EUROPEAN FIRMS' ISSUANCE AND CALL POLICIES OF CONVERTIBLE BONDS

by

Benedikte Kuepper Soegaard

A thesis submitted to the faculty of Economics
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Master of Science in
Economics

Charlotte

2022

Approved by:

_____
Dr. David C. Mauer

_____
Dr. Krista J. Saral

_____
Dr. Paul Gaggl

ABSTRACT

BENEDIKTE KUEPPER SOEGAARD. European Firm's Issuance and Call Policies of Convertible Bonds. (Under the direction of DR. DAVID C. MAUER)

This thesis examines the decision of European firms to issue convertible bonds, their subsequent corporate call policy, and whether this differs from the theoretical optimal call policy. The analysis was divided into two parts: Part I focused on the decision to issue a convertible bond and found that the European convertible bond market has a size of 154 billion USD, making up 22% of the global market, and that convertible bond issuance is higher in high-growth industries. At the same time, issuance should theoretically be higher when interest rate levels are low and volatility high, but this relationship is does not hold perfectly in the sample, suggesting that other socio-economic and political factors also have an impact on issuance. In addition, Western European countries dominate the European convertible bond market, despite creditor and shareholder rights being determined not to influence the decision to issue but instead the design of the convertible bond. With this, part II of the analysis, concerned with firms' call policies and potential deviations from theoretical optimums, arrived at the conclusion that European firms do deviate from the theoretical optimal call policy of calling as soon as the convertible bond is in-the-money. A mean (median) call delay of 200.73 (89) days and premium of 97% (43%) were identified for the called convertibles. When adjusting this for call protection, the delay decreases to a mean (median) of 89 (46) days, while the premium decreases to 76% (19%). The call delay is longer and the premium lower for the non-called convertible bonds as compared to the ones called during the sample period. Lastly, part II of the analysis identified a trend where the convertible bonds in the sample with hard call provisions are called less, suggesting that investor and issuer' preferences can be embedded in the convertible bond design and subsequent call policies. These results are similar to ones identified by scholars researching the US market, implying that the two markets have similar call policies, and that research is thus comparable to a certain degree across the markets.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to Dr. David C. Mauer, the chair of my thesis committee, for his invaluable guidance, patience, and feedback. Many thanks should also go to Dr. Krista J. Saral and Dr. Paul Gaggl for being a part of my thesis committee. I could not have undertaken this journey without you, your expertise and knowledge.

Furthermore, I would like to acknowledge and thank Olivier Adoukonou, as well as his coauthors Florence André-Le Pogamp and Jean-Laurent Viviani, for their advice and for sharing their data sample with me. This greatly aided me in my research process.

Lastly, I would be remiss in not mentioning my family, especially my parents and brother, and friends. Their unwavering support and belief in me has kept my spirits and motivation high during not only the thesis process, but throughout my entire education.

TABLE OF CONTENTS

LIST OF TABLES

GLOSSARY

Call delay: The cumulative number of days the convertible bond has had its conversion value exceeding the effective call price.

Call premium: The percentage amount by which the conversion value exceeds the effective call price at the call date.

Call protection: Refers to a prespecified period of time during which a convertible bond may not be called. See call provisions.

Call provisions: Feature of convertible bond prescribing when the bond can be redeemed by issuer, often divided into soft and hard call provisions. A soft call provision allows the issuer to call the bond early if a prespecified threshold is crossed for a prespecified number of days, but also requires a premium to be paid by the issuer in the case of early redemption. A hard call provision fully protects holders from redemption during a certain period.

Convertible bond: A fixed rate bond issued by a firm, which allows the holders of the bond to convert it into common stock of the issuer at a prespecified conversion price and during a prespecified conversion period.

Dividend protection: A convertible bond is dividend-protected when dividend payments do not affect the conversion value of the shares into which the bond may be converted.

INTRODUCTION

A convertible bond can be defined as a hybrid security, combining features from regular corporate bonds with features of an equity option. On one hand, due to a convertible bond being convertible into a fixed number of shares of stock, the price of a convertible bond is linked to the movement of the underlying stock's price, giving it characteristics of a derivative. On the other hand, a convertible bond has a fixed maturity day and coupon payments, making it a debt instrument (Calamos, 2021). While convertible bonds have existed for a long time, they have recently become very popular, even being named the top performing asset class by global investment firms six times in the past ten years, including the current year, 2022 (Knutson, 2022). One reason behind this popularity is the attractiveness of convertible bonds to their issuers. Convertible debt often has lower coupon rates than its non-convertible counterpart, allowing the issuer to lower its fixed-income costs. At the same time, convertible bonds offer firms with expected future growth a way of rising capital quickly despite facing issues raising short-term finance. However, there are also disadvantages to issuing a convertible bond. Often mentioned is the risk of losing control, which can occur if a large part of the issue purchased by one investor, making it possible for conversion to shift voting control to that buyer. In addition, issuing convertible bonds can lead to a dilution of the earnings per share of common stocks, a development current shareholders often view as negative. Thus, a firm ought to have certain characteristics for it to be attractive for it to issue a convertible bond as opposed to either straight alternative. Identifying and taking a closer look at these can help understand and possibly predict future financial decisions of businesses.

In addition to the recent popularity making convertibles an interesting asset class, the market for convertible bonds is also sizeable, furthering the importance of studying the market. The global convertible market is estimated to have a value of $700 billion, with a forecasted volume of convertibles launching in 2022 being $165 billion. The largest regional market for convertible bonds is

the Americas, which makes up more than half of the global market. Thus, academic literature in the field is often placing emphasis on the American market. Turning to the European convertibles market, it is the second largest, representing roughly a fourth of the global market (Kuehle, 2021). In Europe, a few countries stand out as having especially advanced national markets. Over the past thirty years, the main European markets include the United Kingdom, France, Netherlands, Germany, Sweden, and Switzerland (Bancel et al., 2009; Knutson, 2022).

With a market this sizeable, it is interesting as well as valuable to examine under what conditions the convertible bonds are issued and identify trends in observed call policies. A thorough understanding of the market could aid firms and investors in their decision-making, potentially increasing the efficacy of the use of convertible bonds as a means of capital raising and as a hedge. However, up to this date, academic literature has not been able to arrive at a consensus regarding firms' call policies. Despite the convertible market being a truly global asset class since the 1990s, the main portion of research on it is focused on the American market. Although this emphasis in itself can be justified simply by the size of the American market, there seems to be no consensus in the ongoing discussion surrounding the observed deviations from the theoretically identified optimal call policy. However, this could be a hint that studying other regional convertible markets could lead to an advance in knowledge overall. In studies, there has been identified a correlation between the American and European markets of 74% (Bancel et al., 2009). In this case, it is possible that advancing the research on call policies in European markets could further research on the American market through the identification of trends. Thus, this thesis sets out to answer the following research question:

Why do European firms issue convertible bonds, and do they subsequently deviate from the theoretically optimal call policy?

To answer the research question, this thesis is organized in multiple parts. First, in order to place this research within already existing academic literature and knowledge, literature within the field of optimal call policies will be reviewed, also delineating the theoretical foundation of the paper. Second, the methodology and sample will be described. Third, the two-part analysis will aim to first identify the determinants of convertible bond issuance and second the call policies in Europe. Lastly, the implications of the findings will be discussed and concluding remarks will be made.

