equity-CBs (4)</th>
<th>All CBs (5)</th>
<th>Debt-CBs (6)</th>
<th>Mixed-CBs (7)</th>
<th>Equity-CBs (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AR and AAR by type of CB&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-6</td>
<td></td>
<td>-0.011 (0.3)</td>
<td>0.113 (0.48)</td>
<td>-0.219 (-0.85)</td>
<td>0.126 (0.74)</td>
<td>0.06 (0.1)</td>
<td>0.387 (0.96)</td>
<td>0.001 (-0.19)</td>
<td>0.248 (0.89)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td></td>
<td>-0.241 (-1.57)</td>
<td>-0.038 (-0.1)</td>
<td>-0.247 (-1.2)</td>
<td>-0.215 (-0.51)</td>
<td>-0.03 (0)</td>
<td>0.522 (1.36)</td>
<td>0.156 (0.61)</td>
<td>-0.185 (-0.57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-4</td>
<td></td>
<td>-0.165 (-1.2)</td>
<td>-0.037 (-0.16)</td>
<td>-0.269 (-1.51)</td>
<td>0.189 (0.49)</td>
<td>-0.26 (-1.6)*</td>
<td>-0.149 (-0.29)</td>
<td>0.21 (0.58)</td>
<td>-0.546 (-1.6)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-3</td>
<td></td>
<td>-0.246 (-1.66)*</td>
<td>0.015 (-0.07)</td>
<td>-0.141 (-0.44)</td>
<td>-0.415 (-1.27)</td>
<td>-0.05 (-0.8)</td>
<td>0.156 (0.9)</td>
<td>-0.237 (-0.97)</td>
<td>0.16 (0.37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-2</td>
<td></td>
<td>0.231 (1.15)</td>
<td>0.159 (0.1)</td>
<td>0.19 (0.45)</td>
<td>0.072 (0.25)</td>
<td>-0.2 (1.8)**</td>
<td>0.478 (0.9)</td>
<td>0.008 (0.39)</td>
<td>-0.189 (-0.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td></td>
<td>-0.066 (-0.36)</td>
<td>-0.008 (0.01)</td>
<td>0.046 (-0.33)</td>
<td>-0.008 (0.45)</td>
<td>-0.24 (1.5)</td>
<td>-0.437 (-1.23)</td>
<td>0.318 (1.62)*</td>
<td>-0.66 (-2.71)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>-0.34 (-2.64)**</td>
<td>-0.85 (3.05)**</td>
<td>-0.402 (-3.02)**</td>
<td>-0.313 (1.72)*</td>
<td>-0.22 (1.99)**</td>
<td>-0.226 (-0.76)</td>
<td>0.303 (1.8)**</td>
<td>-0.093 (-0.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>-0.183 (-0.8)</td>
<td>-0.417 (1)</td>
<td>-0.035 (-0.02)</td>
<td>-0.405 (-1.69)*</td>
<td>-0.15 (-0.8)</td>
<td>-0.04 (0.26)</td>
<td>0.016 (0.06)</td>
<td>0.25 (0.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>-0.011 (-0.19)</td>
<td>0.401 (0.81)</td>
<td>-0.137 (-0.55)</td>
<td>-0.154 (-0.31)</td>
<td>-0.18 (-1.7)*</td>
<td>-0.406 (-1.15)</td>
<td>-0.27 (-1.01)</td>
<td>0.022 (0.25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>0.221 (1.27)</td>
<td>0.003 (0.36)</td>
<td>0.328 (1.03)</td>
<td>0.137 (0.23)</td>
<td>0.05 (-0.2)</td>
<td>-0.201 (-1.28)</td>
<td>0.147 (0.11)</td>
<td>0.316 (1.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>0.117 (1.16)</td>
<td>0.555 (1.81)*</td>
<td>-0.013 (0.14)</td>
<td>-0.152 (-0.44)</td>
<td>-0.45 (-3.3)**</td>
<td>0.463 (0.56)</td>
<td>0.282 (0.76)</td>
<td>-0.399 (-1.26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>-0.09 (-0.81)</td>
<td>-0.291 (-1.22)</td>
<td>0.016 (-0.53)</td>
<td>-0.551 (-1.53)</td>
<td>-0.21 (-0.8)</td>
<td>-0.562 (-2.29)**</td>
<td>-0.447 (-1.31)</td>
<td>-0.22 (-0.81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>0.096 (0.43)</td>
<td>0.371 (0.87)</td>
<td>-0.24 (-0.95)</td>
<td>0.296 (0.69)</td>
<td>-0.08 (-0.4)</td>
<td>-0.016 (0.99)</td>
<td>-0.519 (-0.91)</td>
<td>-0.297 (-0.91)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> AR and AAR values are in percentage with Z-values in parenthesis. For each one of the two considered announcement dates, the first column concerns announcement effects for the entire sample of CBs while the three following columns concern announcement effects for debt-like, mixed-like, and equity-like convertibles (see Section 2 for more details). The last three rows contain AAR for the considered periods. The null hypothesis is that the standardized AR is zero. *, **, *** means significant at 10, 5, and 1% level, respectively. AR and AAR significant at 5 and 1% level are in bold.

