# Are there windows of opportunity for convertible debt issuance? Evidence for Western Europe

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## Abstract

This paper hypothesizes that hot convertible debt windows represent periods with smaller convertible debt-related financing costs. In line with this premise, we find that the stock price impact of Western European convertible debt announcements is significantly less negative during hot convertible debt windows. Importantly, this result holds while controlling for equity market, straight debt market and macroeconomic conditions. In addition, we show that stockholders are less sensitive to issuer- and issue-specific financing costs during hot convertible markets. Overall, these findings indicate that hot convertible markets represent windows of opportunity for convertible debt issuance. Firms with high financing costs act accordingly by timing their convertible offering during a hot market.

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## 1. Introduction

It is well-documented that convertible debt announcements induce negative abnormal stock returns intermediate between the abnormal stock returns recorded at straight debt and pure equity announcements.[1] Over the past decades, a number of studies have explored the variables driving cross-sectional differences in the stock price reactions to convertible debt announcements. These papers tend to focus either on the convertible debt design (Davidson et al., 1995; Magennis et al., 1998; Burlacu, 2000) or on the characteristics of the issuing company (Dann and Mikkelson, 1984; Lewis et al., 1999, 2003; Chang et al., 2004).

The present paper extends the literature by examining whether, in addition to the issue- and issuer-specific factors studied by previous papers, stockholder reactions to convertible debt announcements are also influenced by convertible debt market conditions. We hypothesize that hot convertible debt markets (i.e., periods with a high convertible debt issuance volume) represent windows of opportunity during which stockholder reactions to convertible debt announcements are systematically less negative. We draw this hypothesis from a rationale developed by Bayless and Chaplinsky (1996) in the context of seasoned equity offerings (SEOs). Bayless and Chaplinsky (1996) argue that, since economy-wide equity-related adverse selection costs vary over time, firms group their SEOs during periods when these costs are low. The aggregate equity issuance volume thus acts as an inverse proxy for the economy-wide level of equity-related financing costs, which implies that it should have a positive impact on SEO announcement returns. In line with this hypothesis, they find that stockholder reactions are significantly more favorable for SEO announcements made during hot equity windows.

[1] See de Roon and Veld (1998) and Abhyankar and Dunning (1999) for an overview of the convertible debt announcement effects recorded by previous studies.

A straightforward extension of the Bayless and Chaplinsky (1996) rationale suggests that the aggregate convertible debt volume acts as an inverse measure for the economy-wide level of convertible-debt related financing costs. This in turn yields the main hypothesis examined in this paper, being that stockholder reactions to convertible debt announcements are systematically less negative during hot convertible debt windows. In addition, we predict an interaction effect between the convertible debt market condition and the impact of issuer- and issue-specific determinants on convertible debt announcement returns. In particular, we hypothesize that, if the economy-wide level of convertible debt-related financing costs is effectively lower during hot convertible debt markets, then stockholders will respond less negatively to issuer- and issue-specific financing costs during these market conditions.

We test these new hypotheses on a sample of 188 convertibles issued by 154 firms from 13 different Western European countries. While the Western European convertible debt market only gained momentum since the 1990s, it has grown very rapidly since then: in 1990 only 12 Western European industrial firms issued a total of $1.76 billion in convertible debt, whereas in 2002 the number of Western European convertible offerings already amounted to 52 for a total issuance volume of $15.36 billion (source: Thomson ONE Banker).[2] This expansive growth could explain why, since the end of the 1990s, there has been a surge in academic studies calculating the magnitude of the announcement effects of convertibles issued in individual Western European countries.[3] Our study is the

[2] For comparison: 52 US industrial firms issued a total of $ 10.48 billion in convertible debt in 1990, and 88 US industrial firms issued a total of $ 37.00 billion in convertible debt in 2002 (source: Thomson ONE Banker).

[3] Specifically, de Roon and Veld (1998) examine the stock price impact of Dutch convertible debt announcements, Abhyankar and Dunning (1999) and Wolfe et al. (1999) investigate the announcement

first, however, to analyze the determinants of announcement returns for a pan-Western European convertible debt sample. As shown by Dutordoir and Van de Gucht (2004), Western European convertibles tend to be more debt-like in nature than their US counterparts. A priori, this leads to the expectation that, within Western Europe, convertible debt issuance cycles largely coincide with straight debt issuance cycles. Our findings nonetheless reveal that there is only a small overlap between Western European convertible debt and straight debt volume cycles. This suggests that Western European convertibles are not merely a debt instrument, but represent a distinct security class.

Our most important empirical results on the influence of convertible debt market conditions on convertible debt announcement effects are as follows. First, in line with our main hypothesis, we find that stockholder reactions to convertible debt announcements are significantly positively influenced by aggregate convertible debt volumes. Importantly, this finding holds while controlling for other aggregate financing cost measures, i.e., equity and straight debt issuance volumes and several widely-used macroeconomic variables. In fact, none of these other economy-wide financing cost proxies have a significant influence on convertible debt announcement returns. We thus obtain strong evidence that the market perceives the convertible debt volume as a more representative (inverse) measure for the relevant financing costs faced by all convertible debt issuers than other aggregate financing cost proxies. Also in line with our expectations, we find that issuer- and issue-specific proxies for convertible debt-related financing costs have a much smaller negative influence on convertible debt announcement returns during hot convertible debt windows than during non-hot windows.

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effects of UK convertibles, and Burlacu (2000) studies stockholder reactions to French convertible debt announcements.

Having established the existence of windows of opportunity for convertible debt issuance, we examine whether these windows are mainly used by particular firm types. Interestingly, we find that hot market issuers exhibit characteristics which, all else equal, should lead to very negative convertible debt announcement returns. This suggests that hot convertible debt market issuers effectively time their issue to avoid a prohibitively negative stock return at the convertible debt announcement. Mann et al. (1999) obtain evidence that convertible debt issuers try to time the equity market. Our study extends Mann et al.'s (1999) analysis by showing that convertible debt issuers also have a strong incentive to time the convertible debt market.

The remainder of this paper is structured as follows. In the next section, we review the literature and develop the hypotheses. Section 3 describes the sample construction procedure. Section 4 presents the variables used in the regression analyses and provides some descriptive statistics. Section 5 documents the regression results, and Section 6 concludes the paper.

## 2. Development of hypotheses

Several authors argue that financing costs vary not only cross-sectionally but also over time, e.g., due to temporal fluctuations in the availability of profitable investment opportunities or in the level of uncertainty about firm value and firm risk (see, for example, Choe et al., 1993; Bayless and Chaplinsky, 1996; Korajczyk and Levy, 2003; Krishnaswami and Yaman, 2004). If this is the case, then periods with low financing costs represent windows of opportunity during which otherwise identical firms can obtain external financing at more favorable terms.

Choe et al. (1993) and Bayless and Chaplinsky (1996) obtain supporting evidence for the existence of such windows of opportunity by studying stockholder reactions to seasoned equity announcements. Choe et al. (1993) show that abnormal returns at SEO announcements are significantly less negative during business expansions. They attribute this finding to the fact that business expansions represent periods with more profitable investment opportunities and/or less uncertainty about assets in place, and thus a lower level of equity-related adverse selection costs. Bayless and Chaplinsky (1996), however, state that relying on individual macroeconomic variables to identify windows of opportunity for equity issuance omits potentially important information relevant to the issue. They claim that the aggregate equity issuance volume is likely to be a more representative summary measure for the economy-wide financing costs faced by equity issuers, since equity issuers will cluster their offerings when these financing costs are low. In line with this conjecture, Bayless and Chaplinsky (1996) find that stockholder reactions to SEO announcements are significantly less negative during periods with a high equity offering volume (i.e., hot equity markets), even when controlling for several widely-used macroeconomic variables.

Lewis et al. (2003) draw upon the rationale of Bayless and Chaplinsky (1996) by stating that, since convertibles encompass an equity component, stockholder reactions to convertible debt announcements should also be less negative during hot equity markets. They obtain empirical evidence consistent with this hypothesis. Following a similar reasoning, we also expect stockholder reactions to be more favorable for convertibles announced during hot straight debt windows. The underlying intuition is that, if straight debt-related financing costs fluctuate over time (e.g., due to temporal fluctuations in the level of uncertainty about firm risk), straight debt offerings are likely to cluster during periods where these costs are low. The straight debt offering volume thus acts as an inverse

proxy for the economy-wide level of straight debt-related financing costs, which implies that it should have a positive influence on convertible debt announcement returns (due to the straight debt component embedded in convertibles).