LITERATURE REVIEW

As is a starting point for any academic paper, it is important to place the research presented in this thesis within the academic literature already in existence in the area. Thus, the following section will present a survey of the literature within the field of convertible bonds to provide an overview of existing knowledge. The current literature within the field of convertible bonds focuses primarily on American convertibles, optimal call policies, and deviations from these, often all discussed in tandem. Thus, the literature review will focus on call policies, and issuance related literature will be presented in part I of the analysis for a more succinct paper.

With respect to the optimal call policy, Ingersoll (1977a), building on the Miller-Modigliani assumption of symmetric market rationality as well as the option pricing techniques put forth by Black and Scholes, argued that convertible bonds should be called as soon as the conversion value is equal to the effective call price. That is, when the value of the stock received in exchange equals the stated call price plus any accrued interest from the last coupon payment date. Furthermore, Ingersoll's paper argues that deviations from this identified optimal call policy likely will cause incongruities between theoretical prices and observed market prices of convertible bonds (Ingersoll, 1977a). Following this, Ingersoll and many other scholars conducted empirical research to determine whether convertibles are actually called as soon as they are at-the-money. For example, Ingersoll (1977b) identified a 43.9% average call premium, while Asquith (1995) observed an average premium of 20-25% even when accounting for

call-protection, a provision prohibiting the exercise of the embedded call option for a pre-specified period of time. Findings like these imply that a call delay is observed, and for this, differing explanations have been proposed over the years.

Ingersoll himself explained the observed call premium by possible stock price volatility during the call notice period, i.e., the period of roughly 15-60 days where the bondholders are allowed to put the securities back to the issuing firm at the call price plus potential accrued interest (Altintig & Butler, 2005). The argument is that firms require a premium of conversion value to call price before calling due to the chance of the stock price decreasing enough to the point where the conversion value is less than the call price at the end of the call notice period. This would force firms into redeeming the bond with cash, i.e. paying the call price, which is often an uninviting option (Ingersoll, 1977b). However, it is argued that for stock price volatility to be the sole explanation for the call premium, the implied expected volatility would have to be unrealistically high, furthering the need for other explanations (Asquith, 1995). Recently, due to developments in dividend-protection where the vast majority of convertible bonds issued today are dividend-protected, explanations for possible delays can be divided into ones not related to dividends and ones related to dividends (Grundy & Vermijmeren, 2016). This will be done to allow for a better overview of the research. It is worth noting that all of the papers that will be discussed below use samples of American convertible bonds to back their arguments.

Starting with dividend-related explanations, two of these focus on voluntary conversion: Ingersoll (1977b) notes that if a firm calls a convertible, bondholders are effectively given a claim on the firm worth the conversation rate divided by the total number of shares post-conversion multiplied by the value of the issuing firm. Sometimes, bondholders might not voluntarily convert despite coupon payments being worth less than the claim on the firm due to being 'sleeping investors.' In this case, it is optimal for the firm to delay calling. Constantinides and Grundy (1986) build their argument around

the assumption that voluntary conversion is less costly as firms avoid the cost of underwriting a call and any costs associated with a failed call, making it the preferred option. They argue that voluntary conversion is primarily driven by investors' yield advantage, i.e., the difference between coupon and dividend payments. When the yield advantage is negative, dividend payments being larger than coupon payments will lead to voluntary conversion and no calls, as investors are rational and wish to receive the highest payment. This also implies that if dividends are expected to increase, a firm should not call a convertible bond but instead wait for voluntary conversion by investors. As such, this argument is linked to signaling theory; not calling implies that dividends are expected to increase (Grundy & Vermijmeren, 2016). Related to this is Grundy and Vermijmeren's (2016) signaling argument, which states that dividends of low-quality firms are not expected to increase, so they call their convertible bonds, while high-quality firms delay calling, as they are able to rely on voluntary conversion due to future dividends increasing. It is the shareholders of the low-quality firms who force conversion as to trade the costly coupon payments for lower dividend payments. Lastly, another influential proposed dividend-related explanation is the cashflow rationale. Asquith and Mullins (1991) claim that the liability that the option value of a convertible represents to shareholders can be more than offset by the present value of cashflow advantage occurring from the corporate tax shield on coupon payments. Delaying can thus be optimal when the firm is paying less in after-tax coupon payments than it would in dividends to former bondholders if the convertible bond was called. As such, delaying the call can maximize wealth from a shareholder perspective. In a later paper, Asquith (1995) combines this cashflow advantage rationale with the notice period explanation, holding that convertible bonds are not called late when accounting for these two factors. A convertible is called according to Ingersoll's (1977a) theoretical optimum unless there is significant risk of a failed call and/or if the present value of after-tax coupon payment is less than the present value of dividend payments by an amount greater than the option value.

Turning to non-dividend-related explanations for call delays, many scholars have drawn attention to the notice period, which is a period in which bondholders can put securities back to the firm for the call price of the convertible plus any accrued interest. If this happens, the call-forcing conversion of the bond is said to have failed (Altintig & Butler, 2005). Ingersoll (1997b) found that issuers wait to call until the convertible bond is substantially in-the-money, i.e., until a premium has been reached, in order to ensure conversion will not fail. Jaffee and Shleifer (1990) build on this and argue that this 'safety premium' is appropriate due to the cost of conversion failure; it is very costly for firms to raise the necessary cash to redeem a non-converted bond. To particularize this concept, Asquith and Mullins (1990) argue that a safety premium should be 20%, slightly less than twice the average monthly stock price standard deviation in their sample. In practice, however, they hold that managers apply a 20-25% safety premium. Another proposed explanation is the 'Harris-Raviv signaling' hypothesis, which under the assumption that dividends are too small to force conversion, states that high-quality firms delay calling convertible bonds while low-quality firms do not. This is due to the market interpreting the call of a convertible as a negative signal from management about future prospects of the firm (Harris & Raviv, 1991). This is consistent with Mikkelson's (1981) finding of call announcements having a negative impact on stock prices. Thus, a call delay is argued to imply positive future expectations for firm performance, perhaps because dividends are expected to increase and/or be at a higher level than coupon payments, to link the explanation to Grundy and Vermijmeren's signaling theory (2016).

Through the comprehensive examination of the existing literature, it is deemed that despite substantial emphasis being placed on potential reasons for observed call delays in the United States, a thorough analysis of the phenomenon in Europe has yet to be undertaken. Without such an analysis, it is not possible to determine whether the findings regarding convertible bonds in the United States can be extrapolated and characterized as being general to convertible bonds no matter the location of issuance. By the same token, it is also possible that an analysis of the European market can lead to conclusions

that may help explain the deviations from the theoretical optimal call policy observed in the United States. This would be the case if the characteristics are deemed to be similar enough for explanations to transcend geographic borders and political environments, at the same time as findings of research on the European market go beyond the findings of current research on the American market. Thus, the comparability of the two markets is important.