<sup>b</sup> Two dates are considered in this study. VISA COB is the date when the issue is registered with the COB while BALO is the date at which the issue is announced in the official daily financial newspaper BALO.

<sup>c</sup> CB issuers are categorized by their type (see Section 2 for more details). ‘Debt-like’, ‘mixed type’, and ‘equity-like’ CBs are abbreviated as D-, M-, and E-CBs, respectively.
CB type are interesting. As reported in Table 5 in columns 2, 3 and 4, the market reaction at the VISA COB date is significantly negative and similar for all CB types. Contrarily, when all the information concerning CB characteristics is publicly known at the BALO date, the stock price response depends on the CB type (columns 6, 7 and 8). We observe positive reactions (significant at 10 and 5% levels) for M-CBs at days $t = -1$ and $t = 0$, while for E-CBs the market reaction is strongly negative at $t = -1$ (significant at 1% level). The market reaction for D-CBs is negative but not significant.

4.2. Interpretation of announcement effects

The results in Table 5 concerning the total sample are consistent, on average, with the M&M model and its implicit pecking order hypothesis. Announcements of CB offerings imply statistically significant price declines at the two announcement dates. At the VISA COB date the negative announcement effect is highly significant and similar for all CB types. This may be explained by the fact that most of investors are informed only about the fact that CBs will be issued and they know nothing about their characteristics because these characteristics are not yet published. The remaining ‘corrective’ effect at BALO date, which is also significantly negative but less important than for the VISA COB date, is explained by the resolution of the uncertainty concerning the reliability of the issue and the type of CB issued. When the issue announcement is published in BALO, outside investors know that the COB has delivered the VISA and all the information regarding the issue is official and available to all investors.

Results after splitting the sample at the BALO date show that the announcement effect is not the same for the three CB types. The market reaction for E-CBs is significantly more negative than for D-CBs and M-CBs and this supports the M&M model. The negative and not significant market response for D-CB issues also supports the M&M model because these CBs still have an equity component, conveying negative information to the market. But the significant positive market reaction for M-CBs does not support this model. Positive market reactions for M-CB issues occur at dates $t = -1$ and $t = 0$ and the AAR on the $[-1, 0]$ period is positive and significant at 1%. Fig. 1 illustrates the non-linear dependency between the equity component ($\Delta$) and the 2-day $[-1, 0]$ AAR at BALO date (the pattern is the same by considering AAR on larger windows spanning to $[-1, +1]$ and $[-6$ to $+6]$ periods or after splitting our sample by issuer size or industrial sector).

\[\text{As is generally known, most of announcement effects to capital structure changes occur within the window $[-1, 0]$ and the use of this 2-day period is motivated by the uncertainty of the day at which the first post-announcement market transaction occurs. Also, it can be seen from Table 5 that the most important market movements concerning the BALO announcement date occur at days $-1$ and 0 (at day 1 no market movement is detectable while the AAR calculated on the window $[-2, 2]$ is no more significant for any of the three types of CBs, neither for the entire sample).}\]
On average, the greater the equity component, the more negative the market reaction, as illustrated by the regression line (the regression between \([-1, 0]\) AAR and \(\Delta\) is significant at 2%). But this negative relationship is mostly driven by strong negative AAR for E-CB issues. The best fitted second degree curve of AAR as a function of \(\Delta\) and \(\Delta\)-SQUARED\(^8\) has been included to illustrate the non-linear pattern of the market reaction in function of the equity component. This curve is concave and the \(R^2\) becomes 9.45% as compared with 4.1% (the change in \(R^2\) is significant at 5%). The shape of the curve is the result of negative AAR for extreme-CBs and positive AAR for M-CBs.

