

An empirical analysis of the wealth effects associated with the  
announcements of convertible debt issues on the Canadian market

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## **Abstract**

We examine the wealth effects associated with the announcements of convertible debt offerings in the Canadian market for the period between 1990 and 2003. The average wealth effect for the three day event window is a significantly negative -3.95%. This result is in line with previous studies on other Anglo-Saxon markets, but it is different from other markets, where generally no effect or even a positive effect is found. In addition, support is found for the negative effect of both debt- and equity related costs, in particular when the nature of the convertible issue is taken into account. These effects are mitigated with future growth opportunities. Finally, we investigate wealth effects at the issue date of convertible debt offerings and find a difference in market response to more debt- versus more equity-like offerings. This suggests that convertible arbitrage strategies may have a significant effect on the abnormal returns.

JEL codes: G14, G31, G32

# 1 Introduction

A question that receives considerable attention in the theoretical as well as empirical corporate finance literature is why do companies issue convertible debt? While practitioners put forward notions of delayed equity, lower coupon rate and "sweetening" of deals that are otherwise hard to sell<sup>1</sup>, academics have proposed theories that relate the use of convertible debt to informational asymmetries (Brennan and Kraus (1987), Brennan and Schwartz (1988), Kim (1990) and Stein (1992)), agency issues (Green (1984), Mayers (1998) and Isagawa (2000)) and tax motives (Jalan and Barone-Adesi (1995)). These theories in general suggest that companies that face high debt- and/or equity-related costs could benefit from issuing convertible debt as opposed to other "straight" means of financing. Prime candidates for issuing convertible debt are companies for which straight debt or equity do not provide an efficient way of financing. These include companies to which one of the following problems applies: difficulty in estimating risk, possession of ample growth opportunities, high costs of financial distress, financially constrained, and/or high agency costs.

A convertible is a bond that can be exchanged for a predetermined fixed number of shares of the issuing company within a predetermined period of time. In essence a convertible bond is a package, consisting of a straight bond and warrants written on the issuing company stock. Empirically it is well documented that different security types induce different wealth effects at the time of their announcements. For example, seasoned equity offerings induce the strongest negative wealth effects (see, e.g., Masulis and Korwar (1986), Mikkelson and Partch (1986) and Asquith and Mullins (1986)), while straight debt issues induce only slightly (many times insignificant) negative wealth effects (see, e.g., Dann and Mikkelson (1984) and Eckbo (1986)). Given the hybrid character of convertible bonds, we can expect that the size of the wealth effects associated with the announcements of convertible security offerings will be between those for straight debt and equity.

In Table 1 we summarize the main findings of a number of previous studies on stock market reactions of the announcement of a convertible debt issue. Most of these studies use U.S. data, and document significant negative effects of convertible debt announcements in the range between -1 to -3 percent. For other markets the empirical evidence has been somewhat less conclusive. The hybrid nature of

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<sup>1</sup>See for example surveys of managers by: Billingsley and Smith (1996) for U.S. market, Graham and Harvey (2001) for U.S. market and Bancel and Mittoo (2004) for European markets.

convertibles and the institutional and regulatory differences among countries and markets seem to be the driving force of the divergence. This makes the analysis one of the more interesting fields in empirical corporate finance today, since convertible debt can be structured to be either more debt or equity-like as to mitigate some of the risks and deficiencies associated with each of "plain" securities.

*⟨ Insert Table 1 here ⟩*

Following Burlacu (2000), Lewis et al. (2003) and Dutordoir and Van de Gucht (2004), we estimate the structure of the convertible debt design (i.e. how debt- or equity like it is) by employing the delta measure. The delta measure relates the price sensitivity of a convertible bond to the underlying equity, and takes values between 0 and 1. A value closer to 1 suggests that the convertible bond is more equity-like, since the probability of conversion is higher. Note that issuers of convertible bonds that are more equity like are more plagued with equity related costs, while debt-like issuers are more plagued with debt related costs. Therefore we expect that more debt-like offerings are associated with less negative abnormal returns and more equity like offerings with more negative abnormal returns. Moreover, we do not expect debt like offerings to be significantly affected by equity related costs and equity like offerings by debt related costs.

