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Recent wealth effects of convertible bond announcements

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Abstract

In this thesis I examine the shareholder wealth effects of the shift in the convertible bond investor base from convertible arbitrage hedge funds back to long-only investors that happened after the 2007–2008 Global Financial Crisis. I combine a data set of U.S. convertible issues with a variety of variables relating to the issuer, the issue, the macroeconomic conditions at the time of the announcement, and the hedging activities of convertible arbitrage hedge funds. In my univariate analysis, I find no significant difference in cumulative abnormal returns between the periods before and after the Global Financial Crisis. In my multivariate analysis, I find that, ceteris paribus, the cumulative abnormal returns were significantly higher in the period following the Global Financial Crisis. In addition, my results indicate that stock prices reacted more strongly to the activities of hedge funds in the period following the Global Financial Crisis. I conclude that, while the fraction of hedge funds among convertible investors decreased, the hedging activities of the remaining hedge funds made up the difference.

Keywords: convertible bonds; convertible arbitrage; wealth effects; investor base
JEL classification: G14; G32

Contents

1 Introduction

Convertible bonds represent an important source of funds for a wide variety of firms. They are fixed-income securities that can be converted into a predetermined number of common stock at the investor's discretion. As long as they are not converted, the investor will receive coupon payments at regular intervals and the face value at maturity like a regular bond (Dutordoir et al., 2014). Convertible bonds were especially popular before the 2007–2008 Global Financial Crisis.[1] According to Dutordoir et al. (2022) almost $147 billion worth of convertible bonds were issued in the United States in 2007. After the financial crisis, the popularity of convertible bonds was on the wane. Dutordoir et al. (2022) mention that yearly issues in the United States varied between $25 billion in 2012 and $54 billion in 2019. Recently convertible issues have seen a significant comeback, with a total amount issued of $103 billion in 2020.[2] This comeback can also be seen in most financial newspapers nowadays, as one will be quick to note the plethora of articles mentioning large convertible issues.[3]

At the turn of the century, the market for convertible bonds shifted from long-only investors to hedge funds that engage in convertible arbitrage. Convertible arbitrage involves purchasing a convertible bond while at the same time short selling the underlying stock (Loncarski et al., 2009). By having the proper hedge between both positions, convertible arbitrage hedge funds hope to exploit any mispricing present, no matter what direction the market takes (Choi et al., 2010). It is reported that in 2005 convertible arbitrage hedge funds accounted for 75% of the convertible bond market (Mitchell et al., 2007). However, the Global Financial Crisis drastically reduced the fraction of convertible arbitrage hedge funds among convertible bond investors and long-only investors became relevant again (Dong et al., 2018). In a recent article by Howcroft and Ramnarayan (2020) it is mentioned that convertible arbitrage hedge funds now only make up 20% of the convertible bond market, with the remaining 80% composed of long-only investors such as asset managers, mutual funds, and insurance companies.

In this thesis, I focus on the shift away from convertible arbitrage hedge funds and back to long-only investors that happened after the Global Financial Crisis, something that has

[1] Hereinafter I refer to the 2007–2008 Global Financial Crisis as simply the Global Financial Crisis or the GFC. It should not be confused with the COVID-19 Financial Crisis.

[2] A similar pattern can be seen in Figure 3 of Appendix B for the issues in my data set.

[3] A Factiva search reveals that the number of articles mentioning 'convertible bond offering' or related terms decreased after the Global Financial Crisis, but has been increasing since.

surprisingly not been done so far. More specifically, I ask what the wealth effects are of the recent shift in the convertible bond investor base from convertible arbitrage hedge funds back to long-only investors for convertible debt announcements. It is important to examine the shareholder wealth effects of convertible debt announcements, as the primary goal of every firm should be to maximise shareholder value.

I use a large data set of U.S. plain vanilla convertible bond issues, announced between January 2000 and December 2022.[4] I combine this data set with a wide variety of variables relating to the issuer, the issue, the macroeconomic conditions at the time of the announcement, and the hedging activities of convertible arbitrage hedge funds. Furthermore, in line with similar studies, I use a simple event study methodology as described by Brown and Warner (1985) to determine the wealth effects of the announcement of the convertible issues. To answer my research question and to test my hypotheses I divide my sample period into two periods – namely, the period before and including the Global Financial Crisis and the period directly following the Global Financial Crisis.

In line with other research, I find that convertible announcement returns are still overwhelmingly negative. Moreover, I find significant heterogeneity in the cumulative abnormal returns of convertible announcements over time. When looking at my cumulative abnormal returns in isolation, I find that there is no significant difference between the two periods in my data set. In conjunction with my set of control variables, I find that, ceteris paribus, the cumulative abnormal returns were significantly higher in the period following the Global Financial Crisis. It seems that controlling for the hedging activities of convertible arbitrage hedge funds is essential, as this almost doubles the explanatory power of my models. Furthermore, my results indicate that stock prices reacted more strongly to the activities of hedge funds in the period following the Global Financial Crisis. I conclude that, while the fraction of hedge funds among convertible investors decreased following the Global Financial Crisis, the hedging activities of the remaining hedge funds more than made up the difference. I conduct several robustness tests. I find that my main findings are robust to different types of standard error adjustments, to proxies for my control variables, to changing the sample period, and to adjusting the event window.

This thesis makes two contributions to the existing literature.[5] The first contribution relates to the literature that focuses on why firms decide to issue convertibles instead

[4] See Figure 2 in Appendix B for the yearly distribution of the issues in my data set.
[5] This discussion constitutes a brief summary of my theoretical background.

of standard non-hybrid securities. Traditional corporate finance theories suggest that firms issue convertibles either because managers think that convertibles are a cheaper source of financing than straight debt or equity (Dutordoir et al., 2014; Loncarski et al., 2006) or because convertibles can help mitigate agency cost or adverse selection problems associated with issuing straight debt or equity (e.g., Brennan & Kraus, 1987; Brennan & Schwartz, 1988; Green, 1984; Mayers, 1998; Stein, 1992). More recently, the importance of investor demand for corporate financing decisions gained traction (Brown et al., 2019). Several studies find that investor demand is an important determinant for the issuance of convertibles (Choi et al., 2010; de Jong et al., 2013; Dong et al., 2018). I take investor demand into account by considering the shift in the convertible's investor base from convertible arbitrage hedge funds back to long-only investors.[6]

The second contribution relates to the literature that examines the wealth effects at the time of a convertible bond announcement. Studies generally find negative announcement wealth effects for convertible issues (Loncarski et al., 2006; Rahim et al., 2014), although this finding is not necessarily replicated in every country (e.g., Roon & Veld, 1998). Moreover, studies generally find that a larger equity component is associated with more negative wealth effects (e.g., Ammann et al., 2006; Burlacu, 2000). However, aside from this, the evidence for issuer and issue characteristics is mixed (Dutordoir et al., 2014). Finally, the short selling associated with the hedging activities of convertible arbitrage hedge funds can negatively influence shareholder wealth at the time of the announcement and issuance (Duca et al., 2012; Loncarski et al., 2009). The paper of Duca et al. (2012) is of particular importance, as I extend part of their research to include the period after the Global Financial Crisis.

The remainder of this thesis is organised as follows: in Section 2, I provide a theoretical background on convertible bond issues. I present my hypotheses in Section 2.3. My sample selection procedures and a description of my data are presented in Section 3. Section 4 outlines how my event study is set up and provides my full model. I present and discuss the results of my analysis of the recent wealth effects associated with convertible debt announcements in Section 5. Finally, Section 6 concludes.

[6] An important paper here is that of Duca et al. (2012), as they consider the shift in the convertible's investor base from long-only investors to convertible arbitrage hedge funds, which took place at the turn of the century. I consider the reverse shift instead, which took place after the Global Financial Crisis.

2 Theoretical background

As mentioned by Loncarski et al. (2006), firms have a wide variety of options available to them when deciding on how to finance themselves, including but not limited to using internal funds, straight equity, straight debt or hybrid securities. Convertible bonds are an example of a hybrid security. Hybrid securities combine the features of two or more financial securities into one financial security (Berk & DeMarzo, 2020). Convertible bonds combine features of both debt and equity. They resemble debt because they pay a fixed or floating interest rate at regular intervals and the face value at maturity. Moreover, they also resemble equity because the holder has the option to convert the bond into a predetermined number of shares at his or her discretion (Loncarski et al., 2006).[7]

There are a host of theories addressing the fundamental question of why firms decide to issue convertible bonds instead of standard non-hybrid securities such as straight debt or equity. As discussed by Dutordoir et al. (2014), these theories fall into two broad categories: those that focus on convertible debt issuance as a response to (1) supply-side motives, and (2) investor demand considerations. I discuss both categories; I discuss supply-side motives in Section 2.1.1 and subsequently investor demand considerations in Section 2.1.2. In addition to issue rationales, another important strand of literature focuses on the shareholder wealth effects of convertible bond issues.[8] In section 2.2 I take a closer look at the short-term shareholder wealth effects.[9] Finally, I present my hypotheses in section 2.3.

2.1 Issue rationales

2.1.1 Supply-side motives

Traditional corporate finance theories generally approach financial questions from the corporate supply side (i.e., the investor demand side) (Baker, 2009). According to Dutordoir et al. (2014), we can make a distinction between two types of supply-side motives. The

[7] In reality, conversion does not always happen at the discretion of the holder. For instance, the terms of the convertible bond may stipulate a soft call feature, allowing the issuer to call the bond under certain circumstances, typically when the underlying shares have been trading at a premium compared to the conversion price.

[8] Aside from issue rationales and shareholder wealth effects, a set of studies relate to the design of convertible bonds. Although I do not explicitly address this strand of literature, I discuss convertible bond design in the context of issue rationales and shareholder wealth effects where relevant.

[9] For my discussions in Section 2.1 and 2.2 I roughly follow the format of Dutordoir et al. (2014).

first type of motive is of a practical nature; firms issue convertible bonds because they are a cheaper source of funds than both straight debt and equity. Convertible bonds allow firms to issue debt at a lower cost, as they typically pay a lower interest rate than equivalent non-convertible bonds. Similarly, they allow firms to issue equity at a premium, as the conversion price is typically higher than the prevailing stock price (Dutordoir et al., 2014). However, academics reject such a 'free lunch' motive. They argue that this does not make sense because the lower interest rate that convertible bonds pay is compensated for by the value of the option to convert the bond to stock and because conversion prices are not comparable to prevailing stock prices (Loncarski et al., 2006). Notwithstanding, surveys conducted among managers generally find support for this motive. For instance, in a survey by Graham and Harvey (2001) almost 60% of respondents indicate that they use convertible bonds as a less expensive alternative to issuing equity directly. In addition, the lower coupon of convertible bonds has an important influence on the decision to issue convertible bonds instead of straight debt for around 40% of the respondents.