METHODOLOGY

DATA COLLECTION

Before diving into the analysis, a systematic collection of data must take place. For the purpose of this paper, quantitative and qualitative data of a secondary character will be utilized. This data will be gathered from multiple sources, including the academic literature, official reports from, amongst others, financial institutions, and terminals tracking real-time financial market data such as the Bloomberg terminal. While the data collected through this desk research proved satisfactory in informing the analysis and thereby obtaining an answer to the research question, the reliance on secondary data does come with limitations. Specifically, concerns regarding data being outdated, flaws in the research process and biases impacting findings and estimates of sources utilized, as well as the research process of this paper being stifled by a lack of availability of the needed secondary data. In an attempt to mitigate these concerns, this thesis will employ source triangulation through conducting extensive research in order to identify regularities in estimates and findings of multiple sources. This, in turn, also minimizes the risk of biased secondary data leading to data being framed in any way that favors specific ex ante positions (Patton, 1990). At the same time, the quality of the sources that this thesis rely on is also taken into account during the research process to ensure a higher quality of data.

For the sample of convertible bonds, it was decided that the sample of European convertible bonds collected by Adoukonou et. al. (2021), which the authors graciously provided in its entirety, was chosen as the sample for this thesis. The Bloomberg database was used to construct their sample. The initial screening process included certain delimitations, in particular concerning the geographic location of issuance and the issuance year. Here, a sample consisting of 1671 convertible bonds issued by European firms between January 1992 and May 2018 was constructed. The start year of 1992 was chosen due to this roughly being the time when convertible bond issuance started picking up. The 2018 cutoff year decision was arbitrary. From this initial sample, this paper selects the convertible bonds that

were issued by non-financial firms, were in-the-money at some point, and for which the necessary data for analysis was available. Financial firms are excluded as to remove any convertibles potentially issued for reasons substantially different from other types of issuers. With these constraints, the paper ended up with a sample consisting of 159 in-the-money convertible bonds issued by 136 companies in 14 different countries between the years 1992 and 2018. This sample can further be divided into called versus non-called convertible bonds. 122 of the convertibles where called, while 37 were not. Even though the size of the sample is substantial, a larger sample could lead to more accurate aggregate analysis. However, for the purpose of this paper, the sample provided by Adoukonou et al. (2021) was deemed sufficient.

In Table 1, which is depicted below, some of the main characteristics of the final sample collected by Adoukonou et al. (2021) are summarized:

Table 1: Characteristics of Convertible Bond Sample

The convertible bond issuance data from the period 1992-2018 from the Bloomberg database included in the final sample grouped by whether called or not. When not called, computations are based on assumption of the convertible being called in May 2018, the end of the sample period.

	Mean	Median	Minimum	Maximum	Standard Deviation
Issue Size (EURm)					
Called	325.42	246.60	4.57	2,657.30	368.21
Not Called	174.48	80.11	1.54	862.50	248.88
Coupon (%)					
Called	3.72%	3.25%	0.00%	9.00%	2.24%
Not Called	3.19%	3.00%	0.00%	10.00%	2.66%
Maturity (years)					
Called	7.61	6.32	2.35	32.65	4.87
Not Called	5.56	5.00	3.00	10.00	1.22
Issuance to Call (years)					
Called	3.98	3.38	0.25	14.55	2.28
Not Called	3.60	3.72	1.16	5.46	1.11
Soft Call Trigger (%)					
Called	130.57%	130.00%	115.00%	150.00%	8.79%
Not Called	132.00%	130.00%	120.00%	150.00%	7.75%

	With Call Protection	Without Call Protection
Soft Call Provision		
Called	88 (72.13%)	34 (27.87%)
Not Called	15 (40.54%)	22 (59.46%)
Hard Call Provision		
Called	105 (86.07%)	17 (13.93%)
Not Called	32 (86.49%)	5 (13.51%)
Dividend Protection		
Called	36 (29.51%)	86 (70.49%)
Not Called	24 (64.86%)	13 (35.14%)

Source: Sample collected by (Adoukonou et al., 2021)

From Table 1, it is evident that the convertible bonds in the sample differ significantly from each other. First, the largest issue in the sample is EUR 2,657.3 million, while the smallest issue was only EUR 1.54 million. The convertible bonds that were called tend to have a larger issue size, with both the minimum and maximum being higher for this subsample than for the not called bonds. However, the standard deviation in this group is also larger, likely attributed to the difference in the sizes of the subsamples. Turning to the maturity measured in years, the called convertible bonds have a longer mean and median life, but they are relatively close to each other. This trend continues in the issuance to call column, where it can then be concluded that the not-called convertible bonds most likely were issued more recently. This is the case as the assumed call date for the not-called convertibles is the end of the sample period, i.e., May 2018. Lastly, looking at the provisions, the vast majority of all the convertible bonds have hard call provisions put in place, which aligns with the general observation that most firms do include hard call provisions when issuing convertible bonds (Korkeamaki & Moore, 2004). Soft call provisions, on the other hand, are more prevalent for the called subsample, despite the trigger percentage being roughly the same. Hence, it could very likely be the case that the firms in the called subsample simply performed better during the sample period, allowing them to cross the threshold and actually call the convertible. This will be looked further into in the analysis. For dividend protection, it seems that more convertible bonds without dividend protection are called compared to ones with this provision. Further descriptions of the sample are included whenever necessary in the empirical analysis section.

METHODS

This thesis will employ a descriptive research design in order to analyze the issuance and call policies of convertible bonds issued by European companies. This research design is chosen due to the objective of the thesis being to describe the nature of convertible bond issuance and the event of a call. Descriptive studies are associated with the use of both quantitative and qualitative methods, depending

on what best allows for the research question to be answered (Moses & Knutsen, 2012). This type of flexibility allows for utilization of methodology in a manner which suits the research objectives. When conducting research, different approaches can be taken to inform one's research process. The inductive approach, on one hand, utilizes empirical findings to reveal new knowledge within the specific field of research. On the other hand, a deductive approach implies that the research is based on general theories used to draw conclusions on specific observations (Moses & Knutsen, 2012). However, in connection with a descriptive study such as the one at hand, it is argued that combining relevant aspects of both the inductive and deductive approaches can allow one to explain the intersection between theory and practice (Yin, 2014b, 2014a). Thus, even though emphasis is placed on using theoretical frameworks as the basis for analyzing issuance and describing potential deviations from optimal call policies of convertible bonds, aspects of inductive reasoning do also occur. This implies that the findings of the thesis are not solely based on application of theories, but also on a discussion of how empirical findings might diverge from theoretical predictions (Moses & Knutsen, 2012). As such, this paper is hypothesis producing, not hypothesis testing.

To answer the research question, statistical methods are applied. Following the data collection, descriptive statistics will be utilized to provide an overview of the data through the calculation of key variables. This includes computing means, medians, and standard deviations of key variables, which will prove insightful and benefit the analysis immensely. As such, descriptive statistics are used to summarize the data, allowing for a more meaningful discussion of convertible bond issuance and call policies. The key measures that will be computed are the call premium, i.e., the percentage amount by which conversion value exceeds call price when the bond is called, and the call delay measured as number of days the call is delayed from the point the option is in-the-money. The call premium is computed using the following equation:

$$Call\ premium\ (\%) = \frac{conversion\ value\ on\ call\ date}{call\ price} - 1 \quad (1)$$

The call premium and call delay, however, need to take into account the type of call protection the convertible bond has. If the bond has a hard call provision it cannot be called before a certain date even if the option is heavily in-the-money. Thus, the call delay measure has to be adjusted to take into account this period, so that the theoretically optimal call date is the first day where the conversion value exceeds the call price after hard call provision has ended. For soft call provisions, the convertible bond cannot be called before the conversion value exceeds the call price by a certain percentage, referred to as the soft call trigger percentage for a prespecified length of time. For example, most common soft call provision in the sample requires the conversion value to exceed the call price by 130% for at least 20 days within a period of 30 consecutive business days, also called a 20-of-30 soft call. Therefore, the call premium has to be adjusted to account for this trigger percentage. The adjusted call premium is computed as follows:

$$Adjusted\ call\ premium = \frac{conversion\ value\ on\ call\ date}{call\ price \cdot trigger\ percentage} - 1 \quad (2)$$

The adjustment thus computes the call premium by increasing the call price with the soft call trigger percentage. This leads to a higher effective call price and thus a lower call premium when adjusting for the call provisions. It is important to note that equation 2 is an approximation. However, this paper has not identified a better adjustment equation in current literature. For bonds with both soft and hard call provisions, the theoretically optimal call date must be the first date, after the end of the hard call provision, that the conversion value exceeds the conversion price by the soft call trigger percentage and lives up to the requirement about the number of days. This is the date used to compute the adjusted call delay measured in days.