The fact that CB issuers experience announcement effects which are not linearly related to the equity portion embedded in the CB means that the signal sent by the negative equity component interacts with another signal, which is positive and attains its maximum for M-CBs. Generally, models explaining the market response at CB issues are based on asymmetric information about the firm risk, as Brennan and Kraus (1987), Kim (1990) model. These models cannot explain results obtained for M-CBs because these models predict a negative relationship between the equity component and the announcement effect at CB issues, as is the case for the original M&M model. Anyway, Cooney and Kalay (1993) demonstrate that some (realistic) refinements to the M&M model may explain positive market reactions for equity issues (and thus for equity related security issues). The M&M model revision consists of changing its most strong assumption, according to which all potential projects have positive NPVs. If there are no negative NPV projects, the market

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\(^8\) The nature of the regression remains linear, the only change being that a non-linear transformation of the \(\Delta\) is included as a second variable in order to account for the concavity in the mixed region.
response will always be negative at issuance and the higher the equity component, the more negative the market response. Allowing for the existence of possible negative NPV projects implies a major change in the M&M results, undervalued firms may find it interesting to issue in the interest of existing shareholders and positive market reactions are possible. This happens when the uncertainty of project NPVs ($\sigma_B$) is sufficiently higher than the uncertainty concerning the value of assets-in-place ($\sigma_A$). In this case, the advantage of undertaking a good project may overwhelm the disadvantage caused by market under-valuation of assets-in-place. Therefore, managers of undervalued firms may issue while managers of overvalued firms may refuse to issue because the advantage of assets-in-place overvaluation may be overwhelmed by the disadvantage of undertaking a bad, negative NPV project.

Refinements of M&M model were never used to explain puzzling results concerning CB issue announcement effects. Nevertheless, some empirical results are consistent with this revised model. Lewis et al. (1998) find a significant positive relationship between the announcement effect at CB issuance and the issuer’s market-to-book ratio and stock return volatility (these variables are proxies for the $\sigma_B/\sigma_A$ ratio). Mikkelson and Partch (1986) find a significantly higher announcement effect for riskier CB issuers and Davidson et al. (1995), after controlling for the equity component, finds a positive (but not significant) association between the stock return volatility and the announcement effect at CB issuance. These results contradict, as the authors affirm, the M&M model, but they are not in contradiction with the revised M&M model. In our case, M-CBs issuers, which experience positive announcement effects, have concomitantly important research and development/sales and market-to-book ratios, implying high values for $\sigma_B$. Also, these issuers have many tangible assets and, consequently, the uncertainty of assets-in-place ($\sigma_A$) is low. The finding of a positive announcement effect for firms having high $\sigma_B/\sigma_A$ ratios, that is M-CB issuers, supports the revised M&M model.

The revised M&M model implies that firms characterized by high $\sigma_B/\sigma_A$ ratios may issue equity (or equity related securities) and invest in the interest of current shareholders even when they are undervalued. But why do these firms choose M-CBs to the detriment of extreme-CBs? Our interpretation is based on the specificity of M-CB premiums, which are the highest because M-CBs best combine advantages of both straight bonds and common stock. Previous results indicate that M-CB issuers have two major characteristics, they have good project opportunities but also strong informational asymmetries about the value of these opportunities. Under the (realistic) hypothesis that potential negative NPV projects exist, issuing E-CBs (D-CBs) may imply strong adverse selection (debt agency) costs. Contrarily, M-CBs mitigate these costs and allow managers of undervalued firms to diminish the loss due to the under-valuation of project NPVs by neutralizing the premium when informational asymmetries dissipate and the rise in the stock price allows managers to force the conversion. This argument is the same as the one formulated by Stein (1992) when he equates CBs with common stock sold ‘above the market price’ in reason of the managers ability to force the conversion. Thus, the possibility of selling equity ‘above the market price’, by issuing CBs and forcing conversion,
enlarges the set of undervalued firms deciding to issue and invest in the revised M&M model. The greater the expected premium expropriation, the less restrictive the conditions required in the revised M&M model for managers of undervalued firms to issue and invest. Therefore the higher the premium, the stronger the incentive for undervalued and rapidly growing firms to issue and invest and, consequently, the more positive (the less negative) the market reaction. Empirically, results indicate that M-CB issuers sell CBs with high premiums, attaining 16%. On the American market, the wealth transfer from bondholders to existing shareholders caused by the premium expropriation after conversion is important, as related by some empirical studies. Datta and Datta (1996) find a significant reduction in the value of CBs at the call announcement and they explain this by the premium transfer to current stockholders. Brennan and Her (1993) find a positive (but not significant) relationship between the conversion premium and announcement effect for CB issues. In order to deepen these aspects, a cross-sectional analysis is performed in the following section.

