Convertible Bonds Call Policy of Western European Companies

Abstract

This paper analyzes the determinant of the CB call policy on the Western European market. As previous studies, we find that the companies do not call their bonds at the optimum point identified by Ingersoll (1977). The firms in our sample delay the CB call for 76 days and the call occurs when the conversion value exceeds the redemption price by around 46%. Unlike previous researches in the same area, our study considers the main theoretical rationales for CB call delay (notice period justification, cash flow advantage hypothesis, financial distress rationale and the signaling theory). We find little evidence for cash flow advantage and signaling theories but no evidence for the notice period justification. However, our study highlights strong evidence for the financial distress hypothesis. We find for example a null probability of failed conversion at the call date. The regression models confirm this result since we show that the safety premium increases with the failed conversion probability at the Ingersoll (1977a) optimum point. Overall in our models, the financial distress proxies present significant coefficients in line with the financial distress hypothesis.

Keywords: callable convertible bonds, call policy, early call, cash flow advantage, financial distress, call provision.

1 Introduction

Convertible bonds with call provision (callable CB henceforth) is a kind of convertible that allow the issuer the right to call back the bonds before their maturity. Among specific provisions in the CB contract, one providing the early redemption on the initiative of the issuer is widely used. For example, 692 out of 705 CB in Korkeamaki and Moore's (2004) sample are callable. In financial literature, several theories tend to explain why this type of security becomes common over time. When the issuers call the bonds, they redeem bondholders either by cash redemption or exchange the bonds for specified number of the company shares depending on whether the bonds are out-of-the-money (OTM) or in-the-money (ITM). Unlike out-of-the-money CB calls, ITM CB calls have significant impact on the firm value in particular on the shareholders' wealth. Ingersoll (1977a) and Brennan and Schwartz (1977) argue that in a perfect market, managers would call the CB immediately when the conversion value reaches the call price. By doing so, they preserve the value of the firm and limit the wealth transfer from existing shareholders to the new. Nevertheless, in practice the firms' call policies do not meet this theory. Some researchers provide empirical evidence that firms delay too long the call decision, leaving the CB deeply in-the-money for several months. These findings lead to a stream of papers, mainly in US market which investigate the reasons why firms do not make optimal call decisions. It's clear from these results that, companies have sometimes a good reason to not optimally call their bonds and the resulting delay although benefiting bondholders is in the interest of the firm. We provide in this study an overview of the CB call policy for Western European market. We think that an examination of CB call policy in other market than the United Stated is important to more understand and explain the observed call delay. Furthermore, we know that firms' practices can differ over time and across countries despite a worldwide implication of financial theories. It is then interesting to investigate whether the call policy of callable CB issuers in Western European market is optimal, what determine this policy and whether it differs from that of other market. According to Ingersoll's (1977a) theory of optimal call, we determine the theoretical optimal call date using the contract terms of the CB. We then compare this theoretical optimal call date to the effective call date and compute the number of days by which the call decision is postponed, consideration made of different theories explaining the call delay. Our study covers ITM CB calls by Western European firms between 1994 and 2016. We find that the widely-observed CB call delay also applies to Western European market. More precisely, we find for firms in our sample a median call delays of 76 days. For these firms, the decision to call the bonds occurs only when the safety premium (defined by the conversion value divided by the redemption price at the call date minus one) is around 46%. Our results indicate that firms with high financial distress costs delay the call until the safety premium is high enough to ensure the conversion. For example, we find that the safety premium of calling firms increases with the failed conversion probability at the Ingersoll's (1977a) optimum point. In line with this result, we also find that the cash which is necessary in the event of a cash redemption decreases with the safety premium. Compared to the previous studies, our paper considers the main rationales for the call delay to explain the firms' CB call policy. This study is structured as follow: section 2 exposes the literature review on the CB call policy; in section 3 we deal with the investigation and the determinant of the CB call policy of Western European issuers before concluding in Section 4.

2 Literature Review

In this section, we present firstly theoretical study on the optimal CB call policy and secondly empirical studies on the CB call delay and the different rationales for this delay.

2.1 The optimal convertible bonds call policy

In a perfect market, Ingersoll (1977a) as well as Brennan and Schwartz (1977) model that the firms should call their CB as soon as the conversion value reaches the call price. By doing so, the managers minimize the value of the CB, which is in line with the value maximization of the firm. However, empirical studies on CB call policy evidence that firms delay the call of their bonds too long. For example, Ingersoll (1977b) find that 170 over 179 CB called between 1968 and 1975 were made when the conversion value exceeds significantly the call price. In average, the conversion value was above the call price by 44% when the firms call the CB. Nevertheless, it's important to notice that the Ingersoll (1977a) as well as Brennan and Schwartz (1977) models are based on very restrictive assumptions (perfect capital market, no dividend payments, etc.) and do not consider a further determinant of CB call policy.

2.2 The convertible bonds call delay

When the restrictive assumptions of perfect market are relaxed and considering the existence of certain clauses in CB agreement such as soft and hard call protection, the delay of the call decision could be explained in rational way. For example, the hard call provision in CB agreement prevents the firm from calling the CB even if the conversion value exceeds the call price during a certain period. A soft call provision which is less restrictive than the hard call prevents the firm from calling the bonds unless the stock price exceeds the call price by a certain percentage and for a specific number of days. Such provision derives the effective call date to the optimal call under the perfect market decision rules (Ingersoll, 1977a). Studies which consider these determinants of the call policy indicate that CB are not called late. An example is Asquith's (1995) paper which demonstrates that CB are called as soon as possible given their call protection provision. Other recent papers conclude in the same direction (See Grundy and Verwijmeren, 2016; Altintig and Butler, 2005). We expose in this section the main theories which explain why firms wait too long before calling their CB.

2.2.1 The rationale based on the call protection terms and the notice period

Certain clauses in CB contract (the hard or soft call provisions) can simply preclude the managers to early call the bonds even if the conversion price exceeds the call price sufficiently to ensure the conversion. Consequently, for CB with a hard call protection for example, the observed delayed calls in comparison to the optimal policy is not surprising.

When the CB are called, managers give the bondholders a number of days to notice if they want to exchange their bonds for the company's shares or receive instead a cash redemption. This period between the call date and the effective conversion date is called "notice period" and has usually a length of 30 days. There is a possibility that the CB called when the bonds are in-the-money become out-of-the-money at the end of this notice period. To avoid this situation, firms delay the CB until they are sufficiently in-the-money. They thus limit the risk that the share price declines during the notice period so that the conversion becomes uninteresting for the bondholders. This risk is particularly important since the CB call announcement is usually followed by a negative market reaction. Butler (2002) gives a solution for the problem of optimal call policy in presence of the notice period. His result indicates that the length of the notice period and the dilution effect impact the optimal point at which issuers should call their CB. He finds that, in the presence of non-zero notice period, it is optimal for the firm to delay the CB after the stock price reached the conversion price. Unlike Ingersoll (1977a), he also shows that with the zero-notice period, it still optimal to call the bonds at the point the conversion value reached the conversion price.