ANALYSIS

The analysis will be divided into multiple parts, part I being concerned with the reasons behind the issuance of convertible bonds, and part II with observed call policies in the sample.

PART I - CONVERTIBLE BOND ISSUANCE

To start off the analysis, it is valuable to understand the reasoning and mechanisms behind the issuance of a convertible bond. In general, three factors can be said to affect the likelihood of a firm issuing a convertible bond: Agency costs and asymmetric information, market timing, and country specific factors.

First, when it comes to agency costs and asymmetric information, financial theory has tended to describe convertible bonds as a substitute for either debt or equity, when it is viewed from an agency theory or asymmetric information framework perspective. Building on Jensen's (1986) agency cost framework, concerned with overinvestment, i.e., inefficient investments by managers when there are free cashflows, convertibles are argued to present benefits for holders as well as issuers. From the holder perspective, the conversion option in the convertible bond reduces bondholders' concerns about ex-post risk-shifting (Green, 1984). From the perspective of the issuer, convertibles not only aid in controlling the overinvestment problem, but also resolves the sequential-financing problem and reduces issuing costs by avoiding multiple issues of debt and/or equity (Mayers, 1998). Thus, following this line of argument, the call option of a convertible bond is valuable due to the flexibility it provides a firm in financing future investments. Asymmetric information models, on the other hand, build their arguments about convertibles differently, as most models assume managers have superior information compared to investors. Here, convertible bonds resolve the uncertainty about the risk of the firm's current or future assets (Brennan & Kraus, 1987; Brennan & Schwartz, 1988). When in need of external financing, a firm will prefer to avoid issuing equity when its stock is undervalued, but it must balance

this with the distress costs that come with debt issuance. Using convertible bonds as a means of financing can then help the firm in overcoming these adverse selection costs associated with equity issuance, while also overcoming the high cost of straight debt incurred if the firm has sizeable financial distress risk (Stein, 1992). Thus, convertible bond financing can be referred to as "backdoor equity" financing due to its lower distress costs and smaller undervaluation compared to straight financing options (Stein, 1992). Convertibles can, however, also be used as a substitute for debt. In this case, the call option provided to holders is used to sweeten the debt issue by reducing the cost of the debt through conversion clauses (Green, 1984). Whether firms issue convertibles as a substitute for debt or equity depends on their characteristics: High growth firms tend to issue convertibles as backdoor equity, using them to finance future growth, while firms with financing difficulties more often issue convertibles as sweetened debt. This has been shown to hold in the US (Lewis et al., 1999) but in studies of the European market, it is found that equity-like issuance is rare, i.e., convertible bonds are used primarily as sweetened debt (Dutordoir & Van de Gucht, 2009). Overall, from this perspective, convertible issuance is more likely when a firm has high growth, few internal financing sources and only has access to costly external financing (King & Mauer, 2014).

Second, market timing theory argues that managers are opportunists who make use of their superior information in order to select the optimal timing for security issuance. This optimal timing then allows them to take advantage of temporary favorable market conditions as well as attractive security prices (Graham & Harvey, 2001). That is, managers can issue equity or debt at a time where the cost of issuance is lower. As a hybrid security, convertible bonds are also very likely to be influenced by market conditions and interest rate levels, albeit perhaps to a lesser extent than the straight alternatives. Thus, market timing theory is also relevant when discussing convertible bond issues. In a survey, European CFOs state that their decision as to whether or not to issue a convertible depends on the interest rate and stock market volatility levels. For a convertible to be issued, European firms prefer a combination

of low interest rates and high stock market volatility (Bancel & Mittoo, 2004). This is due to the low interest rates making the coupon on the bond part lower, while the high stock market volatility makes the call option more valuable to the bondholder, making the convertible bond a cheaper source of financing for the firm. In addition, the decision can be influenced by the overall volume of convertibles in the market at a given time. Shareholders have empirically been found to generally react negatively to convertible bond issuance but less so during periods of high convertible issuance volume (Dutordoir & Van de Gucht, 2007). Hence, managers can make use of this information to time the issuance optimally.

Third, country specific factors also influence the decision to issue a convertible bond. In particular, it is often evident that the legal and institutional environment plays a large role in determining what type of security a firm will issue to meet its financing needs. This includes the financial system, accounting laws and standards, tax systems etc. For example, if a country has implemented strong minority shareholder protection, odds are that it has a more developed equity market. The same holds for the opposite case where strong creditor protection is associated with more developed debt markets (La Porta et al., 1998). Following from this, a developed stock market in turn means better opportunities for diversification, motivating managers to switch their firm's financing from long-term debt to equity financing (Demirguc-Kunt & Maksimovic, 1999). When it comes to convertible bonds, their hybrid nature means that the country-specific factors will have opposing effects on the two components. In a country with relatively weaker shareholder rights and stronger creditor protection, convertibles will tend to have stronger call protection. In turn, in countries with relatively stronger shareholder protection and weaker creditor protection, firms issue convertibles with a higher expected probability of converting to equity (Lee et al., 2009). This means that firms will issue more debt-like convertible bonds in countries with stronger creditor protection, while they tend to issue convertibles as backdoor-equity in countries with stronger shareholder protection. The impact of country-specific factors is clear when looking at the

difference between convertibles issued in different parts of the world. For example, in the US and UK, issuing a convertible bond is associated with negative stock price reactions (Dann & Mikkelson, 1984), while it tends to be associated with a positive stock price reaction in countries such as Japan and the Netherlands (De Roon & Veld, 1998; Kang & Stulz, 1996). In general, convertibles issued by European firms tend to be more debt-like, i.e., they are used as alternatives to straight debt (Bancel et al., 2009).

Turning to the European market, the convertible bond market has a size of USD 154 billion, compared to the US market of USD 455 billion, making up 22% and 65% of the world market respectively (Kuehle, 2021). The size gap between the two markets decreased following the introduction of the Euro in 1998. The surge in European convertible activity is explained by the correlation between the US and European markets participating in the European Monetary Union increasing to 74%. Thus, the introduction of the Euro allowed the European market to compete more with the American market, as it become a truly global market (Bancel et al., 2009). Empirical studies have furthermore shown that it is especially financial firms and government related agencies that are active in the European convertible bond market, making up 40% of issues compared to only making up 12-18% in other big regions (Bancel et al., 2009). Recognizing the importance of country-specific factors, one acknowledges that the European convertible markets differ based on not only regulatory discrepancies, but also on preferences of both investors and issuers. Thus, when analyzing and discussing the observed and optimal call policy of convertible bonds issued by European firms, these differences must be taken into account.