The purpose of this paper is twofold. The first objective is to provide further evidence on the market reactions to convertible debt offerings. The second objective is to examine the nature and determinants of the size of the wealth effect with respect to issuer characteristics and relate the findings to theories about motives for the use of convertible debt. We examine the influence of several issuer characteristics on announcement reactions in the Canadian market in the period between 1990 and 2003. This study is related to previous; mainly U.S. based research, since the Canadian market shares many of its design features with its U.S. counterpart and adds to the literature on the use of convertible debt. As far as we know this is the first study that examines the wealth effects associated with convertible debt issues in the Canadian market.

Our empirical findings are mostly in line with the seminal work of Myers and Majluf (1984) on external financing and the role of informational asymmetry. Similar as in the U.S, the event study analysis shows that wealth effects associated with the announcements of Canadian convertible bonds

offerings yield significantly negative abnormal returns of about -4%. The analysis shows that this is to be attributed to the more equity like nature of most of the convertible bonds issued in the Canadian market in the period under consideration, in particular before 2000. With respect to the firm-specific determinants of announcement price reactions, we find that on the firm level, the abnormal returns are driven by factors related to both the debt- and equity-like features of convertible debt: financial leverage, which drives debt-related costs, and financial slack, which drives equity-related costs. These results appear to be robust across different specifications, i.e. when we control for the stated use of the proceeds (acquisitions, capital expenditures or refinancing). These findings are in line with the theories that relate the use of convertible debt to mitigate different aspects of informational asymmetries. We also find support for tax arguments for the use of convertible debt.

With respect to the control variables our results indicate that firm size in some cases negatively affects the abnormal market response at the time of a convertible debt announcement. This is somewhat surprising to the extent that both debt- and equity-related costs should be reduced for larger firms, but could also be viewed from the perspective that with the size of the firm opaqueness also increases. Future growth opportunities measured as Tobin's Q are found to be significantly related to abnormal returns as the market reacts more favorably to those offerings where future growth opportunities are better and the probability of overvaluation is lower.

Finally, we examine the wealth effects associated with the issue date. We find much higher downward price pressure between the announcement and issue date for more equity like convertible bonds than for more debt like bonds. Since we do not have data on the structure of investors in convertible bonds, we suspect that this might be caused by the actions of large investors in these convertible bond issues - e.g. convertible arbitrage by hedge funds. If convertible bonds are underpriced, as some studies suggest (see for example Kang and Lee (1996) and Ammann et al. (2003)), taking a long position in the convertible bond and a short position in the underlying equity might yield a profitable strategy with no initial investment required (aside from the margin on the short sale - see for example Arshanapalli et al. (2004)). Our findings about the different extents of the downward price pressure between the announcement and issue date might therefore be attributed to different relative quantities of stock that have to be sold short. For more equity like issues, the relative quantity to short is higher, resulting in higher downward price pressure. This is a highly interesting issue that warrants more

exploration.

The remainder of this paper is structured as follows. The next section reviews the theoretical models yielding the testable hypotheses for our study. Section 3 describes the sample, provides some summary statistics and discusses the methodology. In Section 4 we present the empirical results on the announcement returns and their determinants. Section 5 concludes.

## 2 Shareholder reactions to Convertible Debt announcements

### 2.1 Wealth effects associated with the announcements of convertible debt offerings

A general explanation to why investors react negatively to security offerings follows from the informational asymmetry between managers and the market with respect to value of assets in place and/or future growth opportunities. In this respect, security offerings are viewed as special examples of the lemons problem presented by Akerlof (1970). The models of Myers and Majluf (1984) in particular and Miller and Rock (1985) can be viewed as specific applications of the lemons problem. According to these models, when a company issues risky securities, investors will demand a discount on the security price in order to be compensated for a potential overvaluation of the firm. Therefore, the announcements of convertible bond issues are predicted to have a negative impact on the issuer's stock price.