The second type of motive is of a more theoretical nature. In the perfect capital market proposed by Modigliani and Miller (1958) managers' incentives are perfectly aligned with those of investors, and managers and investors are assumed to possess the same information. In combination with the other assumptions of Modigliani and Miller (1958), the value of a firm should not be affected by how that firm is financed. However, we know that the assumptions do not hold in practice (Berk & DeMarzo, 2020). For instance, agency costs arise due to managers often having conflicts of interest and there is likely to be asymmetric information as managers often possess more information than investors. The choice of financing will therefore send a signal to the market (Myers & Majluf, 1984).[10] Academics argue that issuing convertibles can mitigate financing costs associated with issuing straight debt or equity as issuing convertible debt can help alleviate problems related to agency costs or adverse selection. Hence, they posit that companies will only choose to issue convertibles when the costs associated with issuing straight debt or equity are prohibitive enough (Dutordoir et al., 2014). As mentioned by Dutordoir et al. (2014), two sets of theories have been developed in this camp. The first set of theories views convertible debt as an instrument to reduce agency costs, while the second set of theories

[10]For instance, managers may be more inclined to issue equity when they think their equity is overvalued. If managers proceed with an equity issue, a negative stock price reaction will likely follow to reflect this possibility (Berk & DeMarzo, 2020).

views convertible debt as an instrument to reduce adverse selection.[11]

Several theories on convertible bonds as an instrument to reduce agency costs have been developed. Green (1984) model the effect the use of debt financing has on investment incentives. The use of debt financing may give rise to distortionary incentives between equity holders and debt holders, as debt financing may give equity holders the incentive to exchange value-creating, lower-risk investments for value-destroying, but sufficiently risky investments (i.e., asset substitution) to maximise the value of their equity. In case a risky investment is successful, equity holders stand to gain significantly. However, in the case of a failed investment, equity holders are only liable for their equity holdings, while debt holders are forced to bear the rest of the losses. Equity holders are therefore essentially betting with the money of debt holders (Berk & DeMarzo, 2020). Green (1984) shows that the incentives of equity holders and debt holders can be aligned by using convertibles or a debt-warrant combination, as the ability of convertible or debt-warrant holders to share in the gains of a successful investment by converting into equity tends to offset the incentive of equity holders to engage in asset substitution.

Mayers (1998) contends that firms use convertible debt to deal with problems associated with sequential rounds of financing. He assumes a scenario with an initial investment that requires debt funding, and the option for a follow-on investment that, if profitable, will also require debt funding. If both investments are funded upfront using straight debt, issue costs will be minimised, but an agency conflict can occur as managers may be inclined to overinvest due to the availability of free cash flows. Funding both investments sequentially will eliminate the overinvestment incentive, but issue costs would be unnecessarily high. Instead, firms can initially fund both investments with a convertible bond that matures when managers need to decide on the follow-on investment. This controls the overinvestment incentive, as convertible bondholders will redeem their bonds instead of converting them into equity when a follow-on investment proves to be insufficiently profitable, thus removing free cash flows from the firm and leaving managers unable to do a follow-on investment.

There are also several theories that model convertible bonds as an instrument to reduce adverse selection. When there is asymmetric information regarding the firm, the result-

[11]For the sake of brevity, I only discuss the 'Big Four' theories, as empirical studies focus almost exclusively on these theories according to Dutordoir et al. (2014). For a more thorough discussion on convertible issue rationales, see Loncarski et al. (2006) and Dutordoir et al. (2014).

ing adverse selection may force firms to pass up profitable investments (Myers & Majluf, 1984). Brennan and Kraus (1987) develop a model of information asymmetry where there is uncertainty regarding the risk of the firm. They demonstrate using their model that the appropriate financing strategy can deal with the adverse selection problem. The authors mention that, depending on the exact nature of the information asymmetry present and the financing options available to the firm, examples of such financing strategies may be issuing junior convertible bonds or issuing equity while simultaneously retiring debt.[12] Whereas Brennan and Kraus (1987) consider multiple securities, Brennan and Schwartz (1988) focus solely on convertible bonds.[13] Brennan and Schwartz (1988) argue that convertible bonds are attractive financing instruments because of their 'relative insensitivity to the risk of the issuing firm'. According to them, the issuing firm and outside investors can therefore more easily price convertible bonds.

Stein (1992), on the other hand, asserts that firms issue convertible bonds to get equity into their capital structures indirectly or 'through the backdoor', in his own words. If a conventional equity issue is deemed too unattractive due to the financing costs associated with adverse selection, convertible bonds can be issued instead and later on called in by the issuer. His theory rests on two assumptions, namely, that convertible bonds almost always have a call provision and that costs of financial distress are prohibitive enough to stop firms from taking on excessive debt. The call provision is essential because it can induce investors to convert their convertible bonds into equity when the convertible bonds are called in. Furthermore, if financial distress is costly and a firm is highly leveraged, by issuing convertible bonds firms send a credible signal that they are optimistic about their prospects. Issuing convertible bonds instead of equity should therefore mitigate adverse selection problems.

2.1.2 Investor demand considerations

There is no consensus on the impact of supply-side motives on convertible bond issuance. A series of recent papers have investigated the relationship between convertible bond issuance and investor demand. These recent papers all find that investor demand impacts convertible bond issuance (Brown et al., 2019; Dutordoir et al., 2014). Traditional (cor-

[12] In their model, the information asymmetry relates to either the riskiness of firm returns or to the riskiness of the distribution of firm returns (Loncarski et al., 2006).

[13] In line with Dutordoir et al. (2014) I consider both theories together, as Brennan and Schwartz (1988) give a more intuitive explanation for the findings of Brennan and Kraus (1987) regarding convertibles.

porate supply-side) theories generally assume that investor demand is competitive and perfectly elastic. If this is the case, then investor demand should have no impact on convertible bond issuance (Baker, 2009). De Jong et al. (2013) relax this assumption and examine whether convertible bond (issue) characteristics are affected by fluctuations in investor demand. In line with Baker (2009) they argue that relaxing the assumption of perfect competitiveness and elasticity in the case of convertible bond issues follows naturally, as there are likely to be time-varying investor preferences and limits to the capital available for financial intermediation.[14] According to the authors, if we assume that firms act opportunistically on changes in investor preferences and capital availability, then there is a case to be made that investor demand has an influence on financing policies. Their findings corroborate their intuition, as they find that, among other things, firms are more likely to issue convertible debt when there is high investor demand for them. Moreover, their findings are robust to five proxies of investor demand.

Dong et al. (2018) use in-depth interviews with top executives from several countries to better understand what drives managers to issue convertibles. They argue that in-depth interviews can provide valuable insights despite the generally small sample size, as they allow for a real-time dialogue with managers. Besides examining the validity of the major theories, they also look at the role financial intermediaries and supply-side factors play. Their findings are consistent with de Jong et al. (2013), as the majority of the interviewed managers indicate that they issue convertible debt when they feel that the market for convertibles is doing well. In view of the shift in the convertible bond investor base around the year 2000 from long-only investors to convertible arbitrage hedge funds, they also ask managers whether convertible arbitrage hedge funds in particular had an influence on their security choices. This seems to be the case according to the authors, as most managers speak positively of the liquidity provided by convertible arbitrage hedge funds. However, several managers remark that the short selling actions associated with convertible arbitrage hedge funds are a clear downside to dealing with them.

Choi et al. (2010) further explore convertible arbitrage hedge funds and the role they take on as capital suppliers to firms that issue convertibles. Using a simultaneous equations model, they find that three different variables that capture the supply of capital to

[14]Convertible bonds are frequently privately placed with a select group of investors. This select group generally consists of convertible arbitrage hedge funds and convertibles mutual funds. The demand for convertibles may therefore be a function of the capital available to these funds (de Jong et al., 2013).

convertible arbitrage hedge funds affect convertible bond issuance.[15] For instance, they find that an increase in convertible arbitrage hedge fund flows is both positively and significantly related to convertible bond issue volumes. To lend credence to their findings, they examine the effect of the ban on short selling in 2008 on convertible bond issuance. According to them, if convertible arbitrage hedge funds indeed influence convertible issuance, one would expect to see a decrease in convertible issue volumes, especially given the important role of short selling in convertible arbitrage strategies. Indeed, they document a significant decline in convertible issue volumes, even when taking the issuance of other securities into account.

2.2 Shareholder wealth effects

The empirical literature finds that different types of securities are associated with different announcement wealth effects.[16] Issuing straight debt is often found to induce only slightly negative or even insignificant announcement wealth effects. On the other hand, seasoned equity offerings are often associated with significantly negative announcement wealth effects (Loncarski et al., 2006). Theories based on agency costs and adverse selection both predict announcement wealth effects for convertible bonds that are somewhere between those for straight debt and equity (Dutordoir et al., 2014). Loncarski et al. (2006) provide a table overview of studies that examine the wealth effects associated with convertible debt announcements. They find that the average wealth effect in the United States is -1.63%, with an upper and lower bound of -0.6% and -3% for individual US studies, respectively. Rahim et al. (2014) go one step further and conduct a meta-analysis of papers that report announcement wealth effects. Using the findings of 35 studies, with a combined total of 6310 announcements, they find a mean cumulative abnormal return of -1.14%. However, it is important to note that these findings are not necessarily replicated in other countries (Dutordoir et al., 2014). For instance, Roon and Veld (1998) find a positive but insignificant mean cumulative abnormal return for a data set of convertible bond announcements in the Dutch market.

[15] The variables the authors use to capture the supply of capital to convertible bond arbitrage hedge funds are fund flows, fund returns, and funds' degree of leverage.

[16] To measure the (short-term) announcement wealth effects, studies generally employ a simple event study as described by Brown and Warner (1985). This involves measuring to what extent the returns at the time of the announcement are abnormal, that is, to what extent the announcement returns differ from what was to be expected should no announcement have taken place.