We hypothesize, however, that convertible debt volumes are a more representative measure for the financing costs faced by convertible debt issuers than equity or straight debt issuance volumes. The reason is that, as stated by Ammann et al. (2005), convertibles are not simple combinations of straight debt and equity. Instead, these instruments represent a distinct security class for which not only equity- and debt-related costs, but also the interactions between these costs matter (due to their option-like nature). As a consequence, equity and straight debt volumes are unlikely to fully capture the relevant financing costs faced by convertible debt issuing firms. The same holds for individual macroeconomic variables proxying aggregate financing costs.

We contend that convertible debt volume fluctuations are most capable of capturing temporal variations in economy-wide convertible debt-related financing costs, since convertible debt issuers are likely to time their offering during periods when these financing costs are lowest. Consequently, stockholders should put more weight on convertible debt volumes than on other aggregate financing cost proxies in their assessment of the economy-wide financing costs associated with a convertible offering.

Based on the above discussion, we can formulate the following predictions:

H1a: Stockholder reactions to convertible debt announcements are positively influenced by aggregate convertible debt issuance volumes.

H1b: The impact of convertible debt volumes on convertible debt announcement returns is stronger (i.e., statistically more significant) than the impact of equity and straight debt volumes and of macroeconomic variables.

In addition to the main (positive) effect of the convertible debt volume, we also predict an interaction effect between the convertible debt market condition and the influence of idiosyncratic issuer- and issue-specific information on convertible debt announcement returns. Bayless and Chaplinsky (1996) state that, if hot equity markets represent periods with a smaller economy-wide level of equity-related financing costs, then stockholders should react less negatively to firm-specific equity-related cost measures during these windows. They obtain empirical evidence that supports this hypothesis. By the same logic, we argue that, if hot convertible markets effectively represent periods with a smaller aggregate level of convertible debt-related financing costs, then stockholders should be less worried about issuer- and issue-specific convertible debt-related financing costs during these windows. We thus obtain the following prediction:

H2: During hot convertible debt windows, issuer- and issue-specific measures for convertible debt-related financing costs have a less negative impact on stockholder reactions to convertible debt announcements than during non-hot convertible debt windows.

## 3. Sample construction

The sample of convertible debt issues used for testing the above hypotheses was constructed as follows. First, we collected a list of all convertible debt offerings made by Western European industrial companies during the period January 1990 - December 2002 from Bloomberg Thomson Financial. We excluded issues offered by financial companies and utilities from our search, since the capital structure policy of such firms is often driven

by regulatory aspects. We thus obtained a raw dataset of 303 convertible debt offerings. Observations that met all of the following criteria were retained for the final sample:

- The offering is made by an industrial company headquartered in Western Europe (exclude subsidiaries of non-Western European firms);
- The offering is convertible into the issuing firm's stock (exclude exchangeable bonds that can be converted into shares of a firm other than the issuing company);
- The issuing firm's accounting data for the fiscal year-end immediately prior to the announcement date and the issuing firm's daily stock price data for the full calendar year preceding the announcement date are available on Datastream;
- Security design data (e.g., maturity and conversion premium) and the offering announcement date are available on Bloomberg;
- The offering announcement date does not include other confounding corporate event announcements (e.g., announcements of dividend payments or other security offerings).[4]

The final sample consists of 188 convertibles offered by 154 firms. Panel (a) of Table 1 presents the number of convertible debt offerings per year. The table indicates that the number of offerings varies substantially over time. This could reflect temporal fluctuations in the level of convertible debt-related financing costs for the Western European economy as a whole. We also see that there is considerable growth in the European convertible debt

[4] To identify confounding announcements, we used the Bloomberg Corporate Actions Calendar, the Financial Times World Press Monitor, the Ebscohost database, and company websites. By means of the same information sources, we also checked whether the announcement date provided by Bloomberg effectively corresponds to the date at which the news about the impending convertible debt issue was first communicated to the market. For 26 observations, we found evidence of an earlier mention of the convertible debt offering. In those cases, we replaced the announcement date retrieved from Bloomberg with the date of the earlier mention.

issuance volume over the sample period: more than 50% of the sample issues occur during the last four sample years.

<< Insert Table 1 about here>>

Panel (b) of Table 1 reports the number of convertible debt issues per country. Almost 40% of the issues are made by French firms. Prior studies (Ammann et al., 2003; Bancel and Mittoo, 2004) also document the domination of France in the European convertible market. A univariate analysis reveals no significant differences between the security design features, issuer characteristics and temporal dispersion of French and non-French convertibles. Hence, a priori, we do not expect any significant differences between the announcement effects of French convertibles and the announcement effects of the other sample issues. In line with this expectation, we obtain similar event study results for French and non-French convertible debt announcements. As such, we will only present the results for the full convertible debt sample throughout the paper.[5]

## 4. Measurement

### *4.1. Identification of hot convertible debt windows*

Testing hypotheses H1a and H1b requires a measure for the aggregate convertible debt issuance volume. In the spirit of Bayless and Chaplinsky (1996), we calculate the aggregate convertible debt volume as a three-month moving average of the number of

[5] Detailed test results regarding the differences between French and non-French convertibles are available upon request.

convertible debt issues made by Western European industrial firms. The moving average corresponding with a convertible issued in month t is defined as (number of Western European convertibles issued in month t-3 + number of Western European convertibles issued in month t-2 + number of Western European convertibles issued in month t-1)/3.[6]

To test our prediction on the interaction between the convertible debt market condition and the influence of issuer- and issue-specific variables (i.e., hypothesis H2), we need to identify the hot convertible debt windows over the research period. Bayless and Chaplinsky (1996) define hot equity markets as at least three contiguous months where the aggregate equity issuance volume exceeds the upper quartile of a three-month moving average of the aggregate equity issuance volume. Using the same criterion for the convertible market, we identify four hot convertible debt windows over the period 1990-2002, i.e., October 1993 – February 1994, March 1998 – June 1998, April 1999 – June 2000, and September 2001 – March 2002. In total, 74 out of the 188 convertible debt issues in the cleaned convertible debt dataset are made during these intervals. Thus, whereas the hot convertible debt periods make up only 19.87% of the sample period (i.e., 31 out of 156 months), they account for 39.36% of the convertible debt issues in our sample. Our results are robust to the use of other hot versus non-hot convertible debt market classifications (e.g., a classification whereby a given month is hot if the monthly number of convertible debt issues is higher than the median number of issues over the research window 1990-2002, and non-hot otherwise).[7]

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[6] The convertible offering volume calculations are based on the raw sample downloaded from Bloomberg; not on the cleaned sample. The reason is that it makes no sense to exclude offerings that do not fulfill the sample selection criteria that we imposed (e.g., availability of company accounts data in Datastream, etc.) from the issuance volume calculations.

[7] Detailed results of this robustness check are available upon request.

Based on the documented debt-like nature of European convertible debt offerings (Dutordoir and Van de Gucht, 2004), we might expect a large overlap between hot convertible debt and hot straight debt windows. Nevertheless, a contingency table analysis (not reported for parsimony) reveals that only 60% of the hot convertible debt months are also hot straight debt months ($\chi^2$-statistic equals 24.72). The overlap between hot convertible debt and hot equity months is even smaller, i.e., 36.67% ($\chi^2$-statistic equals 27.38).[8] This clearly indicates that European convertibles are not merely debt or equity instruments but represent a distinct security class.