From the results of previous studies (shown in Table 1<sup>2</sup>) it appears that the abnormal returns may be driven by the type of the financial system. Market-oriented systems, including those in the U.S., Canada and the U.K. have well-developed financial markets and open corporations with widely dispersed share ownership. On the other hand, network-oriented systems, including those in Japan, Germany, Switzerland and the Netherlands have strong banks with large share ownership and a greater role in monitoring. In the market-based systems it is expected that managers are more likely to act in the interest of existing shareholders, and informational asymmetries may be larger. It follows from Myers and Majluf (1984) adverse selection model that in these systems the market reaction to convertible debt issues may be less favourable. In the network-oriented systems, where managers are

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<sup>2</sup>Note that the results documented by Dutordoir and Van de Gucht (2004) are averaged across 13 West European countries, while 40 percent of the sample is drawn from France and 15 percent from UK and the Netherlands each. They do not report results for countries separately.

more likely to be entrenched given their institutional settings, the Myers and Majluf model may not hold.

A second explanation for negative stock returns at the announcement of convertible debt issues attributes these returns at least in part to systematic underpricing of public offerings. If public offerings are underpriced, then wealth is transferred from the firm's current stockholders to the purchasers of the underpriced securities. Evidence that underpricing occurs for convertible bonds is reported by Kang and Lee (1996) and Ammann et al. (2003) for example. Given the adverse selection model of Myers and Majluf (1984), possibility of underpricing and the nature of the convertible bonds (hybrid securities) we test the following hypothesis regarding wealth effects associated with the announcements of convertible debt offerings.

*Hypothesis 1: The announcement of convertible bond offerings by companies in Canada has a significant negative market valuation effect.*

## **2.2 Determinants of the size of wealth effects**

In general the following characteristics determine market response to convertible debt offering:

- issue characteristics (see, e.g. Magennis et al. (1998), Burlacu (2000) and Dutordoir and Van de Gucht (2004)),
- issuer characteristics (see, e.g. Jen et al. (1997), Lewis et al. (1999) and (2003), Dutordoir and Van de Gucht (2004) and Chang et al. (2004)),
- aggregate volume of issues in the market (e.g. Dutordoir and Van de Gucht (2004) and Lewis et al. (2003)),
- market sentiment and macroeconomic factors (e.g. Lewis et al. (2003)).

By adjusting the parameters of the issue (maturity, conversion price, callability, etc.) issuers can structure the convertible bond to be either more straight debt-like or more equity-like. More debt-like convertible bonds will have higher conversion prices (and consequently higher conversion premiums) and/or shorter maturities than more equity like bonds. By classifying convertible issues into more

debt- or equity-like as captured by the delta measure (see Section 3.3) we will test the following hypothesis.

*Hypothesis 2: The wealth effect will be more negative for equity like convertibles than for debt like convertibles.*

Effect of issuer characteristics on the size of the wealth effect associated with the announcements of convertible debt offerings is related to motives for issuing such security. Convertible debt is a particularly useful financing instrument in cases where informational asymmetries and market imperfections make use of straight debt or equity more costly or even impossible.

As Brennan and Schwartz (1988) and Brennan and Kraus (1987) show, convertible debt mitigates problems associated with risk estimation of value and returns of assets already in place. According to these explanations, convertible debt represents an alternative to straight debt, which would be very costly and/or difficult to issue. Green (1984) also considers convertible debt as a resolution to the agency conflict between bondholders and shareholders, where shareholders might be inclined to expropriate debtholders by substituting riskier policies for less risky due to their limited liability in a standard debt contract. Since convertible debt can be turned into equity at the discretion of bondholders, it alleviates the risk shifting problem and can therefore be viewed as a substitute for straight debt.

When treated as a substitute for straight debt, the information signalling model of Ross (1977) suggests that the issuance of debt securities conveys favourable information to the market. A manager of a successful firm may choose to increase leverage to send positive signals to the market about the future performance of the firm; unsuccessful firms cannot mimic these signals, because they have insufficient cash to meet the debt payments. On the other hand, Myers (1977) demonstrates the opposite - firms with higher share of growth opportunities with respect to the current value of the firm issue less debt. In the spirit of Myers, increases in leverage can be interpreted as a worse signal about future growth opportunities of the company.