Analyzing the sample with regard to the issuance of convertible bonds, the three influencing factors will once again be focused on separately. Agency costs and asymmetric information theories predict that the convertibles in the sample should be issued by high growth firms with few internal sources of financing. In the sample, the convertible bonds are issued by firms from nine different industries

according to the Global Industry Classification Standard. Table 2 below summarizes the industries and their related growth rates.

Table 2: Industry Growth Rates

Growth rates of issuer industries reported by S&P Global. The growth rates are in the form of compound annual growth rates (CAGR), which are defined by year-over-year growth rate, assuming reinvestments (Berk & DeMarzo, 2020).

Industry	Number of Convertible Bonds	5-year CAGR
Communication Services	18	2.1%
Consumer Discretionary	17	8.7%
Consumer Staples	14	4.9%
Energy	4	4.6%
Health Care	19	8.8%
Industrials	29	3.6%
Information Technology	34	14.0%
Materials	18	3.4%
Utilities	6	3.0%

Sources: 5-year CAGR (S&P Global, 2022).

The industry with the most convertible bond issues in the sample is information technology, which is also the industry with the highest growth rate with a CAGR of 14%, and the industry with fewest issues, utilities, has one of the lowest growth rates (3%). At the same time, there are also industries in the sample that do not display the same company behavior. In the industrials industry, for example, the number of issues is 29 despite the growth rate 'only' being 3.6%. However, the industry CAGR is pulled down by subindustries such as airlines and industrial conglomerates, while the convertible bonds in the sample are issued by firms from high growth subindustries such as trucking (14% CAGR). To highlight the relationship between the variables, the correlation between issuance and industry growth in the sample is 0.54625, implying a moderate positive correlation between the two variables. Thus, the sample follows the prediction of higher convertible issuance for higher growth companies. In addition

to the high growth, access to internal funding and expensive external funding opportunities are likely relevant for issuance activity but observing these variables for the firms in the sample proved difficult.

For market timing, the number of convertibles issued per year and the interest rate and volatility levels are of interest. According to previous research, issuance should be more prevalent when interest rates are low and when volatility is high. Volatility levels are in this paper estimated using VDAX and VSTOXX, which are both market estimates of expected volatility. VDAX is used for the years 1992 to 1998, and VSTOXX is used for the remainder. This is the case as VSTOXX was not reported before the year 1999. Both of the indices are designed to be measures of market volatility and have been deemed some of the most accurate measures of investor sentiment and European volatility. For example, VSTOXX is based on the implied volatility of the EURO STOXX 50, a stock index composed of fifty leading European companies. The stock market volatility, interest rate levels and number of convertible bonds issued per year are reported below:

Table 3: Issuance Years, Interest Rate and Volatility Levels

The number of convertible bonds issued per year from 1992-2018, the corresponding 10-year maturity interest rate levels for the EU countries, and stock market volatility estimated by VSTOXX and VDAX index levels (market estimates of expected volatility).

Year	Number of Convertible Bonds	Interest Rate Level (%)	Stock Market Volatility (%)
1992	1	9.74%	18.63%
1993	2	8.07%	17.15%
1994	4	8.20%	19.74%
1995	0	8.77%	15.98%
1996	7	7.26%	16.02%
1997	6	5.99%	29.84%
1998	6	4.71%	40.11%
1999	4	4.63%	26.92%
2000	7	5.43%	25.64%
2001	4	5.30%	28.16%
2002	3	5.06%	37.34%
2003	1	4.34%	32.11%
2004	4	4.43%	18.91%
2005	4	3.73%	14.05%
2006	6	4.07%	16.56%
2007	11	4.56%	19.72%
2008	8	4.54%	27.97%
2009	1	4.11%	33.62%
2010	2	3.83%	26.50%
2011	4	4.30%	30.09%
2012	1	3.67%	24.64%
2013	6	2.96%	18.57%
2014	7	2.20%	18.22%
2015	4	1.43%	24.03%
2016	5	1.10%	23.59%
2017	10	1.31%	14.73%
2018	4	1.38%	16.16%

Sources: interest rates (ECB, 2022a, 2022b), stock market volatility (ECB, 2008; STOXX, 2022)

From Table 3, there seems to be a relationship between the three variables. For convertible bond issuance and interest rates levels, the correlation is -0.2097, showing a negative, however low, correlation between issuance and interest rate levels. For stock market volatility and issuance, the correlation is -0.1803, also a low negative correlation. The correlation between volatility and issuance being negative goes against the predictions of literature. From year 1992 to 1995, interest rates are high, stock market volatility low, and the number of convertible bonds issued in the sample is also low. In 1996, issuance increased despite volatility being relatively low, but this might be explained by the high interest rate of 7.26%. For the period from 1997 to 2002, both interest rates and stock market volatility were high, which has opposing effects on issuance, which is reflected by the issuances per year being comparatively average and stable. From 2004 to 2006, issuance was relatively low, as stock market volatility was low. 2008 to 2012 was characterized by lower levels of issuance than in 2007, even though volatility was high and interest rates were intermediate. However, one could argue that the reason for this was lower levels of investments in general, caused by the financial crisis of 2008 (Ksantini & Boujelbène, 2014). From 2013, issuance picks up again, remaining mostly stable at a level around five issues a year, even though there were different combinations of interest and volatility levels, which seems counterintuitive based on the theory. Nonetheless, five issues a year is roughly the average number of issues per year in the sample, so the opposing effects seem to be a plausible explanation for this. Overall, the market timing of issuance appears to be consistent with the prediction of higher issuance during periods with low interest rates, but inconsistent with the prediction of higher issuance during high stock market volatility, despite the relationship being difficult to fully determine at correlation levels that low. This can be due to multiple reasons including other economic factors, and also simply the sample size not being large enough to accurately represent the entire population of convertibles bonds.

For country specific factors, the interesting question is whether some countries show up more or less, and if so, how come. The distribution of convertible bonds based on country of issuance and their call status is reported in Table 4.

Table 4: Issuance Based on Country

The number of convertible bonds issued in each country and whether or not they were called.

	Number of Convertible Bonds	
Country	**Called**	**Not called**
Austria	3	-
Belgium	4	2
Finland	1	-
France	42	11
Germany	11	5
Ireland	1	1
Italy	1	4
Luxembourg	9	2
Netherlands	25	4
Norway	4	1
Spain	6	2
Sweden	-	1
Switzerland	2	3
UK	13	1
Total	**122**	**37**

In the sample, the most prominent countries for issuance are France (53), the Netherlands (29), Germany (16) and the UK (14). Notably, no convertible bonds issued by Eastern European countries made it into the sample. Fewer Eastern European countries are members of the European Union, which means that they are not a part of the European internal market where regulation establishes the right to invest in companies and to carry cross-border capital movements in all member states, as well

as ensures equal treatment of investors regardless of member state nationality (DG Trade, n.d.). Hence, European Union member states tend to offer firms a larger investor pool and less regulatory barriers. All the convertible bonds in the sample were issued by firms from either a European Union member state or take part in the European Economic Area or European Free Trade Area, such as Switzerland and Norway. In addition to being a part of European economic collaboration to some degree, the countries with the most convertible bond issues in the sample have strong shareholder protection, with for example France, Germany, the UK, the Netherlands, Belgium and Spain having relatively similar scores above a seven on a scale from one to ten (Deakin et al., 2018). On the other hand, some of the countries with fewer issues have weaker shareholder protection: Italy and Switzerland both score around a six out of ten (Deakin et al., 2018). Looking at creditor protection, this can be measured by the 'creditor rights index' proposed by La Porta, Lopez-de Silanes, Shleifer and Vishny (1998). Austria, Ireland, the Netherlands, and the UK have relatively weak creditor protection, Belgium, Italy and Norway have intermediate creditor protection, and Finland, France, Germany, Sweden and Switzerland display strong creditor protection (Heitz & Narayanamoorthy, 2018). Based on these observations, there is no clear relationship between creditor and shareholder protection and the number of convertible bonds issued. That is, it is difficult to determine how different combinations of creditor and shareholder protection affect issuance volume, and it is hypothesized that these variables have a larger effect on convertible bond design than on issuance itself.