With regard to empirical proofs, the study of Altintig and Butler (2005) provides evidence in line with the call notice period justification but not for the call protection. In a univariate analysis, they find when taking into account the notice period in the optimal call policy, that the CB are not called late. The median safety premium at the call is only about 3.7% which is very low compared to that of 44% reported by Ingersoll (1977b). Ekkaryokkaya and Gemmill (2010) do not find evidence confirming that the existence of notice period is the reason for delaying CB calls. Theirs results indicate that the observed calls premium for the CB in their sample are larger than the optimal calls premium computed using the Butler's (2002) model. Using the same model, they also find that the observed period delay of 660 days is larger than the optimal period delay of about 17 days given by the Butler's (2002) model.

2.2.2 The financial distress and transaction costs hypothesis

Ingersoll (1977b) argues that firms delay the CB calls to ensure the conversion and avoid the cash redemption which requires higher transaction costs. They wait until the CB being sufficiently in-the-money to ensure that bondholders will choose the conversion even if they do not intend to hold the issuer's stock. A significant safety premium is necessary to cover the transaction costs in the context where bondholders will choose to convert the convertible and resell the shares they received without incurring losses. However, in some case the author still considers the safety premium too high to link the observed call delay to the transaction costs.

Jaffee and Shleifer (1990) also explain the call delay by the likelihood of conversion failure after the notice period which can pushes the firm in financial distress. They assume that the firms' decision to call the CB is firstly related to the cash flow advantage (see the 2.2.3) and that the call delay is explained by the non-zero probability of failed conversion after the notice period. This latter leads the firms to delay the call decision until the safety premium is enough sufficient to ensure the conversion. Their model explains why some firms suffering of high distress costs (high leverage firm), liquidity constrained firms and those with restrictive covenants on their capital structure need to guarantee the conversion by hiring underwriters. In line with this theory, Ekkaryokkaya and Gemmill (2010) find that the interaction of the probability of a conversion failure with financial distress measures increase significantly with the observed safety premium at CB calls. Altintig and Butler (2005) also provide evidences in line with the financial distress theory. They find that when the call is underwritten, the firms do not need to delay the CB call until the conversion price exceeds significantly the call price. They also indicate that the probability of the conversion failure has positive significant impact on the safety premium.

2.2.3 The cash flow advantage hypothesis

Constantinides and Grundy (1986) argues that when the bond's yield advantage is negative (current after-tax interest rate on CB is lower than dividend payment), managers have no incentive to call the bond, and in that case the call delay is longer. The reason is that despite sophisticated investors will voluntary convert their bonds, the less informed investors do not and the cash flow advantage for the firm remains. They validate their theory by showing through a probit model that the probability to call the CB within the six months of the first time that the forced conversion is feasible is greater when the yield advantage is high (positive yield advantage). Several other papers provide evidences in line with this theory. For example, the study of Grundy and Verwijmeren (2016) gives strong support for cash flow advantage hypothesis. Their paper focuses on dividend-protected provision in CB contract to verify if the CB delay is the fact of the existence of the negative yield advantage. Since it is assumed that firms delay the CB call if negative yield advantage exists, the delay should not be observed for dividend-protected[1] CB. Their results are effectively in line with the cash flow advantage theory. The cross-sectional regressions indicate a significant negative impact of dividend protected CB on call delays and significant positive impact for the existence of negative yield advantages on the call delays. This latter result is confirmed by Ekkaryokkaya and Gemmill (2010) which evidence that safety premium is negatively related to the existence of positive yield advantage (after-tax interest payments are greater than the dividend payment) when the

[1] For CB dividend-protected, the conversion price is adjusted to take into account an eventual distribution of dividends. In that case, the decision to convert/call the CB cannot be driven by cash flow advantage consideration.

issuers call the bonds. Using a linear regression model, Korkeamaki and Michael (2013) show that when the CB' yield advantage is negative the firms delay the call decision which extend the life cycle of the bonds.

2.2.4 The signaling theory

Harris and Raviv (1985) argue that companies whose managers have favorable private information have no incentive to force the conversion of the bonds. Hence, the decision to delay the calls signals that the managers are confident that the conversion will take place at maturity. Conversely, managers that have unfavorable private information will force CB and this decision is perceived by the market as the likelihood of the issuers' price decline in the future which is a negative signal to the market. This theory explains the negative decline in issuers' stock price at the CB calls announcements. In line with this, Ofer and Natarajan (1987) record significant negative announcement returns around the CB calls. They also find a strong decline in operating performance for companies that called their bonds for the years following the calls. Inconsistent with the signaling hypothesis, Ederington and Goh (2001) show that negative abnormal returns at CB call announcement are the result of the increased supply of stocks on the market and therefore are reversal. This finding is confirmed by the study of Ekkaryokkaya and Gemmill (2010) which finds that the call announcement negative returns of CB are only temporal and cannot be explained by the signaling hypothesis of Harris and Raviv (1985). The results of the event study only suggest a temporal negative effect on announcement returns due to the increasing sale activity on issuers' stocks. This can be explained by the fact that CB holders in anticipation of the CB conversion sell the stock they hold. In fact, the increase of the supply of the stock in the market creates the downward pressure on the issuers' shares.

2.2.5 The market memory hypothesis

Veld and Zabolotnyuk (2009) find that firms delay the CB calls because market underprices CB of issuers that previously early called their bonds. By doing so, the market punishes issuers that deprive investors for opportunities to benefit from bond value appreciation. In line with their theory, they find that the new CB issue is more underpriced by the market when the issuer has called early a previous CB. However, we do not find any other empirical study which focuses in this theory.

3 Empirical analyses

In this section, we investigate the CB call policy of Western European firms and try to explain which determine this call policy. We introduce firstly our data and the methodology adopted to test the CB call delay rationales thereafter.

3.1 Sample selection and data description

We collect from Bloomberg database, CB called by Western European companies at the end of March 2016. The convertible must be called by non-financial companies and the terms of the issuance available on Bloomberg. We then require that the calls occur when the bonds were in-the-money which leads to a final sample of 71 CB called by 66 firms on 12 Western European countries from March 1994 to March 2016. Table 1 shows the number of calls by country and per year. Around 33% of calls are made in French market, followed by the Dutch firms (21%) and UK firms (14%). Table 2 exhibits the industry's affiliation of the calling firms according to S&P GICS classification. We can see that most of calling firms operate in Technology hardware & equipment and in Materials industries.

Table 1: CB called ITM by Western European companies

This table presents the CB called in-the-money by 66 non-financial companies on Western European market between March 1994 and March 2016 per country and per year.