It is likely that a large part of the variation in the size of the announcement wealth effects can be explained by the characteristics of the issuer and the issue (Loncarski et al., 2006). Consequently, some studies attempt to explain this cross-sectional variation (Dutordoir et al., 2014). For example, one important aspect in the design of convertibles is how equity- or debt-like they are.[17] Several studies find a negative relationship between a convertible's equity component and the announcement wealth effects (e.g., Ammann et al., 2006; Burlacu, 2000). Arshanapalli et al. (2004) find that the natural logarithm of the market value of the issuing firm, the issuing firm's price-to-book ratio, the size of the issue, and the general state of the market can help explain some of the variations in the wealth effects of convertible announcements. Using a sample of European convertible bond announcements, Dutordoir and Van de Gucht (2007) find that during periods of hot convertible debt markets, stockholders react less strongly to financing costs associated with the issuer and the issue. Consistent with this weaker reaction, they find that announcement returns were higher in these hot markets. The above papers are only a small selection and serve as an example. For most cross-sectional studies the explanatory power is low and studies often find contradicting results (Dutordoir et al., 2014).

A more recent strand of literature looks at the relationship between convertible arbitrage hedge funds and the announcement wealth effects of convertible debt. Loncarski et al. (2009) examine the short interest associated with hedging activities of convertible arbitrage hedge funds around the announcement and issuance date of convertible bonds. They find that short selling negatively affects abnormal returns around these dates and that the effect is more pronounced for more equity-like convertibles. In response, firms may be less inclined to issue convertibles that are attractive to hedge funds. According to them, this might explain the decreasing prevalence of convertible arbitrage hedge funds among convertible bond investors after the Global Financial Crisis.

Duca et al. (2012) find that between 2000 and 2008 convertible debt announcement returns were significantly lower than those in the preceding period. They attribute this sharp decrease in returns to the shift in the convertible bond investor base from long-only investors to convertible arbitrage hedge funds that took place around the year 2000, as the differences in returns are no longer significant when controlling for arbitrage-related

[17] As mentioned by Loncarski et al. (2006); more debt-like convertibles could be seen as support for theories such as risk-shifting (Green, 1984) and risk estimation (Brennan & Kraus, 1987; Brennan & Schwartz, 1988), and more equity-like convertibles for theories such as delayed equity (Stein, 1992).

short selling. In addition, they examine the price pressure in the period following the announcement. They find that part of the price pressure is temporary, as prices quickly reverse after issuance. This could explain why firms continue to issue convertibles.

2.3 Hypotheses

The literature on convertible bonds consistently finds negative announcement returns in the United States. This is consistent with agency cost theories and adverse selection theories that predict that the announcement returns of convertible bonds should be somewhere in between those of straight debt and common equity (Dutordoir et al., 2014). I use December 31, 2009 as a cut-off point for the Global Financial Crisis. Officially, the Global Financial Crisis ended in 2008, but the accompanying recession lasted well into 2009. In addition, Duca et al. (2012) only have data available until the end of 2009. Consequently, the data set of convertible bond issues is divided into two periods – namely, the 'Pre-GFC' period between 2000 and 2009 and the 'Post-GFC' period after 2009. I establish whether the prediction of negative announcement returns still holds using this more contemporary data set.

Hypothesis 1. *In the period following the Global Financial crisis, convertible bond abnormal announcement returns in the United States are still negative.*

The period between 2000 and the Global Financial Crisis was characterised by a shift in the convertible bond investor base from long-only investors to convertible arbitrage hedge funds. Duca et al. (2012) find that this is accompanied by a sharp decrease in the returns surrounding convertible bond announcements. Since the Global Financial Crisis significantly reduced the fraction of convertible arbitrage hedge funds among convertible bond investors (Dong et al., 2018; Dutordoir et al., 2022), I expect the announcement returns to be analogous to this new investor composition and therefore overall less negative.

Hypothesis 2. *Abnormal announcement returns in the United States are less negative in the period following the Global Financial Crisis than in the preceding period characterised by convertible arbitrage hedge funds.*

Duca et al. (2012) find that the sharp decrease in convertible announcement returns in the period prior to the Global Financial Crisis can be explained by the price pressure resulting from the hedging activities of convertible arbitrage hedge funds. Analogous to

their study I include a measure of arbitrage-related short selling. I also control for characteristics of the issuer, the characteristics of the issue, and the macroeconomic conditions at the time of the announcement, as these are also found to influence announcement returns (see, e.g., Arshanapalli et al., 2004; Duca et al., 2012; Dutordoir & Van de Gucht, 2007; Loncarski et al., 2006). This allows me to establish whether a change in abnormal announcement returns between the two periods is a result of the recent shift in the convertible bond investor base or is caused by other determinants. I propose a hypothesis similar to Duca et al. (2012):

Hypothesis 3. *Controlling for arbitrage-related short interest makes any difference in abnormal announcement returns in the period following the Global Financial Crisis and the preceding period disappear.*

3 Data

3.1 Convertible bond issues

I obtain all convertible bond issues from the Mergent Fixed Income Securities Database (Mergent FISD) that took place in the United States between January 1, 2000 and December 31, 2022.[18] From this data set I exclude convertible bonds that were issued in currencies other than the U.S. dollar, that were issued by companies whose primary listing is not on a U.S. stock exchange, that were simultaneously issued in a country other than the United States, or that were part of a larger package of securities. In line with Duca et al. (2012) I also exclude convertible bond issues that are classified as preferred, that are classified as exchangeable, or that mention mandatory conversion in their issue type description as taken from their prospectus.[19] Finally, I exclude issues by financial firms (SIC codes 6000-6799) and utilities (SIC codes 4900-4999), as is common practice.[20] This gives me a total data set of 3075 plain vanilla U.S. convertible bond issues.

One apparent issue with the Mergent FISD data set is that certain convertible bonds appear to be issued twice. These bonds are first privately placed under Rule 144A. Issuers can afterwards offer the convertible bond to the public market by filing a statement with the SEC (Huang & Ramirez, 2010). Mergent FISD records the initial private placement and the subsequent filing as distinct issues. However, both relate to the same convertible bond. Similar to Grundy and Verwijmeren (2018), I am only interested in the initial issue from Mergent FISD, therefore I remove any issues that were both privately placed and where the maturity date of the convertible bond matches the maturity date of a convertible bond issued at an earlier date by the same company. This eliminates all duplicates but also a portion of my data set. I end up with 2066 unique convertible debt issues in total.

3.2 Control variables

In addition to my convertible bond issues themselves, I require an exhaustive set of control variables. This is important, as this helps me determine which variables influence the

[18] Mergent FISD is an extensive database of bonds offered in the United States.

[19] To measure the wealth effects of convertible bond issues accurately, I require that the convertible bond issues in the data set are as homogeneous as possible. Preferred securities do not require the issuer to pay dividends, exchangeable bonds convert into the shares of a company other than the issuer, and mandatory convertibles force the bondholder to convert before or on a predetermined date.

[20] Financial firms and utilities are regulated and consequently face constraints on their use of debt.

announcement returns and how this influence differs across the two periods in my thesis. I use the TRACE database to map every convertible bond issue to issuer equity data in the Center for Research in Security Prices (CRSP) database. This approach allows me to match the nine-character CUSIP code specific to each convertible bond with a permanent identifier of the issuing company.[21] Using this permanent identifier, I obtain firm-specific variables from the Compustat North America Fundamentals Annual database. Compustat records these variables at the end of every fiscal year. I take the values measured at the fiscal year-end prior to the convertible bond announcement date.[22] Furthermore, I get information related to the convertible issues from Mergent FISD, stock-related information from CRSP, and macroeconomic information from the Federal Reserve Bank Of St. Louis. I provide an overview of the definitions of all variables in Appendix A.

I control for several issuer-specific variables. Similar to Arshanapalli et al. (2004), I include the natural logarithm of the total market value as a measure of firm size. To the extent that information asymmetries are negatively correlated with firm size, larger firms should have lower costs of raising external financing (Frank & Goyal, 2009). Furthermore, I include the market-to-book ratio, as it may proxy for growth opportunities. Firms with a higher market-to-book ratio may be more prone to information asymmetries, as the profitability of their potential future investments is uncertain. Alternatively, the presence of growth opportunities may decrease financing costs (Lewis et al., 2003). I take the risk of the firm into account by including the volatility of the firm's stock relative to the S&P 500 similar to Duca et al. (2012) and by including the Altman Z-score. The volatility of the firm's stock measures the overall risk of the firm and the Altman Z-score measures the risk of financial distress in particular. Riskier firms generally have higher costs of raising external financing (Lewis et al., 1999). I also include the tangibility of the firm, as firms with more tangible assets have lower costs of financial distress and are less prone to information asymmetries (e.g., de Jong et al., 2011). Finally, I include the issuing firm's stock return leading up to the announcement, as Lewis et al. (2003) mention that investor reactions are typically less negative following periods of increasing stock prices.

With regard to issue-specific variables, I include the credit rating of the convertible

[21] WRDS provides a Bond-CRSP link using TRACE that allows me to match convertible bond CUSIPs with firm PERMCOs. If a convertible bond is not present in this link, I attempt to map a combination of the firm name and the underlying's CUSIP directly to firm-specific data in Compustat.

[22] Unless mentioned otherwise, I measure all firm-specific variables at the end of the fiscal year prior to the convertible bond announcement date.

bond as assigned by one of the credit rating agencies at issuance. A convertible bond with a lower credit rating is associated with higher credit risk and the announcement is therefore likely followed by a more negative stock price reaction (Duca et al., 2012). Furthermore, I include the delta of the convertible bond, as it proxies for the embedded equity component.[23] Delta functions as an umbrella measure, and Dutordoir and Van de Gucht (2007) argue that it provides a better measure of the equity-likeness of a convertible bond than individual measures, such as the maturity and the conversion premium. A higher (lower) delta indicates that the convertible bond has a larger (smaller) embedded equity component. Convertible bonds with a larger equity component are generally associated with more negative announcement returns (see, e.g., Ammann et al., 2006; Burlacu, 2000). I also include the convertible offering proceeds, as larger offerings are associated with higher financing costs (Lewis et al., 2003). Finally, in line with Duca et al. (2012), I include a dummy variable indicating whether the issue was a private placement under Rule 144A, as this is also found to be an important determinant.

Aside from issuer- and issue-specific variables, I control for macroeconomic conditions, as these are also found to influence the returns at announcement (Duca et al., 2012; Lewis et al., 2003). Following Duca et al. (2012), I include the interest rate, term spread, market volatility, and market runup, averaged over the four months prior to the announcement. According to them, the interest rate, term spread, and market volatility proxy for the economy-wide financing costs of firms and should therefore be negatively related to the announcement returns. I also include the investor sentiment index of Baker and Wurgler (2006). Both the sentiment index and the market runup can proxy for the overall state of the market. Dutordoir and Van de Gucht (2007) find that stock returns on the announcement of a convertible issue are significantly less negative in hot markets as opposed to normal and cold markets.