Table 2 compares macroeconomic, equity market and straight debt market conditions during hot and non-hot convertible debt windows. All macroeconomic variables are retrieved from Datastream and expressed as three-month moving averages. In line with previous studies (Choe et al., 1993; Bayless and Chaplinsky, 1996; Korajczyk and Levy, 2003), we use the 6-month leading economic indicator and the industrial production index (both for Europe as a whole) as general business conditions measures, the equity market return (calculated as the return over the Datastream European equity benchmark index) as an inverse proxy for the economy-wide level of equity-related financing costs, and the yield on 5-year German Treasury Bonds and the quality spread (calculated as the yield on Baa minus Aaa Moody's-rated long-term corporate bonds) as proxies for the economy-wide level of debt-related financing costs.[9] As argued before, equity and straight debt issuance volumes act as inverse proxies for economy-wide levels of equity- and debt-

[8] Hot straight debt and hot equity months are determined according to an analogous criterion as the one used for identifying the hot convertible debt months.

[9] The German interest rate plays a leading role in the European economy (Artis and Zhang, 1997), hence our choice for the yield on a German Treasury Bond as a measure for the general interest rate level in Western Europe. The results are robust to the use of other yield measures (e.g., the 10-year US Treasury Bond yield, the 5-year German Treasury Bond yield, etc.) (detailed results available upon request).

related financing costs, respectively. We calculate these issuance volumes in a similar manner as the aggregate convertible debt volumes.[10]

<< Insert Table 2 about here>>

Table 2 shows that hot convertible debt windows are characterized by significantly more favorable business conditions (as proxied by the leading economic indicator and the industrial production index). We also find that both equity-related financing costs (as proxied by aggregate equity offering volumes) and debt-related financing costs (as measured by Treasury Bond yields and aggregate straight debt volumes) are significantly lower during hot convertible markets. This is consistent with the hybrid debt-equity nature of convertible securities.

On the whole, the above results indicate that there are significant differences in macroeconomic and security market conditions between hot and non-hot convertible debt windows, demonstrating the need to appropriately control for these conditions in the regression analyses of convertible debt announcement returns (cf. further, Section 4.3.).

*4.2. Measurement of abnormal stock returns around convertible debt announcements*

To compute abnormal stock returns around convertible debt announcements (i.e., the dependent variables in our empirical analysis), we apply standard event study methodology as described by Dodd and Warner (1983). As proxies for the market return, we use the returns on the respective value-weighted Datastream equity market indices for the

[10] The lists of equity and straight debt offerings made by Western European industrial firms are obtained from Bloomberg and cleaned according to analogous criteria as those used for the convertible debt sample.

individual European countries represented in the sample. In accordance with Dann and Mikkelson (1984) and Lewis et al. (1999, 2003), we estimate the market model regressions over the combined pre- and post-event estimation windows ((-200,-61), (61,200)) relative to the announcement date 0. The statistical significance of the abnormal return estimates is assessed by means of a Patell (1976) Z-test. Since daily abnormal stock returns are highly non-normal in nature (Campbell et al., 1997), we cross-check the conclusions obtained through this parametric test by means of a non-parametric Wilcoxon signed-rank test.

Table 3 presents abnormal stock returns calculated over several windows surrounding the announcement date. For the full convertible debt sample, the average (median) day-0 abnormal stock return is –1.59 (-1.54)%, with 76.06% of the firms experiencing negative abnormal returns.[11] The abnormal return is statistically significant both according to the Z-test and the Wilcoxon signed-rank test. Abnormal returns measured over windows (-1,0) and (0,1) are also significantly negative, but the largest stock price reaction in absolute size takes place on the announcement date itself. This suggests that the announcement dates are properly specified. Unreported analyses reveal that convertible debt announcement effects are negative throughout all sample countries and sample years, although not always statistically significant. Moreover, abnormal return estimates are robust to the use of a different abnormal return model (e.g., the constant mean return model instead of the market model), different market index proxies (e.g., a pan-European equity market index

[11] Event studies on US convertible debt tend to detect abnormal returns that are more negative than those recorded for our Western European sample. For example, Dann and Mikkelson (1984) find an announcement effect of –2.31% on average, and Billingsley et al. (1990) report an announcement effect of –2.04% on average. The (slight) divergence between our event study results and those obtained by US studies could be attributable to the fact that US convertibles tend to be more equity-like in nature than European convertibles (Dutordoir and Van de Gucht, 2004). According to the pecking order model of Myers and Majluf (1984), this implies that US convertibles should induce more negative announcement returns.

or market indices provided by the stock markets on which the sample firms are listed rather than indices provided by Datastream) and/or different market model estimation windows (e.g., the pre-event window (-200,-61) rather than a combined pre- and post-event window).[12]

<< Insert Table 3 about here >>

Columns (2) and (3) report abnormal stock returns separately for convertibles issued during hot and non-hot convertible debt markets. The results indicate that hot market issues induce a significantly negative average (median) day-0 abnormal return of –2.05% (-1.68%), while non-hot market issues induce a significantly negative average (median) day-0 abnormal return of –1.29% (-1.46%). The difference in abnormal returns between the two subsamples is not significant. For windows (-1,0) and (0,1), results are analogous. Hence, on a univariate basis, we obtain no evidence for our hypothesis that convertible debt announcement returns should be less negative during hot convertible debt windows (i.e., hypothesis H1a). Further in this paper, we will provide an explanation for the counterintuitive nature of these univariate test results.

### *4.3. Explanatory variables*

#### *4.3.1. Aggregate financing cost measures*

The main purpose of this paper is to examine whether hot convertible debt markets represent windows of opportunity during which convertible debt announcement effects are systematically less negative. Thus, our key explanatory variable in the analysis of

[12] Detailed results of these robustness checks are available upon request.

convertible debt announcement returns is the convertible debt volume, calculated as outlined in Section 4.1.

To test hypothesis H2b, we also incorporate aggregate equity and straight debt volumes (calculated as outlined in Section 4.1.) in the regression analyses. In addition, we include the following macroeconomic variables described in Section 4.1.: the 6-month leading economic indicator, the equity market return, and the 5-year German Treasury Bond yield.[13] In line with Choe et al. (1993), we measure the leading indicator as a logarithmic growth rate over the quarter preceding the convertible debt issue month. Equity market returns and Treasury Bond yields are expressed as three-month averages calculated over the quarter prior to the convertible debt issue month. Due to the hybrid debt-equity nature of convertible securities, we expect stockholder reactions to convertible debt announcements to be negatively (positively) influenced by (inverse) proxies for aggregate equity- and debt-related financing costs. Thus, we predict a negative impact of the 5-year Treasury Bond yield and a positive impact of equity and straight debt issuance volumes and of the equity market return on convertible debt announcement returns. We also predict a positive impact of the leading indicator, since both debt- and equity-related financing costs tend to be lower during business expansions (Krishnaswami and Yaman, 2004).

*4.3.2. Issuer-specific characteristics*

As noted by Bayless and Chaplinsky (1996), windows of opportunity exist only to the extent that the observed variations in abnormal stock returns are independent of specific firm and security design characteristics. Not appropriately controlling for these features

[13] We do not include all macroeconomic variables specified in Table 2 in the regression analyses since that would induce multicollinearity problems. The regression results remain unchanged when we use other macroeconomic control variables (e.g., quality spreads instead of 5-year German Treasury Bond yields).

might lead to erroneous conclusions on the existence of windows of opportunity. Thus, in addition to the economy-wide financing cost measures specified above, we also need to include issuer- and issue-specific factors in the regression analyses of convertible debt announcement returns.

Since convertibles encompass an equity component, we expect stockholder reactions to convertible debt announcements to be more negative for firms with high equity-related financing costs.[14] Similarly, due to the debt component embedded in convertible debt, we also expect convertible debt announcement returns to be more negative for firms with high costs of attracting new debt(-related) capital.[15]

The amount of slack capital and the pre-announcement stock runup are used to proxy for the level of equity-related financing costs faced by the convertible debt issuers. All issuer characteristics are measured at fiscal year-end preceding the convertible debt announcement, unless otherwise indicated. The amount of slack capital is calculated as the ratio of cash plus marketable securities divided by total assets. When a firm with sufficient

[14] This prediction might seem at odds with the convertible debt rationale of Stein (1992), who states that convertibles can be used as tools to mitigate equity-related financing costs. However, even though convertibles entail smaller equity-related financing costs than equity offerings, their equity component still induces an incremental increase in the level of equity-related costs of the issuing firm. Thus, *within* a convertible debt sample, we expect stockholder reactions to be more negative for issuers with high equity-related financing costs.