Country	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	Total
Austria	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	2
Belgium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Finland	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
France	1	-	4	4	1	1	1	-	-	-	1	2	4	1	1	-	-	-	-	2	1	-	-	24
Germany	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	1	5
Holland	-	-	-	-	-	1	1	1	1	-	-	-	-	4	2	1	-	2	1	-	1	-	-	15
Italy	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	3
Luxembourg	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	-	4
Norway	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
Spain	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Swiss	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2
UK	2	1	1	1	-	1	1	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	10
Total	3	1	6	6	1	3	4	1	1	3	1	3	7	9	6	2	1	2	1	4	4	1	1	71

Table 2: Firms industries based on S&P GICS classification

This table presents the classification of CB calls according to their firms' industry affiliation using the 4 digits S&P GICS classification.

Industry	Number	%
Automobiles & Components	5	7.04
Capital Goods	6	8.45
Commercial & Professional Services	3	4.23
Consumer Durables & Apparel	1	1.41
Consumer Services	1	1.41
Energy	5	7.04
Food & Staples Retailing	4	5.63
Food, Beverage & Tobacco	1	1.41
Materials	11	15.49
Media	4	5.63
Pharmaceuticals, Biotechnology & Life Sciences	5	7.04
Retailing	2	2.82
Software & Services	3	4.23
Technology Hardware & Equipment	14	19.72
Transportation	3	4.23
Utilities	3	4.23
Total	71	100%

3.2 Methodology

In this study, we focus on the CB call policy of firms that forced the conversion of their bonds. We determine the delay[2] premium at the call date and compute the number of days by which the call decision is delayed. In this study, we refer to the percentage over which the conversion value exceeds the conversion price at the call date [(S/X)-1] using the term "delay premium" or "safety premium". According to Ingersoll (1977a), the firms should call the CB as soon as the conversion value exceeds the call price. If the decision to call does not occur at this optimum point, a delay exists and corresponds to the number of days from this point to the effective call date. Nevertheless, circumstances exist to rationally justify a delayed call decision. For example, a forced CB calls cannot occur if the bonds are still protected against the early redemption and if the issuer stock prices do not satisfy the soft call conditions. We determine for each CB call in our sample, the theoretical optimal call date taking into account the soft and hard call protections. The length of the hard protection is not available on Bloomberg database. We then manually collect this information by consulting the issuance prospectus. For 32 bonds for which we are unable to collect this information because of unavailability of the prospectus, we consider the CB being callable two years after the issuance date which is the most observed hard call protection length in our sample. For CB with soft and hard call protection, the theoretical optimal call date is the first date after the expiration of the hard call protection at which the historic of stock prices satisfies the soft call conditions. We obtain the CB call delay length by computing the number of days between the effective called date and the theoretical optimal call date.

We attempt to explain the CB call delay using different approaches. We follow the four main rationales for CB call delay based namely on the notice period, the financial distress, the existence of the cash flow advantage and the signaling theory.

For the notice period justification, univariate analysis is used to compare the observed CB call delay to the optimal call delay computed using the Butler's (2002) model. This methodology is also used by Ekkaryokkaya and Gemmill (2010). In this univariate analysis, attention is also paid to the eventual difference of the delay length between dividend protected and non-dividend protected CB calls which can be an evidence for cash flow advantage

[2] There is some confusion referring to the level of [(S/X)-1], where S is the conversion value and X the conversion price at the call date. Earlier studies use the term "call premium" and even "conversion premium" which can be confusing. We think instead that safety or delay premium are more appropriate.

hypothesis. We subsequently run a multivariate analysis using a multiple linear regression to explain the delay premium at call. In this analysis, we verify if the financial distress and/or cash flow consideration leads the firm to delay the CB call decision. Finally, we test the signaling theory by performing an event study around the CB call announcement and by checking the operating performance of these calling firms for the years following the forced conversion.

3.3 Univariate analysis

For the 71 called CB in our sample, we compute the CB call delay which is the number of days from the adjusted optimal call date to the effective call date. The adjusted optimal call date is the one at which the issuer stock prices satisfy the first time the conditions under which the firms can force the conversion. These conditions include the provisions of the soft and hard call protections. Table 3 shows the characteristics of CB calls in our sample. There is a great heterogeneity relative to the amount issued. While the minimum amount issued is around €2 million, the maximum is €2.5 billion. All the bonds in our sample are issued with a hard call provision and the call decision occurs on average after 4.15 years with a median of 3.27. Around the half of the CB (36 over 71) have a soft call and the triggers range from 115% to 150%. Some of CB in our sample are also dividend-protected but their proportion in the sample is very low (only 12 issues which account for about 17% of the total sample of CB calls) relatively to the Grundy and Verwijmeren's (2016) 2000-2008 sample in which dividend-protected CB account for 60%.

Table 4 gives an overview of the CB call policy of Western European companies. In this table, we report the mean and median value of the safety premium at the call date. Following the procedure described previously we also determine the call delay. The median delay premium for the entire sample at the called date is 46% which is approximately the same that the 44% reported by Ingersoll (1977b) for US CB called between 1968 and 1975. However, this delay premium is greater than those reported by King and Mauer (2014) (31%), Altintig and Butler (2005) (35%). There is no significant difference between the safety premium of dividend-protected and non-dividend protected CB calls. Table 4 also shows that firms delay the call decision for around 195 days (a median of 76 consecutive days). These results are approximately similar to those of Asquith (1995) who finds a mean call delay of 170.5 (a median value of 77). This delay length is higher than the 47.3 call delay (with a zero-median value) reported by Grundy and Verwijmeren (2016) in US market. The median call delays for dividend protected CB calls is only 48 days compared to that of non-dividend protected which is 85 days. The Mann-Whitney test indicates significant difference between the call delay for dividend-protected and non-dividend protected CB calls. This result is in line with the cash flow advantage hypothesis because for CB dividend protected, the decision to postpone the call cannot be driven by the existence of the cash advantage. However, we have no indication that the long call delay for non-dividend protected CB is induced by potential cash flow advantage. This doubt requires further analysis before making eventual inference in direction of the cash flow hypothesis.

Table 3: Characteristics of CB called

This table shows some characteristics of 71 CB called by 66 firms between March 1994 and March 2016 on Western European market. CB amount is the proceeds of the CB offer in EUR million. Years to Call is the number of years between the issuance date and the effective date of the call. Hard call protection equals 1 if the CB has a hard call protection provision and 0 otherwise. Soft call protection equals 1 if the CB has a soft call protection provision and 0 otherwise. Soft Call Trigger is the percentage of stock price above which the CB can be called. Dividend Protection equals 1 if the CB has a dividend protection and 0 otherwise.