Finally, I control for the hedging activities of convertible arbitrage hedge funds. In the-

[23] Dutordoir and Van de Gucht (2007) give the following formula for delta:

$$Delta = e^{-\delta T} N\{\frac{\ln \frac{S}{X} + (r - \delta \ + \frac{\sigma^2}{2})T}{\sigma\sqrt{T}}\}$$

Where δ is the continuously compounded dividend yield of the firm at the fiscal year-end prior to the announcement; T the maturity of the convertible bond in years; $N(\cdot)$ the cumulative distribution function of a standard normal distribution; S the firm's stock price one week prior to the announcement; X the conversion price; r the yield on a U.S. 10-year T-note on the day of the announcement; and σ the annualised volatility of the firm's daily stock returns, measured over the window (-240, -20).

ory, these hedging activities should not influence the announcement returns, as convertible arbitrage hedge funds should open their short positions on the issuance date, and not on the announcement date (Duca et al., 2012). However, in recent years almost all convertible bonds have been issued under Rule 144A. Rule 144A allows firms to directly place convertible bonds with qualified institutional investors, without first registering them with the SEC. Consequently, the time between the announcement and the issuance is vastly reduced and is frequently less than one day (Mitchell et al., 2007). This means there is a strong overlap present between the announcement and issuance returns. It is therefore important to control for the price pressure induced by convertible arbitrage strategies, as not doing so would mean drawing biased conclusions (Dutordoir et al., 2014).

In line with Bechmann (2004), Choi et al. (2009), and Duca et al. (2012), I use the relative change in short interest as a measure of the hedging activity of convertible arbitrage hedge funds. FINRA mandates that firms report their short positions as of settlement twice a month, on the 15th and at month-end.[24] I obtain information on these short positions from Compustat's Supplemental Short Interest File using the permanent company identifiers. Due to trade settlement, the data reflect the short positions held three trading days before the reporting date (or two days after July 2019). To match each convertible issue with the correct short positions, it is therefore important to use the date for which the short positions are calculated instead of the reporting date.[25] With this in mind, I define the relative change in short interest as the difference between the short positions held after the convertible issue and the short positions held prior to the convertible issue, divided by the total shares outstanding in the month preceding the announcement. It is possible that a potential increase in short interest also reflects the short selling of fundamental traders (Duca et al., 2012). However, Choi et al. (2009) argue that this is most likely not the case, as the change in short interest is measured over a fairly short horizon.

[24]Prior to September 2007, firms were only required to report their short positions as of settlement once a month, on the 15th.

[25]For instance, if the 15th of a given month prior to July 2019 falls on a Saturday, then the data reflect the short positions held on the 11th. The data will not reflect any changes made in short positions after the 11th, as these trades will not have settled by the 15th.

3.3 Descriptive statistics

Table 1 provides descriptive statistics for all variables. Looking at the last column, I find that there is a significant difference between the means across the two periods for almost all variables. Firms that issued convertibles after the Global Financial Crisis were on average larger and had a higher market-to-book ratio. However, these same firms also had less tangible assets as a percentage of total assets, and a lower stock runup leading up to the announcement. I find no significant difference in firm volatility relative to the S&P 500 and Altman Z-scores.

With regard to the characteristics of the convertible issues after the Global Financial Crisis, I find that the mean credit rating is lower and the proceeds as a percentage of total firm assets are slightly higher. In addition, firms issued convertibles that were less equity-like (i.e., more debt-like). As mentioned in Section 2.2, studies commonly find that announcement returns of convertibles are more negative for more equity-like convertibles. A possible explanation could therefore be that, in response, firms are simply issuing more debt-like convertibles in the recent period. I also find that more convertibles were privately placed under Rule 144A following the Global Financial Crisis. This is not surprising, as traditional private placements are becoming increasingly rare (Dutordoir et al., 2014).

By looking at the macroeconomic variables, it can be seen that the interest rate is lower in the period following the Global Financial Crisis. This is consistent with the trend of decreasing interest rates in the last decade. In addition, the investor sentiment index has decreased in the same period. Compared to the period before the Global Financial Crisis, the period after the Global Financial Crisis is therefore a 'colder' market, relatively speaking. This could indicate that the announcement returns are lower in the period following the Global Financial Crisis, ceteris paribus, as advanced by Dutordoir and Van de Gucht (2007). On the other hand, I find no significant difference in the term spread across the two periods. Finally, there is no significant difference in the relative change in short interest before and after the Global Financial Crisis. This comes as a surprise, as the fraction of convertible arbitrage hedge funds among convertible bond investors has supposedly decreased.

Table 5 in Appendix C provides the correlations between all variables. At first glance, all correlations are relatively low. High correlations are undesirable, as multicollinearity increases the standard errors of the correlated variables in a model, therefore making it

Table 1: Descriptive statistics

Variable	Pre-GFC (1)			Post-GFC (2)			Diff. in means t-statistic
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	
Issuer							
LogFirmSize	7.229	7.102	1.450	7.502	7.419	1.342	-3.436***
MarketToBook	3.971	2.499	9.090	6.177	3.218	12.685	-3.419***
FirmVolatility	3.506	3.185	1.679	3.659	3.347	1.830	-1.523
AltmanZ	54.455	100.000	47.208	54.943	100.000	47.128	-0.232
Tangibility	0.257	0.174	0.227	0.193	0.096	0.228	4.951***
StockRunup	0.231	0.127	0.748	0.165	0.120	0.429	1.979**
Issue							
CreditRating	9.994	9.000	2.521	9.204	9.000	1.315	9.244***
Delta	0.804	0.856	0.165	0.680	0.701	0.158	13.519***
Proceeds	0.329	0.192	0.445	0.384	0.250	0.391	-2.354**
144A	0.697	1.000	0.460	0.750	1.000	0.433	-2.671***
Macroeconomic							
InterestRate	4.550	4.447	0.794	2.109	2.130	0.719	72.928***
TermSpread	1.642	1.955	1.349	1.560	1.544	0.963	1.616
MarketVolatility	0.175	0.168	0.076	0.165	0.130	0.116	2.060**
MarketRunup	0.030	0.032	0.082	0.040	0.051	0.069	-3.003***
Sentiment	0.226	-0.017	0.964	-0.048	-0.170	0.510	8.331***
Arbitrage							
ΔShortInterest	0.016	0.009	0.027	0.014	0.009	0.027	0.804

Note. This table presents the descriptive statistics. The descriptive statistics are sorted by the period in which the convertible was announced. Pre-GFC refers to convertible announcements that took place before and during the Global Financial Crisis. Post-GFC refers to convertible announcements that took place after the Global Financial Crisis. All variables are as defined in Appendix A. *MarketToBook* is winsorized at the 1% and 99% percentile. *AltmanZ* scores below -100 and above 100 are winsorized. I run an independent sample t-test to determine whether the pre-GFC period and post-GFC period means are statistically equivalent. The t-statistic of this test is reported in the last column.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

hard to draw sharp inferences. To more formally test for multicollinearity, I calculate the variance inflation factors (VIF). As a rule of thumb, multicollinearity is generally assumed to be inconsequential if a VIF of 5 or less is found (Brooks, 2019). I find that the VIFs are generally very low, with the majority between one and two, and a few slightly larger than 4. I therefore rule out multicollinearity and keep all control variables.

4 Methodology

4.1 Event study

Before I start my analysis, I need to calculate the wealth effects at the time of the convertible bond announcements. To that end, I use a simple event study as described by Brown and Warner (1985). In short, an event study is a statistical methodology to determine the impact of an event on a financial variable (Brooks, 2019). In this case, the event is the announcement of a convertible bond issue and the financial variable is the firm's stock returns. The basic idea is to calculate to what extent the returns at the time of the announcement are abnormal, that is, to what extent the announcement returns differ from what was to be expected should no announcement have taken place. To calculate the (cumulative) abnormal returns, it is important to first determine what constitutes a normal return. In line with most short-term event studies, I use the single-factor market model for this purpose. This involves calculating the alpha and the beta of the issuing firm's common stock prior to the announcement date over some given estimation window:

$$R_{it} = \alpha_i + \beta_i R_{mt} + u_{it} \tag{1}$$

Where R_{it} is the return of firm i on day t of the estimation window; R_{mt} is the return of the market index on day t of the estimation window; α_i is the excess return of firm i relative to the market index; β_i is the volatility of firm i relative to the market index; and u_{it} is an error term. For the estimation window, I use the period (-150, -50) relative to the announcement. I require that there be at least 70 returns available in this period for an issue to be included in the sample, although there are 100 returns available in almost all cases. For the market index, I use the value-weighted index from CRSP. To calculate the abnormal returns during the event window (i.e., the time around the announcement), the normal returns need to be subtracted from the actual returns:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt}) \tag{2}$$

Where AR_{it} is the abnormal return of firm i on day t of the event window; R_{it} is the actual return of firm i on day t of the event window; R_{mt} is the return of the market index on day t of the event window; and a_i and b_i are the ordinary least squares estimates

for firm i obtained from the single-factor market model. Finally, I can calculate the cumulative abnormal return (or: CAR) for every firm by summing all abnormal returns in the event window:

$$CAR_i(T1, T2) = \sum_{t=T1}^{T2} AR_{it} \tag{3}$$

Where CAR_i is the cumulative abnormal return of firm i; AR_{it} is the abnormal return of firm i on day t of the event window; and $T1$ and $T2$ are the start and end of the event window, respectively. I use the event window (-1, 1) for my cumulative abnormal returns, where $t = 0$ is defined as the day of the announcement of the convertible bond issue. It is important to note that Mergent FISD only provides offering dates, and not announcement dates. I therefore use the offering date as a proxy for the announcement date. I verify the accuracy of this proxy for several dozen convertible bond issues using Factiva. The proxy seems to be relatively accurate, as most announcement dates indeed coincide with the offering dates provided by Mergent FISD. However, in a few cases, the announcement is one day before or one day after the offering date. This should not materially affect the results, as these cases are limited and both days are part of the main event window. Furthermore, I also calculate the cumulative abnormal returns over the windows (-2, 2), (-1, 0), (0, 1) and (0, 2) for robustness purposes.