[15] In turn, this prediction might seem at odds with the often-cited convertible debt rationales of Green (1984), Brennan and Kraus (1987) and Brennan and Schwartz (1988). These rationales have the common implication that convertibles can be used as tools to alleviate debt-related financing costs. However, even though convertibles entail smaller debt-related financing costs than straight debt offerings, their debt component still induces an incremental increase in the level of debt-related costs faced by the issuing company. Thus, *within* a convertible debt sample, we expect stockholder reactions to be more negative for issuers with high debt-related financing costs.

slack capital issues risky securities, stockholders are more likely to infer that this firm is overvalued, since undervalued firms would rather resort to internal slack financing. Therefore, firms with a large amount of slack capital are expected to incur higher equity-related adverse selection costs (Myers and Majluf, 1984). In line with Lewis et al. (1999, 2003), the pre-announcement stock runup is measured over trading days -75 to -1 relative to the announcement date. Stockholders may interpret a large pre-announcement stock runup as a signal of opportunistic timing behavior, which again results in high equity-related adverse selection costs (Lucas and McDonald, 1990). We thus expect both the slack capital and the pre-announcement stock runup to have a negative impact on stockholder reactions to convertible debt announcements.

We include the leverage ratio, the daily stock return volatility and the tax ratio to capture the level of debt-related financing costs of the convertible debt issuers. The leverage ratio is calculated as the ratio of total debt divided by total assets. Firms with a higher leverage ratio tend to have a higher propensity for harmful asset substitution behavior, and thus a larger cost of attracting new debt(-related) capital (Munro, 1996). In line with Lewis et al. (1999, 2003), the stock return volatility is measured over trading days -240 to -40 relative to the announcement date. Firms with more volatile stock returns tend to have a higher operational and financial risk, and thus a higher debt-related financing cost. The tax ratio is calculated as the ratio of taxes to total assets. Firms with a higher amount of tax liabilities are likely to benefit more from an additional debt issue, since interest payments on the debt issue can be deducted from corporate tax payments. The tax ratio thus acts as an inverse debt cost proxy. In sum, we predict stockholder reactions to convertible debt announcements to be negatively influenced by the leverage ratio and the stock return volatility, and positively influenced by the tax ratio.

Next to these specific equity- and debt-related cost measures, we also include three control variables that act as proxies for both equity- and debt-related financing costs. First, we control for the availability of profitable growth opportunities by including the market to book ratio, calculated as the sum of total assets plus the market value of common equity minus the book value of common equity divided by total assets. As argued by de Jong and Veld (2001), the availability of profitable growth opportunities reduces the potential for managerial opportunism (e.g., investing in negative NPV projects). Hence, we expect the market to book ratio to have a positive impact on stockholder reactions to convertible debt announcements. As a second control variable, we include the issuing firm size, measured as the book value of total assets converted in constant December 2002 US dollars by means of the European monthly Consumer Price Index obtained from Datastream. Our last control variable is the ratio of fixed assets to total assets (also used by MacKie-Mason, 1990). Firms with a large total assets size and/or a high proportion of fixed assets tend to have lower levels of asymmetric information relating to their value and risk, resulting in smaller equity- and debt-related financing costs (Brennan and Schwartz, 1988; Munro, 1996). We thus expect both the firm size and the fixed assets ratio to have a positive influence on convertible debt announcement returns.

*4.3.3. Issue-specific characteristics*

In line with Lewis et al. (1999, 2003), we control for the relative size of the convertible debt offering, calculated as the issue proceeds (converted in US dollars using the exchange rate on the announcement date) divided by the US dollar market value of equity measured one week prior to the offering announcement date. Ceteris paribus, we expect larger offerings to induce higher external financing costs, and hence more negative announcement returns.

We also include a proxy for the equity component size of the convertible debt offering in the regression analyses, being the convertible debt delta (also used by Burlacu, 2000). The delta measures the sensitivity of the convertible bond value to its underlying common stock value. It simultaneously takes into account several convertible debt design characteristics, thereby providing a more complete picture of the convertible debt equity component size than individual features such as the conversion premium or callability. Under the standard Black and Scholes (1973) assumptions, the delta can be represented by the following formula:

$$\Delta = e^{-\delta T} N(d_1) = e^{-\delta T} N\left\{ \frac{\ln\left(\frac{S}{X}\right) + \left(r - \delta + \frac{\sigma^2}{2}\right) T}{\sigma \sqrt{T}} \right\} \quad (1)$$

In the above equation, $\delta$ is the continuously compounded dividend yield for the fiscal year-end preceding the announcement date; $T$ is the initial convertible debt maturity (expressed in years); $N(.)$ is the cumulative probability under a standard normal distribution function; $S$ is the price of the underlying stock measured one week prior to the announcement date; $X$ is the conversion price, $r$ is the continuously compounded yield on a 5-year German Treasury Bond (measured on the announcement date), and $\sigma$ is the stock return volatility per annum. A high delta value (close to 1) means that the convertible bond is very sensitive to its underlying common stock value and subsequently has a large equity component. Conversely, a low delta value (close to 0) indicates that the convertible is structured to be highly debt-like in nature. Based on the pecking order model of Myers and Majluf (1984) and on findings of previous empirical studies (Davidson et al., 1995;

Magennis et al., 1998; Burlacu, 2000), we expect the delta to have a negative influence on convertible debt announcement returns.

The last issue-related variable included in the regression analyses is a Eurobond dummy variable equal to one for Eurobond offerings and equal to zero for domestic or foreign offerings. Because the covenants on Eurobond offerings are generally more difficult to enforce (Kim and Stulz, 1992), we expect convertibles placed on the Eurobond market to induce larger financing costs, and therefore more negative stockholder reactions.

Table 4 presents the average (median) values for the issuer- and issue-specific variables discussed above for the Western European convertible debt sample. On the whole, the descriptive statistics are similar to those reported by US-based studies (e.g., Nanda and Yun, 1996; Lewis et al., 1999, 2003). In line with US studies, we find that convertible debt issuers tend to have volatile stock returns (average (median) daily stock return volatility of 0.027 (0.025)), a substantial pre-announcement stock runup (average (median) runup of 0.068 (0.072)), and many profitable growth opportunities (average (median) market to book ratio of 2.742 (1.403)). Nevertheless, Table 4 also uncovers two important differences between the European and US convertible debt universe. First, European convertibles tend to be more debt-like in nature than their US counterparts: while we record an average (median) delta of 0.632 (0.635), Dutordoir and Van de Gucht (2004) obtain an average (median) delta of 0.82 (0.84) for a sample of US convertibles selected according to similar criteria. A second difference pertains to the issuing firm sizes. In line with Bancel and Mittoo (2004), we find that Western European convertible debt issuers are much larger than their US counterparts: we record an average (median) total assets size of $ 5,185 ($ 1,279) million, whereas US-based studies generally report an average (median) total assets size in the order of $ 1,500 ($ 300) million (see, for example, descriptive statistics reported by Mayers, 1998 and Lewis et al., 2003). This divergence in size might

reflect that, in Europe, only relatively large firms tend to resort to public capital markets for their funding (Pagano et al., 1998).

<< Insert Table 4 about here >>

## 5. Empirical results

### *5.1. Impact of convertible debt market conditions on convertible debt announcement returns*

#### *5.1.1. Full-sample regressions*

Table 5 reports the results of full-sample regression analyses with the day-0 abnormal stock return as dependent variable. The regressions are all estimated by means of the weighted-least-squares technique to avoid a heteroscedasticity bias. Column (1) analyzes the impact of the convertible debt volume on the stockholder reactions while controlling for the issuer- and issue-specific variables discussed in Section 4.[16]

Since the issue-specific characteristics are choice variables of firm management, we might induce an endogeneity bias by combining these variables with the issuer characteristics in a single regression equation. Therefore, in line with Datta et al. (1999), we first regress each of the issue-specific variables on the eight issuer-specific variables. We then use the residuals of these regression analyses instead of the original issue-specific features in the different regression analyses of the convertible debt announcement effect.