Overall, the sample tends to be in accordance with most of the hypotheses presented in this section. Most of the convertible bond issuers belonged to high growth industries, as the unlimited upside potential of the call option is more attractive to investors when firm growth is high, making the option component worth more. While determining whether the issuing firms have little access to internal sources of funding is improbable, it is hypothesized that for high growth firms, the lack of access to internal funding would imply not being able to finance new high growth activities, so they must raise

external capital. Here, convertible bonds are an attractive security to issue for the high growth firms as the convertible feature allows investors to take advantage of future growth by converting to stocks, an advantage effectively reducing the cost of financing for the firm. Besides issuance being dependent on firm characteristics, firms were expected to generally issue more convertible bonds during times of high stock market volatility and low interest rate levels due to these conditions making the coupon payments cheaper and the option more expensive. However, there is very weak evidence for this in the sample, hinting towards the importance of other economic factors also being included to fully account for the market timing of issues. In terms of countries, the European convertible bond market is characterized by a majority of issuers being from Western European countries. Levels of shareholder and creditor protection are deemed to have more of an impact on the design of the convertible bond issued as opposed to on the decision to issue in the first place. This is consistent with different designs implying that convertible bonds are issued for different reasons, i.e., as sweetened debt or backdoor equity.

PART II - CALL POLICIES

Having touched upon the conditions under which European firms choose to issue convertible bonds, this thesis will now turn to the call policies observed in the sample. As described in the methodology section of this paper, the call policy will be quantified using regular measures of call premiums and call delays as well as adjusted measures, which take into account call provisions.

Table 5: Call Premiums and Call Delays

The observed call policies in the sample. For the non-called convertible bonds, the call delays and premiums are computed assuming that the convertible was called at the end of the sample period, May 2018. Adjusted call premiums and delays are computed taking into account both soft and hard call provisions.

	Call Policy		Adjusted Call Policy	
	Mean	**Median**	**Mean**	**Median**
Call Premium (%)				
Called	97%	43%	76%	19%
Not Called	57%	31%	41%	15%
Call Delay (days)				
Called	200.73	89	89	46
Not Called	281.43	244	181.59	155

First looking at the call delay, Table 5 reports that the average (median) call delay for the called convertible bonds in the sample is 200.73 (89) days, while it is 281.43 (244) days for the bonds not called. The adjusted call delay takes into account the hard call provision period where the convertible bond cannot be called no matter what but also removes the time where the conversion value does not exceed the soft call trigger percentage and live up to the day requirements. The average (median) adjusted call delay for called and non-called convertibles is 89 (46) days and 181.59 (155) days respectively. Again, allowing for adjustments based on call provisions decreases the deviation from the optimal call policy, as the number of days the call is delayed decreases significantly. This can be attributed to the fact that a lot of the convertible bonds in the sample have some form of call provision, either hard or soft, as a part of their design (cf. Table 1). As opposed to the call premium, the call delay is longer for the non-called subsample. A possible explanation for this is the lower observed unattained call premiums, i.e., that the call premiums have yet to reach satisfactory levels, extending the delay. Nonetheless, the findings still imply that convertible bonds are called late.

Turning to the call premium, the average (median) call premium in the sample is 97% (43%) for the convertible bonds that were called and 57% (31%) for the non-called ones. These premiums are very high, reflecting European firms requiring a very high safety premium. However, the adjusted call premium is on average (median) lower at 76% (19%) for the called bonds and 41% (15%) for the non-called part of the sample. Thus, the adjusted call premium is already significantly lower than the non-adjusted measure. Nonetheless, this adjusted mean and median also include the premiums of convertible bonds with no soft call provisions, meaning that it is potentially still skewed upwards. Therefore, it is interesting to also examine the effect of soft call provisions on the call premium.

Table 6: Adjusted Call Premiums by Soft Call Provision Inclusion

Adjusted call premiums reported for convertible bonds with and without soft call protection to subtract the effect of convertibles with no soft call protection on the mean and median adjusted call premium.

	With Soft Call Provision		**Without Soft Call Provision**	
	Mean	**Median**	**Mean**	**Median**
Adjusted Call Premium (%)				
Called	45%	18%	137%	40%
Not Called	30%	7%	48%	20%

As seen in table 6, the adjusted call premium is noticeably lower when not including the call premium of the bonds without a soft call provision in the calculation of the mean and median. Without these, the mean (median) call premium in the sample is down to 45% (18%) for the called subsample and 30% (7%) for the non-called subsample. It is apparent that the convertible bonds without a soft call provision drove up the adjusted call premium, given that the average (median) adjusted call premium for convertibles with no soft call provision is a staggering 137% (40%) for called bonds and 48% (20%) for non-called bonds. Hence, call premiums are significantly lower when properly accounting for the call provisions put in place on the convertible bonds. Lastly, the fact that the call premiums are

systematically substantially lower for the non-called subsample than for the called part can be explained by the fact that the non-called premiums are non-realized. That is, these convertible bonds have yet to be called, implying that the safety premiums have yet to be sufficient to warrant this. Therefore, it can be argued that European firms do require safety premiums, and that these are of a significant magnitude. However, these are smaller for convertible bonds with soft call provisions, which is attributed to the fact that the soft call trigger percentages in the sample range from 112-150% with an average of 130%. The presence of hard and soft call provisions further imply that premiums can already be high on the first day that the convertible can be called without the firm requiring a safety premium in excess of the provision.

Lastly, the event of a call is of interest. From the sample, the combination of levels of shareholder and creditor protection has an impact on the number of calls. It is seen that countries with weaker shareholder protection and stronger creditor protection have fewer calls, whereas countries with stronger shareholder protection and weaker creditor protection have a higher call percentage. To emphasize this, five convertible bonds were issued in Switzerland and only two of these were called (40%). In the UK, on the contrary, fourteen convertibles were issued, with thirteen of these being called (92.86%). Lastly, a country like Germany, which is known for both strong shareholder and creditor protection, the pattern is less clear with eleven out of a total of sixteen convertibles called (68.75%). Building on this, the fewer calls can also be attested to due to stronger call protection. The relationship between the type of call provision and whether the convertible bond is called or not is highlighted in Table 7.

Table 7: Call Provisions and Calls

The relationship in the sample between the number of calls and the type of call protection of the convertible bond.