4.2 Regression

I use a simple cross-sectional regression to identify the determinants of the cumulative abnormal returns for every convertible announcement, as shown below:

$$\begin{aligned} CAR_i(T1, T2) = \beta_0 + \beta_1 PostGFC_i + \alpha Issuer_i + \gamma Issue_i + \delta Macroeconomic_i \\ + \beta_2 \Delta ShortInterest_i + \beta_3 \Delta ShortInterest_i \times PostGFC_i + u_i \end{aligned} \tag{4}$$

Where CAR is the cumulative abnormal return; $T1$ and $T2$ are the start and end of the event window, respectively; $PostGFC$ is a dummy variable that takes the value of 1 if the convertible bond issue was announced after December 31, 2009, and 0 otherwise; $Issuer$ is a vector containing issuer characteristics; $Issue$ is a vector containing issue characteristics; $Macroeconomic$ is a vector containing macroeconomic variables; $\Delta ShortInterest$ is the relative change in short interest as defined in Appendix A; $\Delta ShortInterest \times PostGFC$

is an interaction term between $\Delta ShortInterest$ and $PostGFC$; and u is an error term. All coefficients are estimated using ordinary least squares (OLS).

5 Results

In this section I present and discuss the results of my analysis of the recent wealth effects associated with convertible debt announcements. I break my analysis down into two distinct parts. First, in Section 5.1, I examine the (cumulative) abnormal returns in isolation. Second, in Section 3.2, I examine the cumulative abnormal returns in conjunction with my set of control variables. In addition, I verify the robustness of my findings by applying several modifications to my data; I do this in Section 5.3.

5.1 Univariate results

I start my analysis by examining the (cumulative) abnormal returns in isolation. Figure 1 shows the mean and median cumulative abnormal return over the event window (-1, 1) for every year in my sample period, similar to Duca et al. (2012). The mean and median cumulative abnormal returns seem to track each other relatively closely, indicating that my cumulative abnormal returns are not affected by outliers to any meaningful extent. The announcement cumulative abnormal returns in the pre-GFC period seem to closely match the pattern and size observed by Duca et al. (2012), although the mean cumulative abnormal return in 2003 for the convertible issues in my data set is seemingly slightly less negative. Figure 1 also clearly shows the extreme decrease in cumulative abnormal returns brought about by the Global Financial Crisis. Duca et al. (2012) find that this sharp decrease is caused by the remaining convertible arbitrageurs and the general macroeconomic situation. Directly after the Global Financial Crisis, in the post-GFC period, the cumulative abnormal returns seem to reverse course. Under the assumption that the macroeconomic situation stabilised after the Global Financial Crisis, this could be evidence for the shift in the convertible bond investor base towards long-only investors.[26] However, it is clear from the figure that the situation did not last. In the period between 2010 and 2020, the mean and median cumulative abnormal returns seem to decrease and increase repeatedly. In fact, the year 2016 is marked by exceptionally negative cumulative

[26] After the Global Financial Crisis, the U.S. economy still took a while to fully recover. However, the U.S. economy was doing better than it did during the Global Financial Crisis.

Figure 1: Yearly mean and median cumulative abnormal returns

Note. This figure shows the mean and median cumulative abnormal returns per year for the event window (-1, 1). The black line represents the mean cumulative abnormal returns. The grey line represents the median cumulative abnormal returns. The vertical dashed line indicates the end of the pre-GFC period and the start of the post-GFC period. Pre-GFC refers to the convertible announcements that took place before and during the Global Financial Crisis. Post-GFC refers to the convertible announcements that took place after the Global Financial Crisis. The sample period is January 2000–December 2022. Convertible issues with missing cumulative abnormal returns are excluded. The total sample size is 1245.

abnormal returns.[27] Starting in 2020, the cumulative abnormal returns seem to be on the rise again. This coincides with the renewed importance of convertible bonds following the COVID-19 Financial Crisis, as demonstrated by Figure 2 and 3 in Appendix B. That being said, the amount of observations for the year 2022 in my data set is limited, so it is challenging to make projections.

Table 2 shows the mean abnormal returns at the time of the announcement and the mean cumulative abnormal returns for several event windows. The mean cumulative abnormal returns for the full sample are all negative and significant. This is consistent with prior research, as cumulative abnormal returns are generally found to be negative at the time of the announcement for data sets consisting of U.S. firms (e.g., Loncarski et al., 2006;

[27] Although the difference between the relative change in short interest before and after the Global Financial Crisis is not significant, the observed pattern could be explained by temporal variations. In Figure 4 of Appendix B I plot the average yearly relative change in short interest. The pattern is somewhat mirrored, but it seems that short interest alone cannot explain the observed heterogeneity.

Table 2: Mean (cumulative) abnormal returns

Day	Full sample (1)		Pre-GFC (2)		Post-GFC (3)		Diff. in means t-statistic
	Mean	Z-statistic	Mean	Z-statistic	Mean	Z-statistic	
AR							
-1	-0.014	-17.068***	-0.016	-13.790***	-0.012	-10.153***	-1.336
0	-0.025	-28.243***	-0.023	-20.194***	-0.027	-19.819***	1.144
1	-0.002	-1.247	-0.002	-0.637	-0.002	-1.168	0.414
2	0.001	1.234	0.001	0.928	0.001	0.813	-0.387
CAR							
(-1, 0)	-0.039	-32.039***	-0.038	-24.030***	-0.038	-21.193***	-0.069
(-1, 1)	-0.041	-26.880***	-0.040	-19.988***	-0.041	-17.978***	0.137
(0, 1)	-0.027	-20.853***	-0.024	-14.729***	-0.029	-14.840***	1.132
(0, 2)	-0.026	-16.314***	-0.024	-11.491***	-0.028	-11.647***	0.861

Note. This table presents the mean abnormal returns at the time of the announcement and the mean cumulative abnormal returns for several event windows (i.e., AARs and CAARs, respectively). The means for the full sample are given in the Column (1). The means are sorted by the period in which the convertible was announced in Columns (2) and (3). Pre-GFC refers to the convertible announcements that took place before and during the Global Financial Crisis. Post-GFC refers to the convertible announcements that took place after the Global Financial Crisis. I run a Patell (1976) Z-test to determine whether the means are significantly different from zero. The Z-statistic of this test is reported in the column to the right of the mean. I also run an independent sample t-test to determine whether the pre-GFC period and post-GFC period means are statistically equivalent. The t-statistic of this test is reported in the last column.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Rahim et al., 2014). For my main event window (-1, 1) I find a mean cumulative abnormal return of -0.041. This is significantly more negative than the cumulative abnormal returns found in prior research. If my second hypothesis were true, I would expect to find mean cumulative abnormal returns that are in size somewhere between those observed in the period characterised by convertible arbitrage hedge funds and the period characterised by long-only investors. Instead, the full-sample mean is approximately the same as the one observed in the 'Arbitrage Period' by Duca et al. (2012). When looking at the components of the full-sample mean, I find that the pre-GFC period mean and the post-GFC period mean over the same event window are also significant and almost identical at -0.040 and -0.041, respectively. The final column indicates that the difference between the means of these two periods is not significant. In fact, the same conclusions can be drawn for the other event windows. Hence, it does not seem that the cumulative abnormal returns are overall less negative in the post-GFC period. It is also interesting to note that the negativity of the mean cumulative abnormal returns is mostly driven by the

mean abnormal returns on day $t = -1$ and day $t = 0$, given that the mean abnormal returns are close to zero and insignificant for the other two days. This indicates that the negative announcement effect is short-lived, and prices at least do not decrease further in the period directly following the announcement. In addition, this supports the claim of Burlacu (2000), as he mentions that stock price reactions to capital structure changes typically occur on the day before and on the day of the announcement itself.

Taken together, the results of this section indicate that the abnormal returns at the time of the announcement of a convertible issue are still overwhelmingly negative for U.S. firms, whether it be for convertibles announced before the Global Financial Crisis or after the Global Financial Crisis. This is consistent with the first hypothesis. When differentiating the abnormal returns of convertibles announced in the pre-GFC period and those of convertibles announced in the post-GFC period, I find that there is no significant difference in size between the two periods. In addition, there seems to be a significant amount of heterogeneity in the abnormal returns for the convertibles announced in the post-GFC period, as evidenced by Figure 1. Therefore, at least when taking the abnormal returns in isolation, I find no evidence for the second hypothesis.

5.2 Multivariate results

The next step in my analysis is to analyse the cumulative abnormal returns in conjunction with my set of control variables. Table 3 presents several cross-sectional regressions with the cumulative abnormal returns over the window (-1, 1) as the dependent variable. All reported standard errors are robust, as a simple White (1980) test finds evidence for heteroskedasticity. A visual inspection of the residual plots confirms this. In addition, the total sample size is reduced to 1047 convertible bond issues, as not every issue has information on all control variables.

Column (1) is a simple regression containing only my main variable of interest as an independent variable. I find that the cumulative abnormal returns are slightly lower in the post-GFC period. However, the coefficient of $PostGFC$ is not significant. Based on this, I cannot reliably say that there is any significant difference in cumulative abnormal returns between the convertibles announced in the pre-GFC period and the post-GFC period, at least in a univariate setting. In addition, the intercept is negative and significant. This shows that the findings of the previous section still hold, even with a reduced sample size.

Table 3: Cross-sectional regressions

Variable	Pred.	CAR(-1, 1)			
		(1)	(2)	(3)	(4)
PostGFC	+	-0.002	0.005	0.024**	0.067***
		(0.005)	(0.010)	(0.010)	(0.022)
Issuer					
LogFirmSize	+		0.011***	0.007**	0.007**
			(0.003)	(0.003)	(0.003)
MarketToBook	?		0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)
FirmVolatility	–		0.001	0.000	0001
			(0.002)	(0.002)	(0.002)
AltmanZ	+		-0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)
Tangibility	+		0.005	0.005	0.006
			(0.011)	(0.011)	(0.011)
StockRunup	+		-0.004	-0.008	-0.008
			(0.005)	(0.006)	(0.006)
Issue					
CreditRating	–		-0.001	-0.001	-0.001
			(0.001)	(0.001)	(0.001)
Delta	–		-0.086***	-0.071***	-0.043**
			(0.016)	(0.015)	(0.017)
Delta × PostGFC	?				-0.062**
					(0.029)
Proceeds	–		-0.001	0.002	0.002
			(0.011)	(0.010)	(0.010)
144A	–		0.011**	0.013**	0.013**
			(0.005)	(0.005)	(0.005)
Macroeconomic					
InterestRate	–		0.009**	0.012***	0.012***
			(0.004)	(0.004)	(0.004)
TermSpread	–		0.001	0.000	-0.000
			(0.002)	(0.002)	(0.002)
MarketVolatility	–		0.006	0.040	0.044
			(0.042)	(0.036)	(0.036)
MarketRunup	+		0.153***	0.171***	0.177***
			(0.049)	(0.047)	(0.047)
Sentiment	+		0.006	0.006*	0.006*
			(0.004)	(0.004)	(0.004)

Continued on the next page...