[16] The only difference with respect to the variables presented in Table 4 is that we now take the natural logarithm of the book value of total assets in order to allow for nonlinearities in the impact of firm size on convertible debt announcement returns.

Because these residuals are orthogonal to the issuer-specific variables, their regression coefficients reflect the incremental impact of the issue-specific characteristics over the impact of the issuer-specific determinants on convertible debt announcement returns.

<< Insert Table 5 about here >>

Column (1) reveals that the convertible debt volume has a significantly positive impact on the stockholder reactions to convertible debt announcements. Thus, once controlled for issuer- and issue-specific characteristics, we do find evidence for hypothesis H1a stating that convertible debt announcement returns should be less negative during high convertible debt volume periods. This suggests that the insignificant nature of the univariate test results reported in Table 3 might be explained by hot and non-hot convertible debt windows having different firm and/or offering characteristics. We will explore this conjecture in more detail at the end of this section.

Column (2) reestimates the regression reported in Column (1) with equity and straight debt volumes included. The convertible debt volume parameter remains significant and positive. By contrast, the impact of both the equity and straight debt volumes is insignificant. In Column (3), we verify whether the significant positive influence of the convertible debt volume persists when we control for macroeconomic conditions (in addition to the equity and straight debt volumes). We find that this is the case. None of the macroeconomic variables are significant, however.

On the whole, the above results provide strong evidence for our basic premise that hot convertible debt markets represent windows of opportunity during which stockholder reactions are more favorable for all convertible debt offerings, irrespective of their issuer- and issue-specific characteristics (i.e., hypothesis H1a). They are also consistent with our

hypothesis that the convertible debt volume should be a more accurate proxy for the relevant financing costs faced by convertible debt issuers than equity volumes, straight debt volumes or individual macroeconomic determinants (i.e., hypothesis H1b).

Nevertheless, since the Western European convertible debt issuance volume exhibits an increasing trend over our research window (see Table 1), the significantly positive coefficient of the convertible debt volume in the regressions presented in Table 5 might also be spuriously driven by a similar time trend in the abnormal stock returns at convertible debt announcements. To examine this possibility, we reestimate the full-sample regression analyses reported in Table 5 with different time dummy variables included (e.g., a dummy variable equal to one for offerings issued in the second half of the sample period and equal to zero otherwise, a dummy variable equal to one for offerings issued prior to the introduction of the euro in 1999 and equal to zero otherwise, etc.). These dummy variables turn out to be always insignificant and their inclusion affects neither the sign nor the significance of the regression coefficient of the aggregate convertible debt volume.[17]

With regard to the issuer-specific control variables, we obtain the following findings. As predicted, the stock return volatility has a negative influence on the abnormal stock returns. It is only significant in the regression reported in Column (1), however. Also in line with our expectations, the tax ratio has a significantly positive impact on the announcement returns. Lastly, the market to book ratio and the fixed assets ratio (i.e., two control variables) appear with the expected significantly positive regression parameter in all regression equations. The equity-related cost proxies (i.e., slack capital and the pre-announcement stock runup) are both insignificant. This could be attributable to the fact that European convertibles tend to have a small equity component (Dutordoir and Van de Gucht, 2004), so that investors are not highly worried about the level of equity-related

[17] Results of the robustness checks described in this section are available upon request.

financing costs of European convertible debt issuers. Leverage and firm size are never significant either.

The full-sample regression results with regard to the issue-specific control variables, in turn, reveal that the relative issue size and the Eurobond dummy variable both have a significantly negative influence on the stockholder reactions. These findings are in line with our predictions. The delta appears with the expected negative regression parameter in all regression equations, but is never significant.

On the whole, the above results indicate that, next to the significant impact of the convertible debt volume, convertible debt announcement returns are also significantly influenced by issuer- and issue-specific financing cost measures. We will now examine whether the impact of these issuer- and issue-specific financing costs tends to be less strong during hot convertible debt windows, as predicted by hypothesis H2.

*5.1.2. Split-sample regressions for hot market and non-hot market convertibles*

To test hypothesis H2, we conduct a split-sample regression analysis of the impact of issuer and offering characteristics on the announcement effects of convertibles issued during hot and non-hot markets. The right-hand side variables are the issuer- and issue-specific variables discussed in Section 4.[18] We also incorporate Inverse Mills ratios (IMRs) in the regression analyses in order to control for the fact that hot and non-hot market offerings have different issuer- and issue-related characteristics (see further, Section 5.2.),

[18] Due to the limited number of observations, we do not include aggregate financing cost measures in the split-sample regressions. When included, these variables are always insignificant both in the hot and non-hot market regressions.

and are thus not randomly selected from the convertible debt universe.[19] Table 6 reports split-sample regression results for hot market issues (Column (1)) and for non-hot market issues (Column (2)).

<< Insert Table 6 about here >>

We see that the adjusted $R^2$ of the hot market regression (11.44%) is much smaller than the adjusted $R^2$ of the non-hot market regression (27.91%). A Chow test rejects the hypothesis that the parameters of the hot and non-hot market regressions are jointly equal at the 1% level (F-statistic = 2.82). Comparing the individual regression coefficients reveals that, in the non-hot market regression, the tax ratio, the total assets size, the fixed assets ratio and the Eurobond dummy variable are all significant with the predicted signs. In the hot market regression, by contrast, these variables are all insignificant. Together, these findings indicate that stockholders are less sensitive to (inverse) measures of firm- and issue-specific financing costs during hot convertible markets, which supports hypothesis H2.

We also obtain two results that are inconsistent with hypothesis H2, however, being that the leverage ratio and the market to book ratio are significant with the predicted signs in the hot market regression but insignificant in the non-hot market regression. The coefficient of the stock return volatility is also significantly negative both in the hot market

[19] IMRs are obtained from a Heckman (1979) two-step analysis. More particularly, the IMR is calculated as $\varphi(\hat{I})/\psi(\hat{I})$ for hot market offerings and as $-\varphi(\hat{I})/(1-\psi(\hat{I}))$ for non-hot market offerings, with $\varphi$ the standard normal probability density function, $\psi$ the cumulative standard normal distribution function, and $\hat{I}$ the probability of issuing during hot markets. $\hat{I}$ is estimated from a probit model with the dependent variable equal to one for hot market convertibles and equal to zero for non-hot market convertibles. The aggregate, issuer- and issue-specific measures specified in Section 4 are the independent variables.

and in the non-hot market regressions. Thus, although stockholders generally react less negatively (positively) to (inverse) firm- and issue-specific financing cost measures during hot convertible windows, they remain sensitive to certain firm-specific characteristics during these market conditions.

*5.1.3. Interpretation of regression results*

The regression results described above reveal that, during hot convertible debt windows, stockholders react significantly more positively to convertible debt announcements. Moreover, stockholders seem to be less worried about issuer- and issue-specific financing costs during hot market conditions. Overall, these findings are consistent with our conjecture that hot convertible debt windows represent periods with smaller financing costs for convertible debt issuers. Nevertheless, following the reasoning in Bayless and Chaplinsky (1996), we acknowledge that another interpretation of our results is stockholder herding behavior during hot issue windows. More particularly, during hot convertible markets, stockholders may suspend a careful evaluation of each separate convertible debt offering (based on its idiosyncratic issuer and security design characteristics) in favor of a collective, less negative assessment of all convertible debt offering announcements.[20] Unfortunately, the regression results presented in Tables 5 and 6 do not allow us to distinguish between these two non-mutually exclusive interpretations.