5. Cross-sectional analysis

5.1. Regression methodology

In this section, we test the hypothesis that firms having high $\sigma_A/\sigma_B$ ratios are associated with a higher market response in line with the revised M&M model and the hypothesis that the premium stimulates undervalued firms to issue and invest by estimating the following cross-sectional regression model:

$$\text{AAR}_i = \alpha + \gamma \Delta_i + \text{Sum}_j(\gamma_j V_{ij})$$

where $\text{AAR}_i$, $[-1, 0]$ 2 day average abnormal return at BALO announcement date for firm $i$; $V_{ij}$ the control variable $j$ for firm $i$; and $\Delta_i$ is the probability of conversion for the CB issued by firm $i$.

The variable $\Delta$ controls for the equity component of CBs. In line with the original M&M model we should find a negative and significant coefficient for $\gamma$. But our previous results have confirmed that the relation between AAR and $\Delta$ is more complex, resulting from the interaction between the negative signal sent by the equity component and the positive signal sent by variables related to the profitability of investment opportunities concerning M-CB issuers. The inclusion of such variables in the model is expected to control the concavity observed in the ‘mixed’ region and, therefore, increases the explanatory power of the model.9 To address the positive information conveyed by the uncertainty of growth opportunities relative to that of assets-in-place ($\sigma_A/\sigma_B$), we use the variable market-to-book (firm

9 Previously (see Fig. 1 the consideration of $\Delta$-SQUARED in conjunction with $\Delta$ has resulted in a ‘non-linear’ regression (non-linear in the variables but intrinsically linear) having a significantly higher explanatory power because being more adapted to explain the curvilinear relationship between AAR and $\Delta$.}
The intuition beyond this choice is that the market value of a firm is the sum between the value of assets-in-place and its growth opportunities. The higher the market value of a firm in relation to its book value, the higher the ratio $\sigma_A/\sigma_B$. The revised M&M model implies that the coefficient for the variable market-to-book must be positive and significant. To better approach the uncertainty of assets-in-place, we have considered two other variables in conjunction with the market-to-book ratio, a dummy variable, industrials, taking the value 1 for industrial firms and 0 for utilities, and also the variable tangible assets/total assets. As predicted by the revised M&M model, the higher these two ratios, the lower the uncertainty of assets-in-place and therefore the more positive (less negative) the market reaction. Consequently, we should observe positive coefficients for these variables. The variable issue proceeds/market value of common stock (the issue amount divided by the MVCS) is included in our regression because, as indicated by Cooney and Kalay (1993), the larger the issue relative to the firm value, the more positive (less negative) the market reaction.

Anyway, this dependency is more subtle because its sign is influenced by the uncertainty of the project NPVs). To address the hypothesis of the stimulating effect of the premium for the issuance of CBs by undervalued and rapidly growing firms, we use the variable premium. This is the difference between the value of the CB minus the maximum between its bond and equity floor, all this being divided by the CB value. The bond floor is calculated by discounting the promise CB payments (coupons and principal) at the yield corresponding to straight bonds of the same quality (the equity floor is the CB conversion value at issuance). As predicted by our interpretation, the higher the premium, the more positive (less negative) the market reaction which means that we should find a positive coefficient for this variable.

5.2. Results of the regression analysis

After employing generalized least squares with White (1980) correction for heteroskedastic errors, results of the cross-sectional regression strongly support the revised M&M model (see Table 6). The control variables were combined in different manners in order to measure the effect of their inclusion in the regressions. All these variables have the predicted signs and these signs do not change in the various regressions, which confirms the model accuracy. $R^2$ attains 30% when all control variables are considered, thus demonstrating the robustness of our findings.

Column (1) shows that the market reaction is negatively related to the equity component. The variable market-to-book has a positive and significant coefficient and this supports the revised M&M model. The higher the uncertainty of project NPVs compared with that of assets-in-place, the stronger the signal that the firm is undervalued and consequently the more positive (less negative) the signal sent by the decision to issue. The significance of this variable increases after inclusion of variables related to the uncertainty of assets-in-place and this may be explained by the fact that only the market-to-book ratio cannot fully approach the ratio $\sigma_A/\sigma_B$. The coefficient of ‘tangible assets/total assets’ is positive, as predicted by the model.
Table 6
GLS estimates of coefficients in cross-sectional regressions