	With Provision	Without Provision
Soft Call Provision		
Called	68	34
Not Called	15	22
Hard Call Provision		
Called	105	17
Not Called	32	5

As seen in Table 7, there are more calls for the soft call provision bonds than for the hard call provision bonds, as 81.39% of the soft call provision bonds were called while 'only' 76.64% of hard call provision bonds were called. Despite the relationship not seeming very strong, the stronger call protection can be a result of investors' preference for remaining creditors, i.e., not wanting the firm to force conversion. Thus, fewer calls should be expected. The opposing effects of creditor and shareholder protection on the design of the convertible bond is seen in the strength of the call protection. In countries with weak shareholder protection and strong creditor protection, stronger call protection and hence fewer calls are observed and vice versa (c.f. Table 4). For countries with both creditor and shareholder protection being weak or strong, the effects are more ambiguous. This further has a relationship with investor preferences, but the direction of the relationship is not easy to determine.

From this analysis, it can be concluded that European firms do deviate from Ingersoll's (1977a) optimal call policy of calling a convertible bond as soon as conversion value equals conversion price. In the sample, there is a substantial call delay and call premium. When adjusting for call protection, the attained median premium is 19% and the delay is 46 days. However, this adjusted call premium is

skewed upwards by the inclusion of convertible bonds without a soft call provision. In addition, despite this, it is worth noting that ten companies in the sample do follow the optimal call policy, and many others do call the convertible bond very near the optimal date. Thus, the deviation might not be as severe as it seems at first glance.

IMPLICATIONS OF FINDINGS

Having examined the types of issuers and prevalent call policies for the European convertible bond market, this paper will now discuss the implications of the analysis. These implications can be divided into two categories: Extrapolation of findings to the US regional convertible bond market and the definition of what constitutes an 'optimal' call policy.

Comparing the findings of this paper with those of papers on the US market, it is evident that the observed call delays and premiums are similar. Where this paper finds a median attained call premium of 43% and call delay of 89 days, Ingersoll (1977b) found a call premium of 43.9% while Grundy and Vermijmeren (2016) found a call delay of 67.22 days. When adjusting for call protection, the median call premium of this sample decreased to 19% and the median (mean) delay to 46 days (89). Comparing this to Altintig and Butler's (2005) paper, they identified a premium of 35%, and King and Mauer (2014) identified an average delay of 33 days when accounting for cashflow advantages and a safety premium of minimum 20%. In general, these results point toward the call policies of European firms not differing substantially from those of American firms even though there are significant discrepancies in the regulatory and institutional setups inter- and intra-market. From this, it seems that the European and US convertible bond markets are comparable, which implies that the reasons behind the observed delays and premiums should also be comparable. Therefore, furthering research and advancing knowledge in one market could potentially lead to the same progress in the other market. This allows research to be done on the data where data is easiest to gather.

Given the comparability between two major global convertible bond markets, it might be worth considering whether it is 'simply' necessary to change the definition of what the optimal call policy looks like. As mentioned previously, even though a call premium and delay are observed, many companies in the sample call their convertible bonds close to the theoretically optimal call policy. This

could imply that there are specific variables, which if taken into account when defining the optimal call policy, could lead to companies following this policy. For example, it was shown that by isolating the convertible bonds with soft call provisions, the adjusted call premium and delay decreased substantially. In addition to this, the proposed explanations for deviations laid out in the literature review could be incorporated into the definition. In order to determine which explanations are relevant for European convertible bonds, however, would require in-depth tests as those seen performed for the US market. Adoukonou et al. (2021) in their study performed some of these tests, concluding that the observed delay and premium is consistent with the cashflow advantage explanation but less so with other explanations such as the notice period and signaling theory explanations. While these results are interesting, there still does not exist a consensus among scholars what is to blame for the observed deviations in the US or the European market, making it difficult to pinpoint a new definition that is not extremely broad.

CONCLUSION

To conclude, this thesis set out to review the issuance of convertible bonds by European firms as well as the call policies that follow issuance, addressing the research question; "*Why do European firms issue convertible bonds, and do they subsequently deviate from the theoretically optimal call policy?*". The question was approached by first identifying the theoretically optimal call policy before diving into a two-part analysis. The optimal call policy according to theory was deduced from a comprehensive review of existing academic literature. Here, the paper employed Ingersoll's (1977a) theoretical optimum, which states that a convertible bond should be called as soon as its conversion value equals the effective call price, due to its importance in literature as well as its reliance on the renowned option price model, the Black-Scholes model. In the two-part analysis, part I was concerned with explaining why European firms issue convertible bonds and addressing the characteristics of the European convertible bond market and part II with the observed call policy.

Part I found that the European convertible bond market has an estimated size of USD 154 billion, and that issuers belong to various industries as defined by S&P. Industries with a higher growth rate saw a higher number of convertible bonds issued. The market conditions under which more issuances occur is when stock market volatility is high and interest rate levels are low, despite the relationship not being perfect without the inclusion of other economic variables. The most prominent countries for bond issuance in the sample are France, Netherlands, Germany, and the UK. Western European countries are dominant in the regional convertible bond market, with all sample convertibles being issued in one of these. Furthermore, the countries with highest number of issues have strong shareholder protection.

Part II of the analysis identified an average (median) call delay of 200.73 (89) days and a call premium of 97% (43%). The call premium is lower for the non-called subsample than for the called, likely due to the former being unattained and therefore not yet at a satisfactory level for the European firms to call

their convertible bond. The call delay, on the other hand, is shorter for the called convertibles with a median delay of 89 days as opposed to 244 for the non-called subsample. When adjusting for call protection, the attained premium and the delay decreases significantly to averages (medians) of 76% (19%) and 89 (46) days. Thus, adjusting for the period in which the convertible cannot be called, the hard call provision, as well as the required premium, the soft call provision, significantly impacts the observed deviation from the optimal call policy. In addition to this, when subtracting the convertible bonds with no soft call provision from the adjusted call premium, the average (median) premium decreases even further to a level of 45% (18%). In the sample it is also seen that countries with weaker shareholder protection and stronger creditor protection have fewer calls, whereas countries with stronger shareholder protection and weaker creditor protection have a higher call percentage. Stronger call protection can also be at cause for this, as the sample shows more calls for convertible bonds with soft call provisions than compared to ones with hard call provisions. Thus, this paper also shows how accounting for different components of the convertible bond design can change the magnitude of the identified deviation and whether a call even takes place.

This research further suggests that the importance and impact of regulation and institutional setups might be more negligible than first assumed when embarking on the research process. However, one has to be careful to not deem socio-economic factors irrelevant, as the US and Europe are relatively similar as parts of the Western world. The same might not hold when extending research to areas with very different political systems. This realization led to another implication, which is that it might be as relevant to examine whether the definition of the optimal call policy is too theoretical and ignores too many factors.

During the research process and development of this thesis, topics deemed relevant for future research emerged. First of all, it would be very interesting to further examine the observed call premiums and

delays for European convertible bonds in a search for an explanation behind these. Furthermore, it could be relevant to perform similar research focused on a larger sample as well as on other regional convertible bond markets, such as South American or Asian markets, in search of similarities and discrepancies. This kind of research would add to the advancement of knowledge on the impact of different regulatory environments on convertible issuance and potential calls. Potentially, there could also be an interesting behavior aspect to this, for example whether Asian managers behave more "optimally" than American and European managers. In continuation of this, a comprehensive study of investor and firm preferences with regards to convertible bonds could shed light on the decision-making process, despite the apparent impracticality of such research. For example, the conclusion of agency theory that convertible bonds are used primarily as debt in Europe could be tested.