To assess the economic significance of systematically more positive convertible debt announcement effects during hot convertible windows, we perform the following

[20] More formally, hot convertible debt markets might represent 'informational cascades' as defined by Bikhchandani et al. (1992). According to these authors, during informational cascades it is optimal for an individual to follow the actions of preceding individuals without regard to his own information. This might explain why stockholders react more positively to hot market convertible announcements, almost irrespective of the idiosyncratic characteristics of these offerings.

counterfactual analysis proposed by Byoun and Moore (2003). Based on the estimated regression models in Table 6, we calculate forecasts of expected announcement period abnormal returns had the same firms issued during the alternative convertible debt window (i.e., hot instead of non-hot and vice-versa). We determine these forecasts by multiplying the parameter estimates from Table 6 with the correspondent value of the independent variable for each issuer, excluding the Inverse Mills ratio.[21] The predicted values indicate that, if hot market issuers had made their offer during non-hot markets, their average (median) day-0 announcement return would have been -8.68 (-8.33)% instead of -2.05 (-1.68)%. The difference between predicted and actual returns is not only significant in statistical terms (t-value = -12.45) but also in economic terms. Specifically, this difference indicates that the typical hot market issuer would have encountered an (on average) 663 basis points more negative announcement effect had it issued during non-hot markets. This translates into an additional equity value loss of $230.15 million for the average hot market issuer.[22] One can judge the economic importance of this equity value loss by comparing it to the direct costs of issuance. Based on Thomson ONE Banker data, we calculate that the average direct costs associated with a Western European convertible debt offering amount to 2.13% of the offering's gross proceeds.[23] A typical hot convertible debt issue with average nominal dollar proceeds of $ 365.52 million therefore entails direct issuance costs in the order of $ 7.79 million. Thus, for hot market issuers, the potential gains of timing

[21] The Inverse Mills ratio is now excluded because it was used to adjust for nonzero regression errors resulting from self-selection bias.

[22] This value is calculated as (8.68% - 2.05%) * average market value of equity of hot market issuers (measured one week prior to the offering announcement date), which equals $ 3,471.32 million.

[23] This percentage includes lead management fees, underwriting fees, selling concessions and reallowance fees for selling in the secondary market (Thomson ONE Banker).

their issue during a hot window are approximately thirty times larger than the direct costs of convertible debt issuance.

Conversely, had non-hot market issuers timed their issue during a hot convertible window, their average (median) day-0 announcement effect would have been 0.21 (0.15)% instead of -1.29 (-1.46)%. The difference between predicted and actual returns is again statistically significant at less than 1% (t-value = 3.28). It suggests that the typical non-hot market issuer foregoes 150 basis points or $ 68.22 million in equity value, on average, by not timing the issue during a hot convertible debt window.[24] Although this foregone equity value is still multiple times the direct issuance costs, it is substantially smaller than the losses predicted for hot market issuers (i.e., $230.15 million). This could explain why non-hot market issuers are less inclined to time their offering during a hot window than are hot market issuers.

Having established the existence and the economic significance of windows of opportunity for convertible debt issuance, we will now assess whether these windows mainly attract particular convertible debt (issuer) types.

### *5.2. Differences in issuer and issue characteristics between hot and non-hot convertible debt markets*

We assess the differences in issuer- and issue-specific characteristics between hot and non-hot convertible debt markets by conducting a logistic regression analysis with the dependent variable equal to one for hot market convertibles and equal to zero for non-hot market convertibles. The issuer- and issue-specific characteristics discussed in Section 4

[24] This value is calculated as (0.21%-(-1.29%)) * average market value of equity of non-hot market issuers (measured one week prior to the offering announcement date), which equals $ 4,547.73 million.

are the right-hand side variables. The results of this logistic regression analysis are presented in Table 7.

<< Insert Table 7 about here >>

Table 7 reveals that hot and non-hot convertible debt markets differ not only with respect to the quantity of offerings, but also with regards to the issuer- and issue-specific characteristics of the offerings. We find that firms issuing during hot markets have a significantly higher pre-announcement stock runup, leverage ratio and stock return volatility and a significantly smaller fixed assets ratio than firms issuing during non-hot markets. The regression results also indicate that hot market issues are significantly smaller in size than non-hot issues. In addition, the proportion of Eurobond issues is significantly higher among hot market offerings.

On the whole, apart from the result on the relative issue size, the findings outlined above suggest that hot market issuers have higher convertible debt-related financing costs than non-hot market issuers. Hence, ceteris paribus, announcement returns should be more negative on average for hot market issues. We thus obtain a potential explanation for the insignificance in the univariate test results on the differences in abnormal stock returns between hot and non-hot markets (see Table 3). It seems that the negative influence of the higher idiosyncratic financing costs associated with hot market offerings washes out the favorable impact of the lower economy-wide level of convertible debt-related financing costs during hot convertible markets.

In the literature, there exists some mixed empirical evidence on equity market timing behavior by convertible debt issuers. Alexander et al. (1979) find no evidence supporting such behavior, while Mann et al. (1999) report that convertible debt issuers do try to time

their offering during bullish equity markets. Our study extends these previous findings by providing evidence that convertible debt issuers also try to time the convertible debt market. More specifically, the above logistic regression results suggest that issuers with high idiosyncratic financing costs deliberately cluster their offerings during hot convertible debt markets. For such firms, the costs of issuing during a non-hot market might be prohibitive.[25]

## 6. Conclusion

This paper reveals that stockholder reactions to Western European convertible debt announcements are significantly less negative during hot convertible debt windows. Our regression results suggest that stockholders rely more heavily on convertible debt volumes than on individual macroeconomic variables for assessing the aggregate financing costs associated with a convertible debt issue. This is in line with Bayless and Chaplinsky's (1996) claim that aggregate security volumes are more capable of capturing the relevant financing costs faced by security issuers than are macroeconomic variables. Moreover, stockholders seem to perceive the convertible debt market condition as a more representative indicator of economy-wide convertible debt-related financing costs than straight debt (or equity) market conditions. This indicates that, despite the highly debt-like nature of European convertibles, these instruments are not merely debt instruments but represent a distinct security class.

In addition to the main (positive) effect of the convertible debt volume, we uncover an interaction effect between the convertible debt market condition and the way in which

[25] In line with this conjecture, we find that most hot market issuers never issue during non-hot markets. Specifically, only 18 of the 154 sample firms issue both in hot and non-hot convertible markets.

stockholders respond to idiosyncratic information. Specifically, during hot convertible debt markets, issuer- and issue-specific financing costs have a smaller negative influence on stockholder reactions than during non-hot convertible debt markets.

On the whole, the above results support the existence of windows of opportunity during which otherwise identical firms can obtain convertible debt financing with a smaller adverse stock price impact. We also show that these windows are mainly used by firms with high costs of attracting external financing. For these companies, the absolute dollar value benefits of timing their offering during a hot convertible debt window are approximately thirty times the size of the direct underwriting costs associated with a convertible debt financing.

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Table 1

(a) Convertible debt offerings sorted by issue year

| Issue year | Number of issues | Cumulative percentage |
|---|---|---|
| 1990 | 3 | 1.60% |
| 1991 | 5 | 4.26% |
| 1992 | 5 | 6.91% |
| 1993 | 9 | 11.70% |
| 1994 | 9 | 16.49% |
| 1995 | 4 | 18.62% |
| 1996 | 6 | 21.81% |
| 1997 | 22 | 33.51% |
| 1998 | 20 | 44.15% |
| 1999 | 26 | 57.98% |
| 2000 | 34 | 76.06% |
| 2001 | 26 | 89.89% |
| 2002 | 19 | 100.00% |
| N | 188 | 100.00% |

(b) Convertible debt offerings sorted by country of domicile of issuing firm

| Country | Number of issues | Percentage |
|---|---|---|
| Austria | 2 | 1.06% |
| Belgium | 3 | 1.60% |
| Denmark | 3 | 1.60% |
| Finland | 3 | 1.60% |
| France | 74 | 39.36% |
| Germany | 11 | 5.85% |
| Italy | 3 | 1.60% |
| the Netherlands | 22 | 11.70% |
| Norway | 8 | 4.26% |
| Spain | 3 | 1.60% |
| Sweden | 8 | 4.26% |
| Switzerland | 17 | 9.04% |
| United Kingdom | 31 | 16.49% |
| N | 188 | 100% |

The convertible debt sample is retrieved from Bloomberg and consists of 188 convertibles issued by 154 Western European industrial companies between 1990 and 2002. Panel (a) presents the number and cumulative percentage of convertible debt offerings per issue year. Panel (b) reports the number and percentage of convertible debt offerings per sample country.