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant (*100)</td>
<td>0.517 (1.59)</td>
<td>0.44 (1.19)</td>
<td>0.56 (1.19)</td>
<td>0.88 (0.51)</td>
<td>0.11 (0.41)</td>
<td>0.24 (0.68)</td>
</tr>
<tr>
<td>Δ (*100)</td>
<td>−1.91 (−2.3)**</td>
<td>−2.11 (−2.39)**</td>
<td>−2.01 (−2.1)**</td>
<td>−1.95 (−1.9)**</td>
<td>−2.00 (1.81)**</td>
<td>−2.14 (3.1)**</td>
</tr>
<tr>
<td>Market-to-book</td>
<td>–</td>
<td>0.20 (1.74)*</td>
<td>0.21 (1.94)**</td>
<td>0.21 (2.51)**</td>
<td>–</td>
<td>0.20 (2.68)**</td>
</tr>
<tr>
<td>Industrials</td>
<td>–</td>
<td>–</td>
<td>0.15 (1.19)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Tangible assets/total assets</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.45 (1.70)*</td>
<td>–</td>
<td>0.41 (1.81)*</td>
</tr>
<tr>
<td>Premium</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.28 (3.18)**</td>
<td>0.34 (4.98)**</td>
</tr>
<tr>
<td>Issue proceeds/MVCS</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.121</td>
<td>0.022 (1.16)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.041</td>
<td>0.054</td>
<td>0.094</td>
<td>0.121</td>
<td>0.23</td>
<td>0.29</td>
</tr>
</tbody>
</table>

* [−1, 0] Average abnormal returns at the BALO announcement date for 141 CBs issued in France between January 1981 and February 1998 are explained by the probability of conversion (Δ) and other control variables. t-Values are in parentheses. We use White’s correction for heteroskedastic errors. The market-to-book is the ratio between, on one hand, the mean market value of common stock over the period [−30, 30] around the announcement date plus the book value of debt and, on the other hand, the book value of the firm at the end of the fiscal year before the announcement. Industrials is a dummy variable taking the value 1 for industrial firms and 0 for public utility firms. Tangible assets/total assets is the ratio between tangible assets (property, plant, equipment plus inventories) and total assets for the end of the fiscal year preceding the issue. Premium is the ratio between, on one hand, the difference between the issue price of the CB and the maximum between the bond floor and the equity floor and, on the other hand, the issue price of the CB. The bond floor is the sum between all the payments of the CB, discounted by the yield of a straight bond having the same quality. The equity floor is the conversion value at issuance, that is the price of the underlying common stock at issuance multiplied by the conversion ratio (the number of shares obtainable, at the issuance, in exchange for one convertible). Issue proceeds/MVCS is the ratio between the amount issued and the market value of common stock.
and significant at 10%. The coefficient of the variable industrials is positive but not significant.

The variable premium is a strong predictor of announcement effects, being significant at 1% and increasing $R^2$ from 12 to more than 20%. The higher the premium, the higher the market reaction and this confirms that the premium signals the manager’s potential to force conversion and transfer the premium to shareholders when informational asymmetries dissipate. The variable Issue proceeds/MVCS is not significant, but has the predicted sign.

Results outlined in Table 6 are not contradicting the M&M model because, on average, the higher the equity component, the more negative the information sent to the market. But including proxies for the ratio $\sigma_A/\sigma_B$ increases the explanatory power of the model in a significant way, thus supporting the M&M model in its more subtle (and realistic) version which allows the existence of potential negative NPV projects and implies the possibility of positive signaling with equity (or equity-related) issues.

6. Conclusion

This paper analyses announcement effects at French CB issues by controlling for the debt and equity components. Our results reveal that, on average, a higher equity component implies a more negative market response. This finding is consistent with the M&M model and is similar to results obtained on the American market. We also find that M-CB issuers are particular firms, experiencing significantly positive announcement effects at CB issues. The finding of a high uncertainty about project NPVs relative to that of assets-in-place for M-CB issuers supports the revised M&M model, which predicts positive announcement effects in certain conditions. The strong positive relationship between announcement effects and the premium indicates that the choice of high premiums signals the positive information that managers will be able to prematurely force the conversion.

Our results encourage some interesting topics for future research. Empirically, an analysis of announcement effects at CB issues for the Japanese and Dutch markets by controlling for the debt and equity components should help to better understand the positive market response detected by previous studies. Also, it would be interesting to analyze the pattern of conversions in function of the equity and debt components at issue. In line with our results, a higher proportion of future (forced or volunteer) conversions is expected for M-CBs. Theoretically, our results accentuate the necessity of modeling investment decisions with CBs by taking into account asymmetric information about the firm value and the firm risk. Models assuming asymmetric information on only one firm dimension predict a linear (negative) relationship between issue announcement effects and equity components for CBs. Anyway, our results show that the market response is the result of a more complex interaction between, on one hand, the equity and bond portions of the CB and, on the other hand, the premium. While the first two components are mostly sensitive to asymmetric information about the firm value, as demonstrated by Myers and
Majluf (1984), the premium is rather sensitive to asymmetric information about the firm risk.

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