Characteristics	Mean	Median	Min	Max	Standard deviation
CB Amount	346.19	225	1.99	2500	382.70
Coupon	3.94	3.5	0	10.75	2.24
Maturity	7.33	6.40	3	20	3.71
Years to Call	4.15	3.27	0.37	13.97	2.68
Hard Call Protection	1	1	1	1	0
Soft Call Protection	0.51	1	0	1	0.48
Soft Call Trigger	129	130	115	150	0.08
Dividend Protection	0.17	0	0	1	0.38

Table 4: CB call policy of the Western European firms

This table shows the means and medians of delay premiums [(S/X)-1] and the length of the call delays for 71 CB called by 66 firms between March 1994 and March 2016 on Western European market. The Wilcoxon rank-sum test (Mann-Whitney test) is used to assess eventual difference between dividend and non-dividend protected subsamples. The last column reports the z statistic of the Wilcoxon rank-sum test. * denotes the significance at 10% level.

	Global Sample (71)		Dividend Protected (12)		Non-Dividend Protected (59)		Mann-Whitney z-stat
	Mean	median	Mean	median	Mean	median	
Premium	0.69	0.46	0.76	0.51	0.68	0.46	-0.80
Call delay	195	76	83.58	48	217.66	85	1.65*
Observations	71		12		59		

In order to test if the existence of the notice period explains the delay of the CB calls, we compare the delay observed at the call announcement to that we should observe if the CB were called at the Butler's (2002) optimum point. In absence of the notice period, Ingersoll (1977a) models that it is optimal for the firm to call the CB as soon as the conversion value reached the call price. However, if the firm gives a notice period to the bondholders, the optimum point to call the bonds is henceforth above that of Ingersoll (1977a), since a certain safety premium becomes necessary to ensure the conversion at the end of the notice period. The Butler's (2002) model provides an approximation for this optimum point at which the CB should be called in the presence of non-zero notice period. The model is based on the Black & Scholes option pricing model. It gives for a non-zero call notice period the level of S/X at which it is optimal to call the CB. This S/X level satisfies the following equation:

$$N[d_1(t,r_t)] - \left(\frac{n}{n+m}\right)^2 N[d_1(T,r_T)] = 1 - (\frac{n}{n+m})$$

with

$$d_1 = \frac{\ln(S/X) + (r_\tau + \delta^2/2)\tau}{\delta\sqrt{\tau}}$$

S is the stock price, X the conversion price, r the risk-free rate[3] other τ which is either t (the notice period) or T (the time to maturity), δ is the annualized underlying stock price returns volatility, N(.) the cumulative standard normal distribution, n the existing number of shares and m le number of shares into which the CB are exchanged.

Because the effective call notice periods are not available on Bloomberg database, we check manually this information on the CB offers prospectus when available. For all prospectuses we consulted, a range of delay is mentioned instead of specifically numbers of days. For example, for French CB, it is mentioned that the issuer will redeem the bonds after given at least a 30 days' notice period to the bondholders. For the UK CB, the issuers give not less than either 30 or 45 but in all case no more than 60 days to bondholders to exercise their option to convert or not. In practice, the researchers report typically 30 days' notice period (see for example Altintig and Butler, 2005; Ekkaryokkaya and Gemmill, 2010, etc.). The number of observations drops from 71 to 39 because we are unable to obtain the number of existing shares

[3] We use the 1-month and the 10-years US Treasury rate respectively for t and T.

for some companies in our sample. For the 39 remaining CB called, we determine the Butler's (2002) optimum S/X point using successively a 30, 45 and 60 days' notice period. However, for expositional purpose we report only the result for the 30 and 45 days' notice period.

Table 5 shows the optimum S/X point at which the firms should call their CB if the notice period was 30 or 45 days. For each company in our sample, we compute the call delay if firms had to force the conversion at Butler's (2002) optimum point. We also compute at the Butler's (2002) optimum point the probability that the CB will not be converted after the expiration of the notice period (henceforth the failed conversion probability). We obtain this probability by computing the N(-d2) of the Black & Scholes option pricing model. As shown in Table 5, the Butler's (2002) delay premium is 7% for the 30 days' notice period and 9% for the 45 days' notice period. The call delay for these different points are respectively 8 days and 11 days which is lower than the observed median call delay of 76 days. Based on these findings, we can assert that the existence of the notice period is not a main reason of the observed CB call delay. These results are also similar to those of Ekkaryokkaya and Gemmill (2010) which also conclude that the notice period cannot totally explain the decision to delay the CB call. For the 60 days' notice period the safety premium is 10% but we do not report this result in the Table 5.

At the Ingersoll's (1977b) optimum point (when S=X), we find that the probability that the CB will not be converted at the end of the call notice period is around 50%. This probability is very high and can explain why the firms usually do not call their CB at the (S=X) point. As shown in the Table 5, the probabilities of failed conversion after the expiration of the notice period at Butler's (2002) optimum point are lower than those of Ingersoll's (1977b) optimum. For both the 30 and 45 days' notice period, the median failed probability in our sample is around 26%. This probability significantly drops to 0% at the call date. This later result can indicate that firms wait too long before calling their bonds to ensure that the conversion will succeed. Firms waiting until the probability of failed conversion drops to zero can be interpreted by a very fear of cash redemption especially for financially constrained companies. In the next section, we explore this possibility using a multivariate analysis.

Table 5: Observed call policy vs. Butler's (2002) model call policy

This table shows the delay premiums, the call delays and the failed conversion probabilities at different level of S/X for 71 CB called by 66 firms between March 1994 and March 2016 on Western European market. The second and third columns show respectively the premium and the number of days by which the CB call would be delayed if the calling firms had called their bonds at Butler's (2002) optimum point for respectively a 30 days and 45 days' notice periods. The Wilcoxon rank-sum test (Mann-Whitney test) is used to assess eventual difference between the observed call policy and those of the different Butler's (2002) models. The two last columns report the z statistic of the Wilcoxon rank-sum test. ** and *** denote respectively the significance at 5% and 1% levels.

	Observed Call policy (1)		Butler Model 30 days (2)		Butler Model 45 days (3)		Mann Whitney	
	Mean	median	Mean	median	Mean	median	(1) vs. (2)	(1) vs. (3)
Premium	1.69	1.46	1.07	1.05	1.09	1.07	7.57***	-7.24***
Delay	195	76	35	8	47.28	11	-3.03***	-2.37**
Failed probability	0.04	0.00	0.25	0.26	0.25	0.26	7.28***	7.29***
Observation	71		39		39			

3.4 Multivariate analysis

We investigate in this section the impact of the financial distress and the cash flow consideration in the CB delay. The methodology adopted consist to link various proxies for both financial distress and cash flow advantage to the delay premium. For this, we run a multiple linear regression in which the dependent variable is the natural logarithm of S/X at the call date and independent variables are various measures of financial distress, financial constraint and cash flow advantage.