Table 3: Cross-sectional regressions *(continued)*

Variable	Pred.	CAR(-1, 1)			
		(1)	(2)	(3)	(4)
Arbitrage					
ΔShortInterest	–			-0.379**	-0.403**
				(0.167)	(0.169)
ΔShortInterest × PostGFC	?			-0.782***	-0.729***
				(0.273)	(0.274)
Intercept		-0.039***	-0.099***	-0.094***	-0.115***
		(0.003)	(0.038)	(0.036)	(0.035)
N		1047	1047	1047	1047
Adj. R^2		-0.00	0.09	0.16	0.16

Note. This table presents several cross-sectional regressions. I use the cumulative abnormal returns over the window (-1, 1) as the dependent variable in the numbered columns. The column labelled 'Pred.' indicates the expected sign of the coefficients in the numbered columns. All coefficients are estimated using ordinary least squares (OLS). White (1980) standard errors are reported in parentheses below the estimated coefficients. *PostGFC* is a dummy variable that is equal to one if the convertible was announced after the Global Financial Crisis and zero otherwise. All other variables are as defined in Appendix A. *MarketToBook* is winsorized at the 1% and 99% percentile. *AltmanZ* scores below -100 and above 100 are winsorized. *N* denotes the number of convertible issues used in the regression.
* p < 0.10, ** p < 0.05, *** p < 0.01

That being said, the adjusted R^2 is very close to zero, indicating that *PostGFC* alone is not enough to explain any variation in cumulative abnormal returns.

In Column (2), in addition to including my main variable of interest, I control for the characteristics of the issuer, the characteristics of the issue and the macroeconomic conditions at the time of the announcement. Including these control variables increases the adjusted R^2 to 0.09, bringing it more in line with other similar event studies. I find that the size of the issuing firm, the dummy denoting whether the convertible was issued under Rule 144A, the interest rate, and the market runup are significant and positively related to the cumulative abnormal returns. For instance, a one per cent increase in firm size is associated with cumulative abnormal returns that are 110 basis points higher. The signs of the size of the issuing firm and the market runup are consistent with the predictions of Section 3.2. However, this is not the case for the Rule 144A dummy and the interest rate. The delta of the convertible issue is also significant, but negatively related to the cumulative abnormal returns. This confirms the findings of prior research, as they commonly find that more equity-like convertibles are associated with more negative

cumulative abnormal returns (e.g., Ammann et al., 2006; Burlacu, 2000). Furthermore, the intercept is still significant and negative, providing further evidence for hypothesis one. The remaining variables are insignificant and the estimated coefficients are close to zero. However, with the inclusion of all the control variables, the coefficient of $PostGFC$ is now positive.

In Column (3), I also control for the relative change in short interest and an interaction effect between the relative change in short interest and $PostGFC$. Again, I find that the size of the issuing firm, the Rule 144A dummy, the interest rate, the market runup, the delta of the convertible issue and the intercept are significant and of the same sign and approximately the same size as in Column (2). In addition, the investor sentiment index of Baker and Wurgler (2006) is now significant and, as predicted, is positively related to the cumulative abnormal returns. With regard to the relative change in short interest and the interaction effect, I find that both are significant. The results indicate that a 100 basis point increase in the relative change in short interest is associated with a 37.9 basis point decrease in the cumulative abnormal returns. Furthermore, the effect is more pronounced in the period following the Global Financial Crisis. In the period following the Global Financial Crisis, a 100 basis point increase in the relative change in short interest is associated with an additional 78.2 basis point decrease in the cumulative abnormal returns. This shows that stock price reactions to the activities of convertible arbitrage hedge funds were larger (more negative) in the post-GFC period. It is also important to note that with the inclusion of the relative change in short interest and the interaction effect, the estimated coefficient of $PostGFC$ increased in size and is now both statistically and economically significant. In other words, the cumulative abnormal returns are less negative, ceteris paribus, in the post-GFC period. I do not find any evidence for hypothesis 3. In fact, I find the opposite, as controlling for short interest makes $PostGFC$ significant. Finally, the adjusted R^2 almost doubles and is now on the higher end, highlighting the importance of controlling for short interest, as mentioned by Duca et al. (2012) and Dutordoir et al. (2014).

In the final column, in line with Duca et al. (2012) I add an interaction effect between the delta of the convertible and $PostGFC$.[28] This does not materially affect any of the variables that were found to be important in Column (3), other than the delta of the

[28]Instead of delta, Duca et al. (2012) use the conversion premium for the interaction effect. The conversion premium can also be used to measure the equity-likeness of a convertible.

convertible and *PostGFC*. I find that with the inclusion of the interaction effect the coefficient of delta decreased in size. In addition, the coefficient of the interaction effect is significant and negative. This means that the reaction to convertible issues that were more equity-like was more negative in the post-GFC period. This, in turn, might explain why convertibles were found to be more debt-like in the same period. More importantly, the coefficient of *PostGFC* almost tripled in size and is now significant at the one per cent level. I conclude that the cumulative abnormal returns were higher in the period following the Global Financial Crisis all other things being equal, but that the more negative reaction to convertible arbitrage-related shorting and equity-like convertibles in the period following the Global Financial Crisis made the cumulative abnormal returns indistinguishable from those in the period prior to and including the Global Financial Crisis. In other words, the more negative stock price reaction to the activities of the remaining convertible arbitrage hedge funds seems to counteract the effect of the relative decrease in convertible arbitrage hedge funds among convertible bond investors. I therefore interpret this as evidence against the second hypothesis.

5.3 Robustness

The last step in my analysis is to check the robustness of the findings of the previous section. I therefore run several additional cross-sectional regressions. Table 4 presents the estimated coefficients of these regressions. In Column (1) I repeat the regression of Column (4) from the previous table. However, this time I cluster the standard errors by both the Fama and French (1997) 12-industry classification and the year in which the announcement took place, as the residuals may be correlated within industries and within years. Due to the availability of the industry classification, the sample size decreases to 1034 observations. The results are overall very similar to the regression from the previous table.[29] The standard errors increase for most coefficients due to the clustering, but, with the exception of sentiment, the same variables are still significant. This indicates that the findings are generally robust to changes in the way the residuals are treated.[30]

In Column (2) I adjust the regression of Column (3) from the previous table by re-

[29] I cross-check these results by rerunning the regression of Column (4) from Table 3 with the reduced sample size.

[30] In untabulated results I also examine clustering by the Fama and French (1997) 12-industry classification and years separately, but I come to the same conclusion.

Table 4: Robustness tests cross-sectional regressions

Variable	Pred.	CAR(-1, 1)			CAR(0, 1)	CAR(-2, 2)
		(1)	(2)	(3)	(4)	(5)
PostGFC	+	0.066***	0.027**	0.052**	0.045**	0.059**
		(0.024)	(0.011)	(0.022)	(0.019)	(0.025)
Issuer						
LogFirmSize	+	0.007**	0.007***	0.008***	0.003	0.010***
		(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
MarketToBook	?	-0.000	-0.000	-0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FirmVolatility	–	0.001		-0.000	-0.002	0.004*
		(0.002)		(0.002)	(0.002)	(0.002)
Beta	–		-0.010**			
			(0.004)			
AltmanZ	+	-0.000	-0.000	-0.000	0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tangibility	+	0.006	0.004	0.011	-0.006	-0.000
		(0.010)	(0.011)	(0.011)	(0.010)	(0.013)
StockRunup	+	-0.008	-0.008	-0.004	-0.005	-0.006
		(0.005)	(0.006)	(0.004)	(0.007)	(0.006)
Issue						
CreditRating	–	-0.001	-0.001	-0.001	-0.001	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Delta	–	-0.046**		-0.046**	-0.014	-0.064***
		(0.019)		(0.017)	(0.013)	(0.019)
Delta × PostGFC	?	-0.059*		-0.042	-0.045*	-0.066**
		(0.032)		(0.029)	(0.025)	(0.033)
Maturity	–		0.000			
			(0.000)			
ConvPremium	+		0.003			
			(0.004)			
Proceeds	–	0.002	-0.003	0.003	-0.003	-0.003
		(0.009)	(0.010)	(0.010)	(0.009)	(0.012)
144A	–	0.014**	0.012**	0.010**	0.014***	0.020***
		(0.006)	(0.005)	(0.005)	(0.005)	(0.007)
Macroeconomic						
InterestRate	–	0.012***	0.009**	0.015***	0.007**	0.007
		(0.004)	(0.004)	(0.004)	(0.003)	(0.005)
TermSpread	–	0.000	-0.001	0.002	-0.000	0.002
		(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
MarketVolatility	–	0.047		-0.014	-0.046	0.031
		(0.041)		(0.050)	(0.033)	(0.043)
VIX	–		-0.000			
			(0.000)			
MarketRunup	+	0.178***	0.141***	0.167***	0.070	0.169***
		(0.047)	(0.043)	(0.047)	(0.045)	(0.059)

Continued on the next page...