BIBLIOGRAPHY

Adoukonou, O., Pogamp, F. A.-L., & Viviani, J.-L. (2021). The determinants of convertible bonds call policy of European companies. *International Review of Financial Analysis*, *73*.

Altintig, Z. A., & Butler, A. W. (2005). Are they still called late? The effect of notice period on calls of convertible bonds. *Journal of Corporate Finance*, *11*, 337–350. https://doi.org/10.1016/j.jcorpfin.2003.08.001

Asquith, P. (1995). Convertible bonds are not called late. *Journal of Finance*, *50*, 1275–1289.

Bancel, F., & Mittoo, U. R. (2004). Why do European firms issue convertible debt? *European Financial Management2*, *10*, 339–373.

Bancel, F., Mittoo, U. R., & Zhang, Z. (2009). *The Geography of European Convertible Bonds: Why Firms Issue Convertibles?*

Berk, J., & DeMarzo, P. (2020). *Corporate Finance* (5th ed.). Pearson Education Limited.

Brennan, M., & Kraus, A. (1987). Efficient Financing under Asymmetric Information. *Journal of Finance*, *42*(5), 1225–1243.

Brennan, M., & Schwartz, E. S. (1988). The Case for Convertibles. *Journal of Applied Corporate Finance*, *1*(2), 55–64.

Calamos, J. P. (2021). *Convertible Securities. Structures, Valuation, Market Enviroment, and Asset Allocation*. https://www.calamos.com/globalassets/media/documents/market-insights/convertiblesecurities.pdf

Dann, L. Y., & Mikkelson, W. H. (1984). Convertible debt issuance, capital structure change and financing-related information. *Journal of Financial Economics*, *13*, 157–186.

De Roon, F., & Veld, C. (1998). Announcement effects of convertible bond loans and warrant bond loans: an empirical analysis for the Dutch market. *Journal of Banking & Finance*, *22*, 1481–1506.

Deakin, S., Sarkar, P., & Siems, M. (2018). Is There a Relationship Between Shareholder Protection and Stock Market Development? *Oxford Business Law Blog*.

Demirguc-Kunt, A., & Maksimovic, V. (1999). Institutions, financial markets, and firm debt maturity. *Journal of Financial Economics*, *54*, 295–336.

DG Trade. (n.d.). *Investing in the EU*. https://trade.ec.europa.eu/access-to-markets/en/content/investing-eu

Dutordoir, M., & Van de Gucht, L. (2007). Are there windows of opportunity for convertible debt issuance? Evidence for Western Europe. *Journal of Banking & Finance*, *31*(9), 2828–2846.

Dutordoir, M., & Van de Gucht, L. (2009). Why Do Western European Firms Issue Convertibles

Instead of Straight Debt or Equity? *European Financial Management*, *15*(3), 536–583.

ECB. (2008). *Monthly Bulletin*. https://www.ecb.europa.eu/pub/pdf/other/mb200803_focus05.en.pdf

ECB. (2022a). *Long-term interest rate for convergence purposes - 10 years maturity, All currencies combined - EU 28 (fixed composition) as of 1 July 2013*. https://sdw.ecb.europa.eu/quickview.do;jsessionid=3A9A5D4457F1142B61D09DF3EC15E222?SERIES_KEY=229.IRS.M.V3.L.L40.CI.0000.Z01.N.Z

ECB. (2022b). *Long-term interest rate for convergence purposes - 10 years maturity, denominated in Euro - Euro area (changing composition)*. https://sdw.ecb.europa.eu/quickview.do;jsessionid=3A9A5D4457F1142B61D09DF3EC15E222?SERIES_KEY=229.IRS.M.U2.L.L40.CI.0000.EUR.N.Z

Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics*, *60*, 187–243.

Green, R. C. (1984). Investment incentives, debt, and warrants. *Journal of Financial Economics*, *13*(1), 115–136.

Grundy, B., & Vermijmeren, P. (2016). Disappearing Call Delay and Dividend-Protected Convertible Bonds. *Journal of Finance*, *71*(1), 195–224. https://doi.org/10.1111/jofi.12363

Harris, M., & Raviv, A. (1991). The Theory of Capital Structure. *The Journal of Finance*, *46*(1), 297–355. https://doi.org/https://doi.org/10.2307/2328697

Heitz, A. R., & Narayanamoorthy, G. (2018). *Creditor Rights and Bank Losses: A Cross-Country Comparison*. 1–57.

Ingersoll, J. (1977a). A contingent-claims valuation of convertible securities. *Journal of Financial Economics*, *4*, 289–322.

Ingersoll, J. (1977b). An Examination of Corporate Call Policies on Convertible Securities. *The Journal of Finance*, *32*(2), 463–478. https://doi.org/10.2307/2326780

Kang, J., & Stulz, R. (1996). How different is Japanese corporate finance? An investigation of the information content of new security issues. *Review of Economics Studies*, *9*, 109–139.

King, T.-H. D., & Mauer, D. C. (2014). Determinants of corporate call policy for convertible bonds. *Journal of Corporate Finance*, *24*, 112–134.

Knutson, T. (2022). Convertible bonds could have a moment if rates rise. *CFODIVE*. https://www.cfodive.com/news/convertible-bonds-could-have-a-moment-if-rates-rise/619773/

Korkeamaki, T., & Moore, W. (2004). Convertible Bond Design and Capital Investment: The Role of Call Provisions. *Journal of Finance*, *59*(1), 391–405.

Ksantini, M., & Boujelbène, Y. (2014). Impact of Financial Crises on Growth and Investment: An

Analysis of Panel Data. *Journal of International and Global Economic Studies*, *7*(1), 32–57.

Kuehle, M. (2021). *Outlook 2022: Global Convertible Bonds*. https://www.schroders.com/en/mt/professional-investor/insights/markets/outlook-2022-global-convertible-bonds/

La Porta, R., Lopez-de Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and Finance. *Journal of Political Economy*, *106*, 1113–1155.

Lee, C., Lee, K., & Yeo, G. (2009). Investor protection and convertible debt design. *Journal of Banking & Finance*, *33*, 985–995.

Lewis, C. M., Rogalski, R. J., & Seward, J. K. (1999). Is convertible debt a substitute for straight debt or for common equity? *Financial Management*, *28*(3), 5–27.

Mayers, D. (1998). Why firms issue convertible bonds: the matching of financial and real investment options. *Journal of Financial Economics*, *47*(1), 83–102.

Moses, J., & Knutsen, T. (2012). *Ways of Knowing: Competing Methodologies in Social and Political Research*. Palgrave Macmillan.

Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed.). Sage Publications.

S&P Global. (2022). *S&P 500 GICS Sector Scorecard*. https://www.spglobal.com/spdji/en/documents/additional-material/gics-500-scorecard.pdf

Stein, J. C. (1992). Convertible bonds as backdoor equity financing. *Journal of Financial Economics*, *32*, 3–21.

STOXX. (2022). *Historical Data VSTOXX*. https://www.stoxx.com/document/Indices/Current/HistoricalData/h_v2tx.txt

Yin, R. (2014a). *Case Study Research: Design and Methods*. SAGE Publications Inc.

Yin, R. (2014b). Designing Case Studies. In *Case Study Research: Design and Methods* (5th ed.). SAGE Publications.