3.4.1 Test of the financial distress hypothesis

If firms delay the decision to call the CB to ensure the conversion when the call occurs, then we hypothesize that the call delay and thus the safety premium should be greater for companies facing a high cost of financial distress and for those that are financially constrained. Given that the conversion fails at the end of the notice period, the firms must make a cash redemption by either using the free cash flow or issuing a new security. López-Gutiérrez et al. (2015) show that financially distressed firms are small companies, highly leveraged, have high Tobin's q, small cash flow and invest less than non-distressed firms. We then measure the financial distress costs by firm size, financial leverage, the Tobin's q and the cash ratio. We also include the firms' stock price returns volatility as proxy for financial distress since the risky firms have higher default probability. We predict negative relationship between the firm's size as well as the cash ratio and the safety premium. For the financial leverage, the stock price volatility and the Tobin's q variables, we predict a positive coefficient. However, the Tobin's q is also widely used as proxy for asymmetric information. On the basis of the signaling theory of Harris and Raviv (1985), we can also predict a positive relationship between the Tobin's q and the delay premium because the decision to delay the CB call is due to the existence of private information and therefore in situation of asymmetric information.

Furthermore, we use three proxies to measure the ability of the firms to access to new financing. The greater are the possibilities for the firm to obtain a new financing, the lesser is the fear regarding the conversion failure and thus the call delay will be short. The first proxy is the firm size since larger companies are able to readily access to capital markets. The negative coefficient is predicted for this variable. The second proxy is the tangible assets divided by the total assets which measures the firm's ability to obtain a bank loan since tangible assets serves as collateral for the debt repayment. The negative coefficient is also predicted for the tangible asset variable. However, we know that firms with high asymmetric information faced higher costs to make external financings. For these firms, we predict that the safety premium will be higher than for those facing less adverse selection costs. We then include in our independent variables, the firm's Tobin's q as indicator of the asymmetric information and expect that it has positive impact on the delay premium.

We measure financial constraint by the interaction of the cash ratio and the firm size since financially constrained firms are generally small firm with lower internal funds. Because this variable is an inverse proxy for financial constraint, we predict a negative coefficient. As indicated in Table 5, firms in our sample wait until the probability of failed conversion at the end of the notice period drops to 0% before taking the decision to call the bonds. We suspect that this behavior is driven by the financial distress and/or financial constraint. We then add in our regression the probability of failed conversion at the end of the 30 days' notice period computed at the Ingersoll's (1977a) optimum point. Our prediction is that the greater is the probability of failed conversion at this point, the greater will be the call delay and thus the delay premium. As control variable, we add in our model the amount of the issue and the soft call protection trigger. The issue size does not have a direct link with the financial distress and the financial constraint but in case of the conversion failure, the amount necessary to redeem all bondholders is greater for issuers of large amount of CB than for the small offers size. In this context, the positive relationship between the issue size and the safety premium is plausible. Regarding the soft call protection, we consider that the trigger is 100% for CB with no soft call provision. Otherwise, we take the trigger provided in the bond contract which ranges from 115% to 150%. We predict that the soft call trigger will impact positively the delay premium.

3.4.2 Test of the cash flow advantage hypothesis

The cash flow hypothesis explains the call delay by the existence of negative cash flow advantage for the firm (when current after-tax interest expenses on CB are lower than dividend payment) (Grundy and Verwijmeren, 2016; Constantinides and Grundy, 1986, etc.). If this is the case, we expect that the existence of the negative cash flow advantage for the firms would push them to delay the CB call. In that case, we predict that the delay premium for CB that present a negative cash flow advantage for the firm will be important. We determine whether the current after-tax interest expense on CB debt are lower than the last announced dividend payment. The dummy variable "Cash advantage" take the value of 1 if this is the case and 0 otherwise. We predict a longer call delay and thus a larger safety premium for the CB that presents a negative cash flow advantage. The dividend protected dummy variable which is 1 if the CB is dividend protected and 0 otherwise is also integrated in our models to test whether dividend protected CB are called sooner than non-dividend protected CB.

Table 6 provides information on the calculation of all variables in our models. The variables are measured at the last fiscal year before the CB calls except for the failed conversion probability and the dummy variable of cash flow advantage which are computed at the time that the conversion value reached the conversion price. In Table 7 we report the descriptive statistics for all variables in our models. Firms in our sample are not highly leveraged, the median value of total debt related to total asset is only 17% with a maximum of 59%. They also have a significant part of their total assets in tangible property (84%).

The pairwise correlation analysis indicates important correlation between the firms size and issue size variables and between the cash ratio as well as the firm size and the financial constraint variables. In order to avoid multicollinearity issue, we do not introduce in the same model two correlated variables. Table 8 reports the result of our various models. In model 1, we find significant positive relationship between the Tobin's q as well as the failed conversion probability and the safety premium. We also find that the cash ratio impacts negatively the safety premium. These results are consistent with the financial distress costs theory. However, we also find significant positive impact of the firm size on the delay premium which is inconsistent with the financial distress costs theory. We add in model 2, the issue size and the soft call trigger variables. We find for issue size, significant positive impact on the delay premium. This finding shows that for large CB offers, the firms delay the call until the safety premium increases significantly. The stock price volatility in model 2 presents significant negative coefficient which is not in line with our prediction. In model 3, we introduce the financial constraint variable which presents a significant negative coefficient as predicted. Not surprisingly, we find that the soft call protection trigger increases the delay premium (model 2 and 3). None of the proxy for cash flow advantage is significant in model 1.

Table 6: Presentation of variables.

This table presents the variables used in our regression models and their calculations. All the variables are measured at the last fiscal year before the CB calls except for the failed conversion probability and the cash advantage dummy variable which are computed at the time that the conversion value reached the conversion price (when S=X)

Variables	Calculations
LEVERAGE	Long-term debt/Total asset
TOBIN's Q	Market value of equity/Book value of equity
CASH RATIO	Cash flow available after investment/Total Assets
STOCK VOL	Stock price returns' volatility over -312 to -60 relative to the call date
FAILED CONV PROB	The probability of failed conversion at the end of the 30 days' notice period (the N(-d2) term of Black & Scholes option pricing model)
TANGIBLE ASSET	Sum of property, plant and equipment scaled by total assets
FIRM SIZE	Log of Total assets
ISSUE SIZE	Log of amount issued
FINANCIAL CONSTRAINT	Cash ratio*Firm size
DIVIDEND PROTECTION	Dummy variable taking the value 1 if the CB is dividend protected and 0 otherwise
CF ADVANTAGE	Dummy variable taking the value 1 if the CB presents a negative cash flow advantage and 0 otherwise
SOFT CALL TRIGGER	The percentage trigger of the soft call protection, if the CB is not call protected, the value of 100% is assigned.

As the financial distress costs impact the call policy conditional to the probability of failed conversion, we use an alternative method consisting of replacing in our various models the distress costs proxies (cash ratio, tangible asset and leverage) by the interaction term of the probability of failed conversion with these financial distress proxies. Untabulated results for this procedure do not differ in meaningful way from that reported in Table 8. The same results hold except for the failed conversion probability which is no longer significant although the adjusted R-squared remained virtually unchanged in the 3 models.

We can conclude that western European companies delay too long the call decision due to the costs of financial distress associated to the failed conversion. In the next section, we test the information content's rationale for the CB delay by conducting an event study.