Table 4: Robustness tests cross-sectional regressions *(continued)*

Variable	Pred.	CAR(-1, 1)			CAR(0, 1)	CAR(-2, 2)
		(1)	(2)	(3)	(4)	(5)
Sentiment	+	0.006	0.005	0.004	0.003	0.015***
		(0.004)	(0.004)	(0.004)	(0.003)	(0.006)
Arbitrage						
ΔShortInterest	–	-0.398**	-0.414**	-0.388**	-0.239*	-0.454*
		(0.167)	(0.171)	(0.166)	(0.123)	(0.265)
ΔShortInterest × PostGFC	?	-0.733**	-0.749***	-0.573**	-0.566**	-0.534
		(0.290)	(0.278)	(0.283)	(0.253)	(0.339)
Intercept		-0.119***	-0.116***	-0.128***	-0.045	-0.123***
		(0.039)	(0.035)	(0.034)	(0.030)	(0.043)
N		1034	1047	939	1047	1045
Adj. R^2		0.17	0.15	0.15	0.11	0.13
Period		2000-2022	2000-2022	2000-2019	2000-2022	2000-2022

Note. This table presents several robustness checks for the cross-sectional regressions in Table 3. I use the cumulative abnormal returns over the window (-1, 1) as the dependent variable in Columns (1), (2), and (3) and the cumulative abnormal returns over the window (0, 1) as the dependent variable in Column (4). The column labelled 'Pred.' indicates the expected sign of the coefficients in the numbered columns. All coefficients are estimated using ordinary least squares (OLS). Clustered standard errors are reported in parentheses below the estimated coefficients in Column (1). White (1980) standard errors are reported in parentheses below the estimated coefficients in Columns (2), (3), (4), and (5). *PostGFC* is a dummy variable that is equal to one if the convertible was announced after the Global Financial Crisis and zero otherwise. *Maturity* is the maturity of the convertible in years. *Beta* is the issuing firm's beta, measured using the S&P 500 and daily (stock) returns over the window (-240, -20) relative to the announcement. *ConvPremium* is the convertible's conversion price divided by the underlying's price one week prior to the announcement. *VIX* is the CBOE Volatility Index, averaged over the window (-80, 2) relative to the announcement. All other variables are as defined in Appendix A. *MarketToBook* is winsorized at the 1% and 99% percentile. *AltmanZ* scores below -100 and above 100 are winsorized. *N* denotes the number of convertible issues used in the regression.
* p < 0.10, ** p < 0.05, *** p < 0.01

placing several control variables with close proxies. I replace the relative volatility of the issuing firm's stock with the issuing firm's beta, measured over the same window. It seems that the beta is significant and negatively related to the cumulative abnormal returns, as opposed to the firm volatility. Furthermore, I replace the delta with the maturity and the conversion premium of the convertible, as Dutordoir et al. (2022) find that investors prefer the maturity and the conversion premium over the delta when determining the equity-likeness of a convertible. However, I find that both coefficients are close to zero and insignificant. In addition, without the interaction effect between delta and *PostGFC*, the coefficient of *PostGFC* is smaller. Finally, I replace the volatility of the market with

the CBOE Volatility Index (VIX), measured over the same window. It seems that the coefficient of VIX is insignificant, similar to $MarketVolatility$. That being said, the adjusted R^2 remains approximately the same with the inclusion of these proxies, indicating that they do not hold any additional explanatory power.

In Columns (3)–(5) I repeat the regression of Column (4) from the previous table once again, but with slight modifications in all instances. In Column (3) I exclude the last three years from the sample period. I do this because the last three years were marked by the COVID-19 Financial Crisis, an important event that may have changed investors' perceptions of financial markets. Consequently, there may be a structural break in the data. Excluding the last three years reduces the sample size to 939 observations. The results are very close to the regression from the previous table. However, the interaction effect between the convertible's delta and $PostGFC$ is no longer significant. This indicates that the more negative reaction to more equity-like convertibles was driven by the last three years of the sample period.

In Column (4), I use the event window (0, 1) as the dependent variable, as this window is another common event window in similar event studies.[31] It seems that some control variables are sensitive to this change in the dependent variable. The size of the issuing firm, the delta of the convertible, the market runup, the investor sentiment, and the intercept are no longer significant. Even so, my main variables of interest are still significant; $PostGFC$ is still significant and positive, and both the relative change in short interest and the interaction effect between the relative change in short interest and $PostGFC$ are still significant and negative. Furthermore, the adjusted R^2 is still on the higher side and comparable to the other regressions.

It is also interesting to see what happens if the main event window is extended slightly, as the offering date provided by Mergent FISD is not always the same as the actual announcement date. In some cases, the announcement took place just before or just after the offering date. In Column (5) I extend the event window to (-2, 2). This larger event window should theoretically capture more 'correct' announcement dates. However, the tradeoff is that this also reduces the accuracy for the cases where the proxy was in fact correct. Despite this, I find that most of the same control variables are still significant. Moreover, the coefficient of $PostGFC$ is still significant and positive. That being said, the

[31] See Rahim et al. (2014) for an overview of similar event studies and their respective event windows.

interaction effect between the change in relative short interest and the *PostGFC* dummy is now marginally insignificant at the one per cent level.

The above discussion highlights that the findings of Section 5.2 are mostly robust to changes in the regression setup. Most importantly, *PostGFC* remains positive and both economically and statistically significant in all regressions. The arbitrage-related variables remain significant and negative in almost all regressions. The same can be said for the intercept. Moreover, the same control variables are generally found to influence the cumulative abnormal returns and proxies for these control variables do not change the main findings. The results also seem to be robust to changes in the way the residuals are treated. On the other hand, the incremental negative effect of *Delta* in the post-GFC period seems to not be valid for the entire post-GFC period, but is found to be driven by the last three years of the sample period. In untabulated results, I run all regressions using winsorized cumulative abnormal returns, but the above conclusions remain the same.

6 Conclusion

Until now research has mostly focused on the shift in the convertible bond investor base from long-only investors to convertible arbitrage hedge funds that took place around the year 2000. As reported by several papers, the fraction of convertible arbitrage hedge funds among convertible bond investors started decreasing after the Global Financial Crisis. This gap was largely filled by long-only investors again. With my thesis I complemented the existing literature by examining this recent shift in the convertible bond investor base. I asked what the wealth effects are of this recent shift for convertible debt announcements. Shareholder wealth effects are important to take into account, as the primary goal of every firm should be to maximise shareholder value.

In line with the predictions of plenty of other studies, I find that the cumulative abnormal returns of convertible announcements are still overwhelmingly negative. This is the case when looking at the cumulative abnormal returns in isolation and in conjunction with my set of control variables. That being said, there seems to be considerable heterogeneity in the cumulative abnormal returns, especially after the Global Financial Crisis. When comparing the cumulative abnormal returns before and after the Global Financial Crisis, I find that there is no significant difference on the whole. When controlling for the hedging activities of convertible arbitrage hedge funds and the delta of the convertibles, I find that the cumulative abnormal returns were higher and both economically and statistically significant in the period following the Global Financial Crisis. Furthermore, the results seem to indicate that stock price reactions to both the hedging activities of convertible arbitrage hedge funds and more equity-like convertibles were more negative in the period following the Global Financial Crisis. With no significant difference in arbitrage-related short interest found between both periods in my thesis, this could explain the univariate findings. It seems that the more negative reaction to the hedging activities of the remaining convertible arbitrage hedge funds following the Global Financial Crisis counteracts the effect of the decrease of convertible arbitrage hedge funds among convertible investors.

I ran several additional cross-sectional regressions to verify the robustness of my findings. I find that my findings are robust to the way the residuals are treated. Furthermore, using close proxies for some of the control variables does not alter the results in any significant way. The same can be said for changing the event window. Most importantly, in the multivariate setting, the cumulative abnormal returns are consistently found to be more

positive in the period following the Global Financial Crisis and investors are consistently found to react more negatively to the hedging activities of the remaining convertible arbitrage hedge funds in the same period. On the other hand, the incremental negative investor reaction to more equity-like convertibles seems to have been driven by the last three years of the sample period.

My thesis has several limitations. First, my data set of convertible issues is only a small selection of the total universe of convertible issues in the same period. It is unclear why some convertible issues are included in the Mergent FISD data set and others are not. Using another data set of convertible issues from a different source could have altered my findings. Second, I proxy for the announcement date with the offering date provided by Mergent FISD. Although the offering date is a reasonably accurate approximation, it is still possible that this biased my findings. Third, I explicitly assumed that the change in short interest was a result of the hedging activities of convertible arbitrage hedge funds and that the activities of fundamental traders were negligible. This may not be a realistic assumption, as trading on fundamentals is not an uncommon practice.

The adjusted R^2 of all my regressions are still reasonably low. This is the case for most event studies examining convertible announcement returns (Dutordoir et al., 2014). On this basis, there is still plenty of work left for future researchers. There appears to be a significant amount of heterogeneity in the cumulative abnormal returns over time. Perhaps examining the causes of this could aid future researchers in improving their models. Furthermore, models that use firm fixed effects have improved the explanatory power of plenty of models in the corporate finance literature. Perhaps this could also be the case for models examining convertible announcement returns, provided that one can obtain a suitable data set. I look forward to seeing what the future holds in this field.

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A Variable definitions

LogFirmSize The natural logarithm of the market value of equity ($CSHO \times PRCC\_F$) of the issuing firm, measured at the fiscal year-end prior to the announcement date. Data are obtained from Compustat.

MarketToBook The market-to-book ratio ($(CSHO \times PRCC\_F)/CEQ$) of the issuing firm, measured at the fiscal year-end prior to the announcement date. The market-to-book ratio is winsorized at the 1% and 99% percentile. Data are obtained from Compustat.

FirmVolatility The annualised volatility of the issuer's daily stock returns divided by the annualised volatility of the daily S&P 500 returns, both measured over the window (-240, -20) relative to the announcement. The issuer's daily stock returns are obtained from CRSP and the daily S&P 500 returns are obtained from the Federal Reserve Bank of St. Louis.

AltmanZ The Altman Z-score of the issuing firm, measured at the fiscal year-end prior to the announcement date. Altman Z-scores below -100 and above 100 are winsorized, similar to Brown et al. (2012). Data are obtained from Compustat.

Tangibility Net tangible assets (PPENT) as a percentage of total assets (AT), measured at the fiscal year-end prior to the announcement date. Net tangible assets and total assets are both obtained from Compustat.

StockRunup The issuing firm's stock return over the window (-80, -2) relative to the announcement. The firm's stock returns are obtained from CRSP.

CreditRating The numerical credit rating assigned to the convertible bond at issuance by S&P, constructed similar to Choi et al. (2009) and Duca et al. (2012). If the convertible is not rated by S&P, then the rating of Moody's or Fitch is used, in that order. Following Loncarski et al. (2009) and Duca et al. (2012), I assign a rating of BBB (or equivalent) to convertible bonds that are not rated at issuance. 1 = AAA, 2 = AA+, etc. Credit ratings are obtained from Mergent FISD.

Delta A proxy for the embedded equity component of a convertible bond. Data are obtained from Mergent FISD, CRSP and the Federal Reserve Bank of St. Louis.

Proceeds The par value of debt initially issued (OFFERING_AMT) as a percentage of total assets (AT). The par value of debt initially issued is obtained from Mergent FISD and the total assets are obtained from Compustat.

144A A dummy variable that is equal to one if a convertible issue was privately placed under Rule 144A and zero otherwise. Obtained from Mergent FISD.