Table 2
Macroeconomic, equity market and straight debt market conditions during hot and non-hot convertible debt windows

| Variable | Hot convertible debt months Mean (median) (N = 31) (1) | Non-hot convertible debt months Mean (median) (N=125) (2) | t-statistic (Wilcoxon signed-rank statistic) for difference between (1) and (2) |
|---|---|---|---|
| *General business condition proxies* | | | |
| Leading indicator | 1.003 (1.005) | 1.001 (1.000) | $3.00^{***}$ $(2.60)^{***}$ |
| Ind. production index | 94.718 (95.787) | 89.428 (88.130) | $3.89^{***}$ $(3.76)^{***}$ |
| *Aggregate equity-related financing cost proxies* | | | |
| Equity market return | 0.020 (0.023) | 0.000 (0.012) | 1.34 (1.04) |
| Equity volume | 42.200 (42.333) | 32.731 (33.000) | $4.08^{***}$ $(3.91)^{***}$ |
| *Aggregate debt-related financing cost proxies* | | | |
| Treasury Bond yield | 0.044 (0.045) | 0.061 (0.054) | $-8.29^{***}$ $(-5.35)^{***}$ |
| Quality spread | 0.008 (0.008) | 0.008 (0.007) | -0.54 (-0.28) |
| Straight debt volume | 7.389 (8.833) | 4.536 (4.333) | $5.04^{***}$ $(4.22)^{***}$ |

This table compares the macroeconomic, equity market and straight debt market conditions during hot and non-hot convertible debt windows. Hot convertible debt months are at least three contiguous months where the number of Western European convertible debt issues exceeds the upper quartile of a three-month moving average of the number of Western European convertible debt issues. Non-hot convertible debt months are all other months. All macroeconomic variables are retrieved from Datastream and expressed as three-month moving averages. Leading indicator is the 6-month leading European economic indicator, industrial production index is the European industrial production index, equity market return is the return over the Datastream European equity market index, Treasury Bond yield is the yield on 5-year German Treasury Bonds, and quality spread is the yield on Baa minus Aaa Moody's-rated long-term corporate bonds. Equity and straight debt volumes are calculated from lists of all equity and straight debt offerings made by Western European industrial firms obtained from Bloomberg, and expressed as three-month moving averages. *, ** and *** denote significance at the 0.10 level, 0.05 level and 0.01 level, respectively.

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Table 3
Daily abnormal stock returns (AR) around Western European convertible debt announcements

| Interval | Full sample (N= 188) (1) | | Hot market issues (N = 74) (2) | | Non-hot market issues (N = 114) (3) | | Difference between hot market and non-hot market issues |
|---|---|---|---|---|---|---|---|
| | Mean (median) AR | Z-statistic (% negative) | Mean (median) AR | Z-statistic (% negative) | Mean (median) AR | Z-statistic (% negative) | t-statistic (Wilcoxon signed-rank statistic) |
| (-1,0) | -1.35% (-1.42)% | -4.90*** (66.49%)*** | -1.79% (-1.77%) | -4.00*** (66.22%)*** | -1.07% (-1.20%) | -3.07*** (66.67%)*** | -1.07 (-1.17) |
| 0 | -1.59% (-1.54)% | -8.19*** (76.06%)*** | -2.05% (-1.68%) | -6.41*** (77.03%)*** | -1.29% (-1.46%) | -5.35*** (75.44%)*** | -1.40 (-1.45) |
| (0,1) | -1.54% (-1.59)% | -5.61*** (65.43%)*** | -1.87% (-1.91%) | -3.71*** (66.22%)*** | -1.33% (-1.24%) | -4.27*** (64.91%)*** | -0.78 (-1.21) |

This table reports estimates of abnormal stock returns around Western European convertible debt announcements. The convertible debt sample is retrieved from Bloomberg and consists of 188 convertibles issued by 154 Western European industrial companies between 1990 and 2002. Abnormal stock returns (AR) are calculated by means of standard event study methodology as described by Dodd and Warner (1983). As proxy for the market index, we use the Datastream equity market index for the issuing firm's country of domicile. Market model regressions are estimated over the windows (-200,-61) and (61,200) relative to the announcement dates. The Patell (1976) Z-statistic indicates the significance of the average abnormal returns. The significance of the percentage of negative abnormal returns is tested by means of the Wilcoxon signed-rank test. Hot market issues are convertible debt offerings made during hot convertible debt windows, i.e., at least three contiguous months where the number of Western European convertible debt issues exceeds the upper quartile of a three-month moving average of the monthly number of Western European convertible debt issues. Non-hot market issues are all other offerings. *, ** and *** denote significance at the 0.10 level, 0.05 level and 0.01 level, respectively.

Table 4
Descriptive statistics for issuer- and issue-specific explanatory variables

| Variable | Mean (N=188) | Median (N=188) |
|---|---|---|
| ***Issuer-specific characteristics*** | | |
| *Equity-specific cost proxies* | | |
| Slack | 0.119 | 0.086 |
| Stock runup | 0.068 | 0.072 |
| *Debt-specific cost proxies* | | |
| Debt/TA | 0.277 | 0.254 |
| Volatility | 0.027 | 0.025 |
| Tax/TA | 0.017 | 0.013 |
| *General financing cost proxies* | | |
| M/B ratio | 2.742 | 1.403 |
| Total assets ($ mio) | 5,185 | 1,279 |
| Fixed assets/TA | 0.298 | 0.254 |
| ***Issue-specific characteristics*** | | |
| Relative issue size | 0.181 | 0.124 |
| Delta | 0.632 | 0.635 |
| Eurobond dummy (fraction = 1) | 0.361 | |

This table provides the mean and median values of the issuer- and issue-specific explanatory variables used in the analyses. The convertible debt sample is retrieved from Bloomberg and consists of 188 convertibles issued by 154 Western European industrial companies between 1990 and 2002. Issuer-specific information is retrieved from Datastream, and issue-specific information is retrieved from Bloomberg. All issuer-specific variables are measured at fiscal year-end prior to the announcement date, unless otherwise indicated. Slack equals the sum of cash and marketable securities divided by total assets. Stock runup is the cumulative stock return measured over the window (-75,-1) relative to the announcement date. Debt/TA is total debt divided by total assets. Volatility denotes the standard deviation of the daily stock returns measured over the window (-240, -40) relative to the announcement date. Tax/TA is taxes divided by total assets. M/B ratio is the market to book ratio, measured as (total assets + market value of equity measured one week prior to the announcement date - book value of equity)/total assets. Total assets is the book value of total assets, expressed in constant 2002 US dollars using the monthly European Consumer Price Index. Fixed assets/TA is fixed assets divided by total assets. Relative issue size is the offering size expressed in US dollars using the exchange rate on the announcement date, divided by the market value of equity measured one week prior to the offering announcement date. Delta is the sensitivity of the convertible bond value to its underlying common stock value (calculated according to equation (1)). Eurobond dummy is equal to one for offerings placed on the Eurobond market, and equal to zero otherwise.

Table 5
Determinants of stockholder reactions to convertible debt announcements: full-sample analysis

| Variables (predicted impact) | Parameter estimates (t-statistics) (1) | (2) | (3) |
|---|---|---|---|
| Intercept | -0.115*** (-2.67) | -0.119*** (-2.73) | -0.376* (-1.84) |
| ***Aggregate financing costs*** | | | |
| Conv. debt vol. (+) | 0.005** (2.25) | 0.004* (1.73) | 0.005* (1.93) |
| Equity vol. (+) | - | 0.001 (1.42) | 0.000 (0.90) |
| Straight debt vol. (+) | - | -0.001 (-1.20) | -0.002 (-1.49) |
| Leading indicator (+) | - | - | 0.252 (1.24) |
| Equity market return (+) | - | - | 0.001 (0.01) |
| Treasury Bond yield (-) | - | - | 0.000 (0.09) |
| ***Issuer-specific characteristics*** | | | |
| *Equity-related cost proxies* | | | |
| Slack (-) | 0.006 (0.23) | 0.008 (0.27) | 0.007 (0.27) |
| Stock runup (-) | -0.010 (-0.99) | -0.010 (-0.97) | -0.011 (-0.95) |
| *Debt-related cost proxies* | | | |
| Debt/TA (-) | -0.002 (-0.08) | -0.004 (-0.22) | -0.005 (-0.25) |
| Volatility (-) | -0.476* (-1.72) | -0.412 (-1.41) | -0.317 (-1.03) |
| Tax/TA (+) | 0.338** (2.33) | 0.355** (2.44) | 0.370** (2.52) |
| *General financing cost proxies* | | | |
| M/B ratio (+) | 0.002* (1.93) | 0.002* (1.92) | 0.002* (1.79) |
| Ln(total assets) (+) | 0.003 (1.57) | 0.003 (1.42) | 0.003 (1.62) |
| Fixed assets/TA (+) | 0.057*** (4.07) | 0.057*** (4.07) | 0.056*** (3.92) |
| ***Issue-specific characteristcs*** | | | |
| Relative issue size (-) | -0.034** (-2.03) | -0.031* (-1.83) | -0.033* (-1.96) |
| Delta (-) | -0.035 (-1.36) | -0.035 (-1.34) | -0.037 (-1.39) |
| Eurobond dummy (-) | -0.019*** (-2.80) | -0.017** (-2.36) | -0.017** (-2.39) |
| Adjusted $R^2$ | 16.24% | 16.38% | 15.83% |
| N | 188 | 188 | 188 |