Table 7: Descriptive Statistics

This table presents some descriptive statistics for the variables used in our cross-sectional regressions for a sample of 71 CB called by 66 firms between March 1994 and March 2016 on Western European market. More details on these variables are provided in Table 6.

Characteristics	Mean	Median	Min	Max	Standard deviation
LEVERAGE	0.18	0.17	0	0.59	0.12
TOBIN Q	1.59	1.36	0.72	5.52	0.77
CASH RATIO	0.60	0.29	0.02	11.82	1.44
STOCK VOL	0.38	0.33	0.16	1.85	0.270
FAILED CONV PROB	0.50	0.50	0.46	0.60	0.022
TANGIBLE ASSET	0.82	0.84	0.38	1	0.14
FIRM SIZE	8.38	8.77	4.06	11.85	1.80
FINANCIAL CONSTRAINT	4.24	2.56	0.173	55.20	7.02
ISSUE SIZE	19.40	19.51	14.50	22.44	1.51
DIVIDEND PROTECTION	0.16	0	0	1	0.37
CF ADVANTAGE	0.40	0	0	1	0.49
SOFT CALL TRIGGER	114	115	100	150	0.15

Table 8: Determinants of the CB safety premiums.

This table reports various multiple linear regressions models for the determinant of the CB delay premium. The dependent variable is the natural logarithm of (S/X) where S is the conversion value and X the conversion price of the CB at the call date. Independent variables are various measures presented in Table 6. *, ** and *** denote respectively the significance at 10%, 5% and 1% levels.

Variables	Expected signs	Model 1	Model 2	Model 3
Intercept		-7.38 (-1.98)	-7.93 (-2.26)**	-7.71 (-2.10)**
LEVERAGE	+	-0.57 (-1.39)	-0.28 (-0.67)	-0.40 (-0.93)
TOBIN Q	+	**0.28 (4.57)*** **	**0.25 (4.05)*** **	**0.22 (3.54)** **
CASH RATIO	-	**-0.17 (-1.86)* **	**-0.24 (-2.52)** **	-
STOCK VOL.	+	-0.90 (-1.58)	**-0.89 (-1.74)* **	-0.85 (-1.59)
FAILED CONV PROB	+	**13.66 (1.78)* **	**12.65 (1.86)* **	**12.09 (1.71)* **
TANGIBLE ASSET	-	0.23 (0.89)	0.24 (0.96)	0.20 (0.76)
FIRM SIZE	**-**	**0.08 (3.48)*** **	-	-
FINANCIAL CONSTRAINT	+	-	-	**-0.02 (-1.78)* **
ISSUE SIZE	+	-	**0.06 (2.44)** **	**0.07 (2.45)** **
DIVIDEND PROTECTION	-	0.09 (0.92)	-	-
CF ADVANTAGE	+	0.05 (0.81)	-	-
SOFT CALL PROVISION	+	-	**0.43 (1.84)* **	**0.46 (1.91)* **
Adjusted R-squared		35.12%	30.02%	24.65%

3.5 Event study analysis

We test the information theory for the CB calls by performing an event study around the announcement of the decision to call the bonds. We verify firstly if the CB calls announcement returns are also negative in the Western European market as it is the case on other markets (see for example Mikkelson, 1981; Campbell et al, 1991; Ederington and Goh, 2001; etc.). Secondly, we determine if these announcement returns are induced by the signaling theory.

3.5.1 The announcement effect of the convertible bonds calls

The methodology adopted to perform this event study is that described by Brown and Warner (1985). We use alternatively two different approaches to capture the normal returns. It is well investigated that the issuers‘ stock prices increase before the decision to call and drop subsequently. For this reason, the estimation period must be defined with caution. Some authors use the post-call returns to estimate parameters of the market model instead of the pre-call returns (see for example Ederington and Goh, 2001). Campbell et al. (1991) compare the announcement returns of the CB calls using the pre- and the post-call market models and they find that the abnormal returns based on the pre-event models are lesser (more negative) than those based on the post-event. They find that the intercept of the pre-event models exceeds significantly that of the post-event model about 0.09% which leads to more negative announcement returns in the first case. However, using the post-event market model rather than the pre-event market model is also debatable if effectively the decision to call the CB signals bad prospects. There is a possibility according to the market inefficiency hypothesis that the negative information is not fully incorporate in the stock prices at the call date and the calling firms' bad prospects are progressively reflected to the market. In that case, the stock prices gradually drop for a long time. In line with this, Ofer and Natarajan (1987) find cumulative average excess returns of -24.16% for the 2 years following the CB calls. In these circumstances, the choice of post-call estimation period can also cause significant bias in abnormal returns estimation. For this reason, we use alternatively the windows of [-503, -252] (the pre-call control period) and [+252, +503] (the post-call control period) to perform the event study, where the (day 0) is the call date. The parameters of the market model are estimated using an ordinary least square regression. The market index used is the DJ Stoxx 1800. Abnormal returns are determined by the following formula:

$$\boldsymbol{AR}_{\boldsymbol{it}} = R_{it} - Rm_{it}$$

Where AR_{it}, R_{it} and Rm_{it} are respectively abnormal returns, observed and normal returns of security i at time t.

We use the non-parametric signed-rank test of Wilcoxon to test the null hypothesis that the observed returns and the normal returns are equal.

Table 9 shows the result of the event study. We do not have sufficient daily stock prices for all CB in our sample. For the pre-call model, only 68 CB present the required number of daily stock prices for the analysis. When we consider instead the post-event period, the number of CB drops to 54. The reason of this drop is that the call is too recent for some CB and for other the calling firm does not survive two years after the call decision. Panel A exhibits average abnormal returns (AAR) while Panel B presents the cumulative abnormal returns (CAR). The results show at (day -1) a negative AAR significant at 10% level and at (day +2) a significant positive AAR regardless of the estimation period. For the post-event model, we also find at (day +3) a significant positive AAR and over the (day -1) to the call date, a significant positive CAAR. There is only small difference between the pre-call and post-call (day -1) AAR, which indicates that the choice of the estimation period is not a very important issue in our case. However, it is plausible that the size of our sample is the reason of that result and can also explains why the abnormal returns are not significant in some cases. However, the fact that the AAR becomes positive at (day +2) can suggest a quick stock price reversal after the drop occurred at (day-1). Overall, the results in Table 9 seem to indicate a possible downward pressure on the stock price rather than a consequence of the negative signal of the decision to call as supported by the information theory of Harris and Raviv (1985). We conclude in this direction because the positive abnormal returns at the (day +2) and (day +3) that quickly follow the negative abnormal returns recorded at (day-1) support the sale pressure hypothesis and do not corroborate the negative information content. In the next paragraph, we make a further test of the signaling theory using another methodology.

Table 9: CB call announcement returns.