InterestRate The nominal interest rate (measured using a U.S. 10-year T-note), averaged over the window (-80, -2) relative to the announcement. U.S. 10-year T-note yields are obtained from the Federal Reserve Bank of St. Louis.

TermSpread The difference between the yield of a U.S. treasury 10-year T-note and the yield of a U.S. treasury 3-month T-bill, averaged over the window (-80, -2) relative to the announcement. U.S. treasury 10-year T-note yields and U.S. treasury 3-month T-bill yields are obtained from the Federal Reserve Bank of St. Louis.

MarketVolatility Annualised volatility of daily S&P 500 returns, measured over the window (-80, -2) relative to the announcement. S&P 500 returns are obtained from the Federal Reserve Bank of St. Louis.

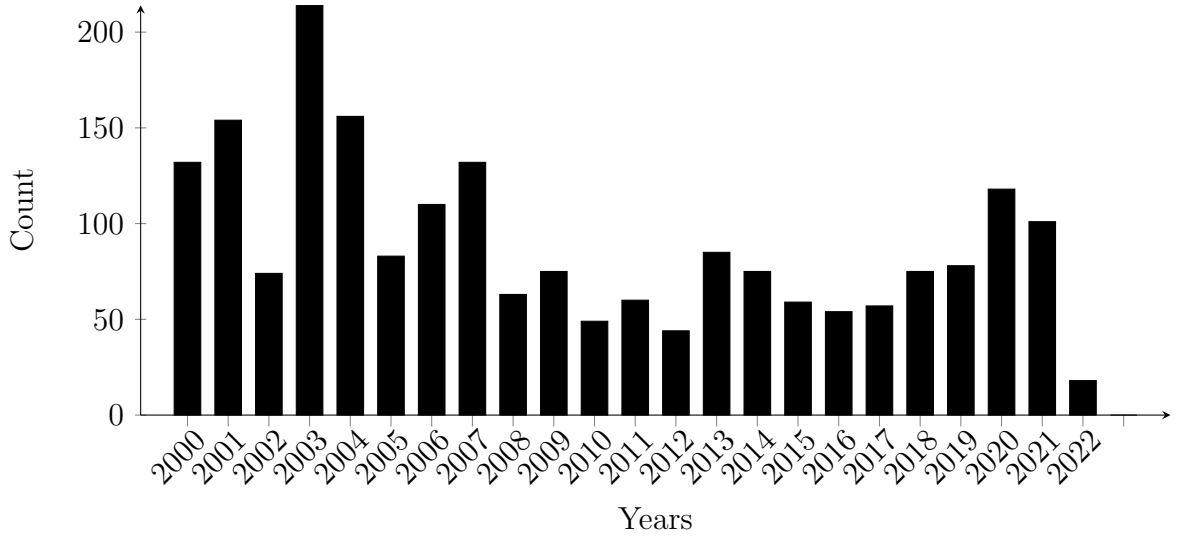
MarketRunup Return of the S&P 500 over the window (-80, -2) relative to the announcement. S&P 500 returns are obtained from the Federal Reserve Bank of St. Louis.

Sentiment Monthly investor sentiment index of Baker and Wurgler (2006), averaged over the four months prior to the announcement.

Δ*ShortInterest* The difference between the short positions held after the convertible issue and the short positions held prior to the convertible issue, divided by the total shares outstanding in the month preceding the announcement. The short positions and the total shares outstanding are both obtained from Compustat.

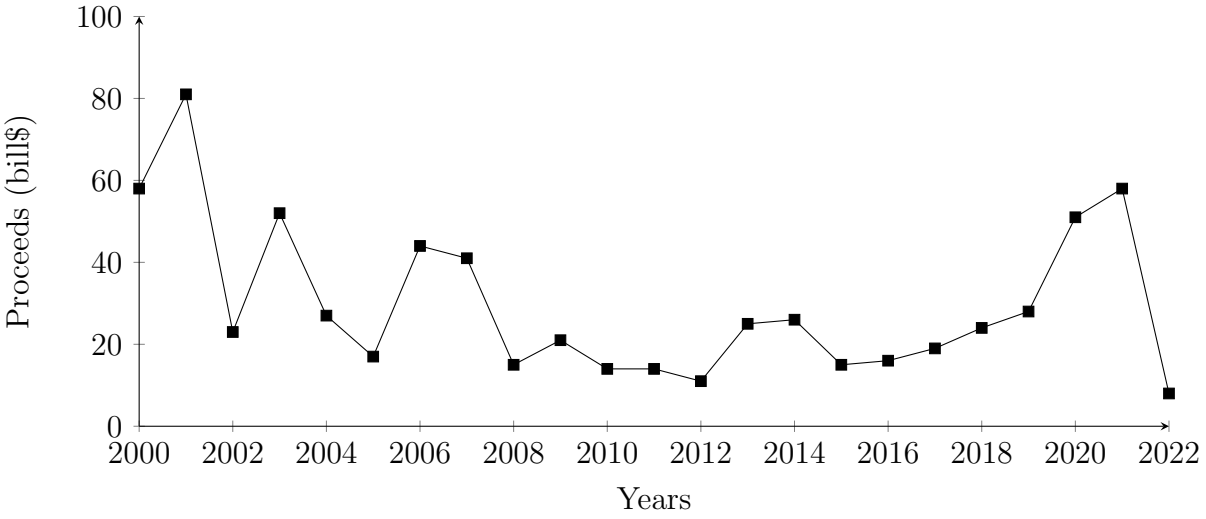
B Figures

Figure 2: Yearly convertible issues



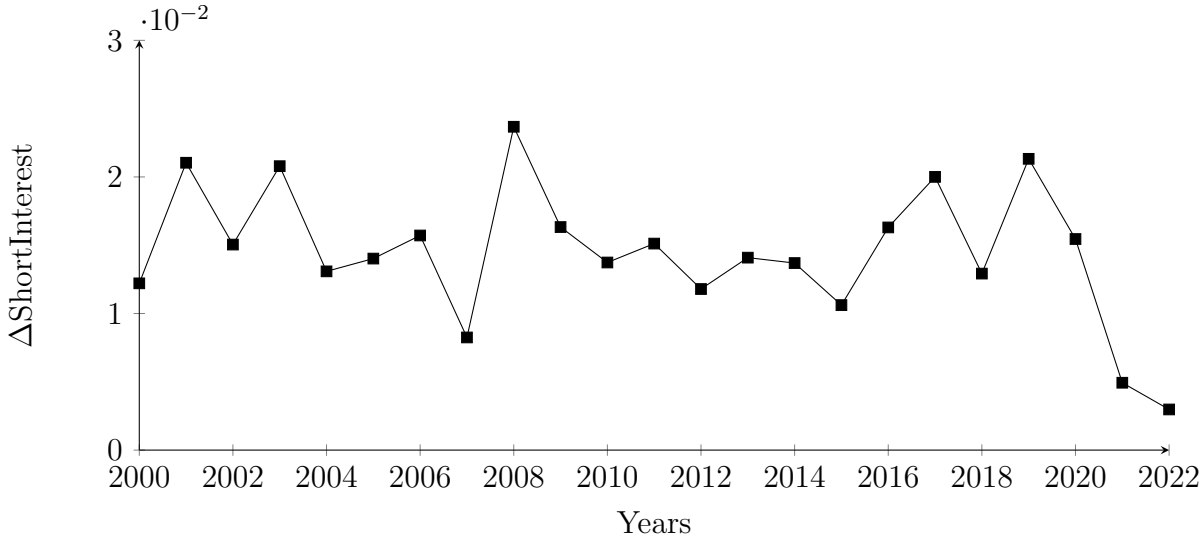
Note. This figure shows the amount of convertible issues in my data set per year. The sample period is January 2000–December 2022. The total number of issues across the years is 2066.

Figure 3: Total yearly convertible issue proceeds



Note. This figure shows the combined issue proceeds of all issues in my data set per year. The proceeds are denoted in billions of U.S. dollars. The sample period is January 2000–December 2022. All unique convertible issues in my data set are used ($N = 2066$).

Figure 4: Yearly mean relative change in short interest



Note. This figure shows the mean relative change in short interest per year. The sample period is January 2000–December 2022. Convertible issues with missing information on the relative change in short interest are excluded. The total sample size is 1062.

C Tables

Table 5: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	LogFirmSize	1															
2.	MarktToBook	0.20	1														
3.	FirmVolatility	-0.31	0.05	1													
4.	AltmanZ	0.03	0.14	0.07	1												
5.	Tangibility	0.01	-0.14	0.01	-0.26	1											
6.	StockRunup	-0.11	0.01	0.04	0.01	0.03	1										
7.	CreditRating	-0.09	-0.07	-0.00	-0.06	0.13	0.02	1									
8.	Delta	-0.19	-0.05	0.25	-0.04	0.11	0.13	0.13	1								
9.	Proceeds	-0.15	0.25	0.24	0.40	-0.31	0.04	-0.12	0.08	1							
10.	144A	0.04	0.05	-0.04	0.12	-0.23	0.07	-0.05	-0.01	0.12	1						
11.	InterestRate	-0.07	-0.17	0.01	-0.07	0.16	-0.06	0.11	0.25	-0.14	-0.08	1					
12.	TermSpread	-0.14	-0.09	-0.11	0.01	0.07	0.08	0.11	0.07	-0.10	0.03	-0.06	1				
13.	MarketVolatility	0.11	0.04	-0.36	-0.10	0.08	-0.00	-0.02	0.02	-0.07	-0.10	-0.18	-0.01	1			
14.	MarketRunup	-0.09	0.01	0.09	0.01	-0.02	0.24	0.08	0.04	0.01	0.05	-0.10	0.20	-0.46	1		
15.	Sentiment	0.25	0.09	-0.01	-0.00	0.06	-0.09	-0.06	0.01	-0.02	-0.13	0.24	-0.41	0.05	-0.32	1	
16.	ΔShortInterest	-0.22	-0.10	-0.01	0.07	-0.00	-0.07	0.06	0.14	0.09	0.02	0.03	0.03	0.05	-0.01	-0.02	1

Note. This table presents the correlations between all variables. The sample period is January 2000–December 2022. All variables are numbered vertically. The numbers on the vertical axis match the numbers on the horizontal axis. All variables are as defined in Appendix A. *MarketToBook* is winsorized at the 1% and 99% percentile. *AltmanZ* scores below -100 and above 100 are winsorized.