This table presents the results of regressions of abnormal returns at Western European convertible debt announcements on aggregate financing cost measures, issuer-specific characteristics, and issue-specific characteristics. The convertible debt sample is retrieved from Bloomberg and consists of 188 convertibles issued by 154 Western European industrial companies between 1990 and 2002. Regressions are estimated using weighted least squares, with as weight for each observation the inverse of the standard deviation of the corresponding market model residual. (+) (-) indicate a positive (negative) expected impact on the announcement returns. The dependent variable is the abnormal stock return realized on the convertible debt announcement date, calculated according to standard event study methodology as described by Dodd and Warner (1983). The definitions of right-hand side variables are as follows. Conv. debt/equity/straight debt vol. is a three-month moving average of the number of Western European convertible debt/equity/straight debt offerings, calculated over the quarter preceding the convertible debt issue month based on data obtained from Bloomberg. Leading indicator, equity market return and Treasury Bond yield are retrieved from Datastream. Leading indicator is the 6-month leading economic indicator for Western Europe, equity market return is the return over the Datastream European equity market index, and Treasury Bond yield is the yield on 5-year German Treasury Bonds. Leading indicator is expressed as a logarithmic growth rate over the quarter preceding the issue month; equity market return and Treasury Bond yield are expressed as average values over the quarter preceding the convertible debt issue month. All issuer- and issue-specific variables are defined as outlined below Table 4. The issue-specific variables are orthogonalized with respect to the issuer-specific variables according to the methodology outlined by Datta et al. (1999). *, ** and *** denote significance at the 0.10 level, 0.05 level and 0.01 level, respectively.

Table 6
Determinants of stockholder reactions to convertible debt announcements: hot versus non-hot markets

| Variables (predicted impact) | Parameter estimates (t-statistics) | |
|---|---|---|
| | Hot market issues (1) | Non-hot market issues (2) |
| Intercept | 0.049 (0.75) | -0.220*** (-3.53) |
| ***Issuer-specific characteristics*** | | |
| *Equity-related cost proxies* | | |
| Slack (-) | 0.008 (0.21) | -0.021 (-0.54) |
| Stock runup (-) | -0.020 (-1.20) | 0.003 (0.24) |
| *Debt-related cost proxies* | | |
| Debt/TA (-) | -0.059** (-2.13) | 0.039 (1.53) |
| Volatility (-) | -1.121** (-2.22) | -0.677* (-1.87) |
| Tax/TA (+) | 0.174 (0.80) | 0.634*** (3.50) |
| *General financing cost proxies* | | |
| M/B ratio (+) | 0.004** (2.21) | 0.002 (1.00) |
| Ln(total assets) (+) | -0.001 (-0.47) | 0.005** (2.37) |
| Fixed assets/TA (+) | 0.035 (1.50) | 0.080*** (4.24) |
| ***Issue-specific characteristics*** | | |
| Relative issue size (-) | -0.081 (-1.36) | -0.020 (-1.03) |
| Delta (-) | 0.045 (0.85) | -0.042 (-1.36) |
| Eurobond dummy (-) | -0.002 (-0.22) | -0.023*** (-2.65) |
| Inverse Mills ratio | -0.041 (-1.09) | -0.607 (-1.54) |
| Adjusted $R^2$ | 11.44% | 27.91% |
| N | 74 | 114 |

This table analyzes whether the impact of issuer- and issue-specific characteristics on convertible debt announcement returns is different between hot market and non-hot market convertibles. The total convertible debt sample is retrieved from Bloomberg and consists of 188 convertibles issued by 154 Western European industrial companies between 1990 and 2002. Hot market issues are convertible debt offerings made during hot convertible debt windows, i.e., at least three contiguous months where the number of Western European convertible debt issues exceeds the upper quartile of a three-month moving average of the number of Western European convertible debt issues. Non-hot market issues are all other offerings. Regressions are estimated using weighted least squares, with as weight for each observation the inverse of the standard deviation of the corresponding market model residual. (+) (-) indicate a positive (negative) expected impact on the announcement returns. t-statistics are inserted in parentheses. The dependent variable is the abnormal stock return realized on the convertible debt announcement date, calculated by means of standard event study methodology as described by Dodd and Warner (1983). All issuer- and issue-specific variables are defined as outlined below Table 4. The issue-specific variables are orthogonalized with respect to the issuer-specific variables according to the procedure outlined by Datta et al. (1999). Inverse Mills ratios are calculated as $\varphi(\hat{I})/\psi(\hat{I})$ for hot market offerings and as $-\varphi(\hat{I})/(1-\psi(\hat{I}))$ for non-hot market offerings, with $\varphi$ the standard normal probability density function, $\psi$ the cumulative standard normal distribution function, and $\hat{I}$ the probability of issuing during hot markets. $\hat{I}$ is estimated from a probit model with a dummy variable equal to one for hot market convertibles and equal to zero for non-hot market convertibles as dependent variable and the aggregate, issuer- and issue-specific measures specified in Section 4 as independent variables. *, ** and *** denote significance at the 0.10 level, 0.05 level and 0.01 level, respectively.

Table 7
Differences in issuer- and issue-specific characteristics between hot and non-hot convertible debt markets

| Variables | Parameter estimates (Wald-statistics) |
|---|---|
| Intercept | -0.377 (0.02) |
| ***Issuer-specific characteristics*** | |
| *Equity-related cost proxies* | |
| Slack | 0.752 (0.22) |
| Stock runup | 1.573* (4.13) |
| *Debt-related cost proxies* | |
| Debt/TA | 2.083* (3.22) |
| Volatility | 45.304*** (6.70) |
| Tax/TA | -5.207 (0.33) |
| *General financing cost proxies* | |
| M/B ratio | -0.092 (1.26) |
| Ln(total assets) | -0.093 (0.74) |
| Fixed assets/TA | -2.367** (6.37) |
| ***Issue-specific characteristics*** | |
| Relative issue size | -4.083* (3.49) |
| Delta | 2.537 (2.41) |
| Eurobond dummy | 1.044*** (10.25) |
| Pseudo $R^2$ | 21.28% |
| % Concordant | 77.00% |
| N | 188 |

This table presents the results of a logistic regression analysis examining the differences in issuer- and issue-specific characteristics between hot market and non-hot market convertible debt issues. The convertible debt sample is retrieved from Bloomberg and consists of 188 convertibles issued by 154 Western European industrial companies between 1990 and 2002. Wald-statistics are inserted in parentheses. The dependent variable is a dummy variable equal to one for hot market issues, and equal to zero for non-hot market issues. Hot market issues are convertible debt offerings made during hot convertible debt windows, i.e., at least three contiguous months where the number of Western European convertible debt issues exceeds the upper quartile of a three-month moving average of the number of Western European convertible debt issues. Non-hot market issues are all other offerings. All issuer- and issue-specific variables are defined as outlined below Table 4. *, ** and *** denote significance at the 0.10 level, 0.05 level and 0.01 level, respectively.