This table shows the means and medians (in parentheses) of abnormal returns around the calls announcement of CB by Western European firms. Panel A exposes the average abnormal returns from (day -5) to (day +5) while Panel B exhibits the cumulative average abnormal returns for various windows. (Day 0) is the call announcement date. The Wilcoxon sign-rank test is used to test the null hypothesis that the observed returns equal the normal returns. The two first columns are relative to the abnormal returns computed using the pre-call control period while the two last columns concern abnormal returns obtained using the post-call control period. The z statistic and p-value (in parenthese) are reported for each abnormal return obtained according to the estimation period. * and ** denote respectively the significance at 10% and 5% level.

Period	Pre-Event Control period (68)		Post-Event Control period (54)	
	Abnormal Return	Wilcoxon Z stat	Abnormal Return	Wilcoxon Z stat
Panel A: Average Abnormal returns				
-5	0.56 (0.02)	0.86 (0.38)	0.53 (0.18)	1.12 (0.26)
-4	-0.05 (-0.04)	-0.10 (0.91)	-0.11 (0.11)	0.32 (0.74)
-3	0.29 (0.19)	0.70 (0.47)	0.20 (0.38)	1.07 (0.28)
-2	-0.04 (0.07)	0.17 (0.86)	0.45 (0.34)	1.38 (0.16)
-1	**-0.20 (-0.43)**	**-1.76 (0.07)***	**-0.23 (-0.59)**	**-1.71 (0.08)***
0	-0.39 (-0.06)	-0.93 (0.34)	-0.61 (-0.13)	-1.10 (0.27)
+1	-0.20 (0.02)	-0.42 (0.67)	-0.14 (0.10)	0.57 (0.56)
+2	**0.44 (0.29)**	**1.92 (0.05)***	**0.63 (0.58)**	**2.44 (0.01)****
+3	0.35 (0.27)	1.47 (0.14)	**0.59 (0.38)**	**1.95 (0.05)***
+4	0.05 (-0.02)	-0.37 (0.70)	0.12 (-0.06)	-0.56 (0.57)
+5	-0.27 (-0.13)	-1.42 (0.15)	-0.15 (-0.14)	-0.24 (0.80)
Panel B: Cumulative Average Abnormal Returns				
[-1 ; 0]	-0.59 (-0.3)	-1.31 (0.18)	**-0.85 (-0.56)**	**-1.73 (0.08)***
[-0 ; 1]	-0.59 (0.12)	-0.37 (0.70)	-0.76 (0.02)	-0.49 (0.62)
[-1 ; +1]	-0.80 (-0.33)	-1.29 (0.19)	-0.99 (-0.55)	-1.25 (0.21)
[-5 ; 0]	0.17 (-0.82)	-0.29 (0.76)	0.23 (0.30)	0.65 (0.51)
[0 ; +5]	-0.03 (0.04)	0.25 (0.80)	0.44 (1.31)	0.95 (0.34)
[-5; +5]	0.53 (-0.57)	-0.58 (0.56)	1.28 (0.74)	0.99 (0.32)

3.5.2 The determinants of the convertible bonds calls announcement returns

The signaling theory of Harris and Raviv (1985) supports that calling the CB early sends negative signal to the market because firms having a good prospect have no incentive to force the conversion since the quality of the firm will be revealed and the investors may voluntary convert the bonds. Therefore, calling the CB early has an information content that managers do not believe that the stock price will continue to increase so that the investors will voluntary convert the bonds at maturity. We previously find that the market reaction around the CB calls are not consistent with the signaling theory. We use a linear multiple regression model to further investigate this theory. In our models, the dependent variable is the CAAR over the (day -1) to the call date. We retain as the independent variables, indicator of the early call which is the natural logarithm of the conversion value divided by the conversion price at the call date (S/X). We then predict that the market reaction will be less negative when the call delay is long. Furthermore, we use the growth opportunities (the Tobin's q) as a proxy for asymmetric information. We predict that the market reaction to CB call will be more negative in situation of high asymmetric information. The reason is that, forced conversions should not signal bad prospects in situation where the investors are well informed about the firms' quality. We also test whether the abnormal returns are caused by eventual price pressure from the increase of shares' supply in the market. If this is the case, we would expect that the dilution caused by the conversion will have negative impact on the stock price around the CB call since the number of shares to sell in anticipation of the conversion will increase with the number of shares into which the CB will be converted. The firm size is add to our model as liquidity proxy since for larger firms the shares are easily tradable at lower cost and in that case the downward pressure will be lower. We then predict a positive relationship between firm size and the market reaction around the CB calls. We run different models according to the estimation period used to perform the event study. The Table 10 reports the results of our models. Using the pre-call estimation period, we are unable to link any of our explanatory variables to the market reaction at the call announcements. For the post-call estimation period model, we find however that the Tobin's q has a significant negative impact on the firms' abnormal returns at the call. This result is consistent with Harris and Raviv (1985) signaling theory. Furthermore, the very low explanatory power of our regression models indicates that our independent variables do not really explain the abnormal returns at the call. This can once again be explained by our small sample size.

Table 10: Determinants of the market reaction to CB call announcements.

This table reports multiple linear regression models for the determinants of the CB calls abnormal returns. The dependent variable is the cumulative average abnormal returns (CAAR) from (day -1) to the call announcement date (day 0). Independent variables are natural logarithm of (S/X) where S is the conversion value and X the conversion price of the CB at the call date (DELAY), the number of shares into which the CB will be converted divided by the firms' outstanding number of shares (DILUTION), the natural logarithm of the firms' total assets (FIRM SIZE) and the Tobin's q (TOBIN's Q) measured at the fiscal year ending before the CB calls. In the pre-call model, the dependent variable is the CAAR computed using the pre-call estimation period while in the post-call model the dependent variable is the CAAR computed using the post-call estimation period. ** denotes the significance at 5% level.

Variables	Expected signs	Pre-call Model	Post-call Model
Intercept		0.05 (1.17)	0.02 (0.42)
DELAY	+	0.003 (0.51)	0.007 (0.86)
DILUTION	-	-0.14 (-1.14)	-0.02 (-0.21)
FIRM SIZE	+	-0.004 (-1.14)	-0.004 (-1.04)
TOBIN Q	+	-0.01 (-1.42)	**-0.02 (-2.32)****
Adjusted R-squared		-1.26%	5.75%

3.5.3 The post-call performance of the convertible bonds calling firms

Harris and Raviv's (1985) signaling hypothesis supports that the calling firms' managers do not believe that the stock price will increase to ensure the conversion at CB's maturity. Since, the stock prices increase with the positive information about firm's prospects and operating performance we can test the information content of the CB calls by tracking the post-call operating performance of calling firms. Although this theory has a clear implication on the firms' operating performance after the calls, very little empirical researches point in this direction. In line with Harris and Raviv (1985), Ofer and Natarajan (1987) find a strong decrease of some operating performance indicators of the calling firms immediately after the calls and for the five following years.

We use as Ofer and Natarajan (1987) the earnings before interest and taxes (EBIT) and we add two other performance measures such as the operating margin ratio (OMR) which is the operating earnings divided by the total revenue and the price earnings ratio (PER) which is the stock price divided by the earnings per share. We scale the EBIT by the total asset of year -1. Unlike Ofer and Natarajan (1987), we compare the calling firms post-call performance to that of control firms obtained from following matching procedure: (1) firms in DJ Stoxx 1800 market index except the calling firm, (2) firms operating in the same 4-digits industry (S&P GICS classification) and (3) firms with total assets within a range of 90-110%. Table 11 reports operating performance of the calling firms and their counterparts the year of the call through the subsequent three years. The Wilcoxon signed-rank test is used to test whether the operating margin ratio, the price earnings ratio and the relative size of earnings before interest and taxes of calling firms are different from those of non-calling firms.

The trend observed in Table 11 is not in line with a decrease of the firm operating performance after the call announcement. We find for example increasing medians for operating margin ratio (OMR) and EBIT variables from the year of the call announcement to the following two years. For the PER however, median value decreases from the year of the call announcement to the following two years. Furthermore, with few exceptions, we find overall no difference between operating performance of calling firms and non-calling firms from the call date to the following three years. In this context, arguing that the post-call operating performance trend of calling firms' is in relation with their growth prospects at the call announcement amounts to saying that the non-calling firms also had at the same date the similar growth opportunities. Despite the fact that the matching procedure is strict, there is low probability that the growth prospects of the calling firms matched those of non-calling firms at the call date. Hence, we conclude that the post-call performance of the calling firms is not related to the private information held by managers as predicted by the signaling hypothesis of Harris and Raviv (1985).

Overall, we find very little support for the signaling hypothesis. First, we find non-significant abnormal returns at the call date and the (day -1) significant excess return can be explained by plausible price pressure due to the sale activities in anticipation of the conversion. Second, we find in our cross-sectional analysis that the market reaction to the CB call announcements increases with the asymmetric information relative to the firms' growth opportunities at the call date, which is in line with Harris and Raviv (1985) signaling theory. Third, we find neither evidence for a decrease of calling firms operating performance after the CB call, nor significant difference between operating performance of these firms and their control group.

Table 11: Post-call operating performance of calling firms and their matching group.

This table shows the means and medians (in parentheses) of some post-call operating performance indicators for CB calling firms and their control groups. Operating performance indicators are operating margin ratio (OMR), price earnings ratio (PER) and earnings before interest and taxes (EBIT). Calling firms are companies that called their CB in-the-money before their maturity. Matching firms are control groups obtained by the following matching procedure: (1) firms in DJ Stoxx 1800 market index except the calling firm, (2) firms operating in the same 4-digits industry (S&P GICS classification) and (3) firms with total assets within a range of 90-110%. The Wilcoxon rank-sum test (Mann-Whitney test) is used to assess eventual difference between the post-call performance of calling firms and their control groups. a, b and c denote respectively the significance at 10%, 5% and 1% levels.

Periods	OMR		PER		EBIT	
	Calling firms	Matching firms	Calling firms	Matching firms	Calling firms	Matching firms
0	**8.73 (7.32)a**	10.6 (8.91)	28.12 (18.52)	26.61 (20.28)	**7.46 (6.33)b**	9.53 (7.91)
1	8.55 (7.77)	11.59 (8.87)	36.17 (15.8)	25.05 (21.07)	6.69 (6.68)	9.72 (7.75)
2	6.74 (7.97)	8.69 (7.58)	**19.46 (15.81)c**	26.71 (20.96)	6.36 (6.68)	8.08 (6.75)
3	9.67 (7.65)	9.77 (8.88)	43.6 (16.42)	53.03 (21.37)	7.55 (5.88)	8.6 (7.29)

4 Conclusion

We analyze in this study the call policy of the Western European companies from 1994 to 2016. We find that the firms delay the CB call for 76 days and the call occurs when the safety premium is around 46% which is overall similar to that reported by Ingersoll (1977b) but differs from those reported by King and Mauer (2014) as well as Altintig and Butler (2005). Unlike previous researches in the same area, our research considers the main theoretical rationales for the observed CB calls delays (existence of the notice period and the call protection provisions, cash flow advantage hypothesis, financial distress and the signaling theories). Firstly, considering the call protection provision in determining the delay length we still conclude that CB are called late. Using the Butler's (2002) model, we find that the existence of the notice period explains neither the call delay nor the safety premium at call. We show that the unusually long notice period of 45 days would only result in delay of 11 days and a safety premium of 9%. Inconsistent with this, we find that firms in our sample call their CB after a delay of 76 days with a safety premium of 46%. This result confirms that of Ekkaryokkaya and Gemmill (2010) on US market. Secondly, for cash flow advantage hypothesis the results are mixed. In our univariate analysis, the CB call delays of non-dividend protected firms are significantly greater than those of dividend protected firms which is in line with the cash flow hypothesis. But we do not find results that are consistent with this theory in our cross-sectional regression analysis. The proxies for cash flow advantage remain non-significant in all models. Thirdly, we find strong evidence in line with the financial distress costs hypothesis. We find at the call date that the probability of failed conversion for firms that called their bonds is null. The regression models confirm this result since we show that the safety premium increases with the failed conversion probability at the Ingersoll (1977a) optimum point. Overall, the financial distress measures present significant coefficients in line with the financial distress hypothesis. Finally, we do not find that the CB call delay is caused by the fact that the forced conversion signals unfavorable private information. We find very small stock price decline around the CB calls announcement and this decline is more likely to be due to the downward pressure on the shares of the calling firms than to a negative signal. This result is confirmed both by the determinant of the market reaction at the CB call and by the post-call performance analysis. We find at the call date that the call delay does not have significant impact on the market reaction. However, in line with the information content hypothesis we find that CB called by firms with high asymmetric information receive more negative market reaction at the CB call. But once again in contradiction with this theory, we find an increasing trend for two of the three indicators of the firms' post-call operating performance. Further, we do not find significant difference between calling and non-calling firms post-call operating performance. We conclude that the observed CB call delay in Western European can be explained only marginally by Harris and Raviv's (1985) signaling theory.

This research contributes to the existing literature on CB call policy by providing an empirical evidence of the CB calls policy on Western European market. We provide evidence that Western European firms delay the calls of their CB due to the financial distress costs in the event that the bonds will be out-of-the-money at the end of the notice period and investors choose the cash redemption rather than the conversion. However, one can challenges this conclusion arguing that why firms do not force the conversion at the Butler's (2002) optimum knowing that the financial distress costs become an issue only if the conversion falls at the end of the notice period. The reason is that at the Butler's (2002) optimum the failed conversion probability is still high. We find that the failed conversion probability at the end of the notice period for the Butler's (2002) model is 26% which remains very high for financially constrained firms. We recognize however as important limitation in our study the small size of our sample which does not allow us to refine our models sometimes.

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