From the debt perspective the effect of convertible debt issuance on leverage is not obvious, since it has both debt like and equity like components if we analyze the entire sample of convertible bond

issues. However, for more debt like convertibles, the level of debt-related costs at the firm level should have a negative impact on the price response. Firms are expected to face high debt related costs when their financial leverage and stock return volatility are high, since these factors increase the risk of financial distress and the threat of bankruptcy. With respect to debt related costs we test the following two hypotheses, where we take leverage and stock price volatility as proxy measures for the level of debt and the risk of financial distress.

*Hypothesis 3a: The market valuation effect is less favourable when financial leverage is high.*

*Hypothesis 3b: The market valuation effect is less favourable when stock return volatility is high.*

From the equity component perspective Kim (1990) and Stein (1992) argue that convertibles are delayed equity and are used to signal the quality of the firm in the framework of informational asymmetry. This is consistent with the adverse selection model of Myers and Majluf (1984), where conventional equity issues are unattractive due to high issue costs and dilution. Kim demonstrates that the conversion ratio serves as a credible signal of a company's future earnings. Stein argues that good quality firms issue debt, while medium quality firms differentiate themselves from bad quality firms by issuing convertibles.

If the nature of a convertible bond issue is more equity like, the equity-related adverse selection costs should negatively affect the price reaction to convertible debt offerings. Lucas and McDonald (1990) show why equity issues on average are preceded by positive abnormal returns. However, in line with the pecking order theory of Myers and Majluf (1984), costs associated with issuing equity should be higher for companies with larger stock run-ups, since they are more likely to be overvalued. De Jong and Veld (2001) argue that the problem of perceived overvaluation will be worse for firms with sufficient slack capital, because slack provides an alternative source for financing new projects and enhances the potential agency problem (overinvestment) between managers and shareholders. This negative impact should be more pronounced for equity-like convertibles and likely not to be detected in the overall sample of convertible bonds, since the role of it should be diminishing for more debt-like convertibles. Based on this we test the following hypotheses.

*Hypothesis 4a: The market valuation effect is less favourable after a period of positive abnormal*

*returns.*

*Hypothesis 4b: The market valuation effect is less favourable when the issuing firm has considerable slack capital.*

Jalan and Barone-Adesi (1995) consider convertible bonds as the delayed equity financing and motivate their use with different tax treatment of coupon interest and dividend payments in a setting with market frictions and incompleteness. In such a setting issuing convertible bonds increases the residual equity value of the firm, since the firm benefits from the tax shield as opposed to up-front equity financing. The cooperative game and the fact that firms have repeated need for the financial markets assure that both firms and investors have an incentive to use convertibles and share their benefits. Compared to straight debt convertible bonds offer much less trade-off between interest tax shields and cost of financial distress. In the case of straight bonds higher interest tax shields are only achievable through higher indebtedness, which increases the probability of financial distress. On the other hand convertible bonds offer the benefit of interest tax shields, but much less increase the probability of financial distress. A direct test of this tax motivated argument for the issue of convertible debt is also related to calls of convertibles, which we will not address in this paper. We do however expect a positive effect of the tax burden (marginal tax rate) on the size of abnormal returns, especially in the case of more equity-like convertibles, implying some evidence on the tax motive argument. We therefore also test the following hypothesis.

*Hypothesis 5: The market valuation effect is more favourable when the issuing firm has higher tax burden.*

From the above it follows that price reactions to convertible debt announcements should be negatively influenced by both debt and equity related costs, since convertible debt encompasses both debt-like and equity-like components. We consider two additional factors that influence both debt- and equity-related costs. First, both debt-related costs (e.g. risk uncertainty and financial distress costs) and equity-related adverse selection costs should be lower for larger companies. Larger firms tend to be more familiar to the market, lowering its respective issuing costs because less information search and processing costs are required. On the other hand, the size of the company increases the complexity and analysis, so the larger company might actually be more opaque. Size therefore does

not necessarily translate into a smaller adverse selection problem. We therefore use size of the firm as a control variable, but do not have any a priori expectation about the direction of the effect. The size of the company captures complex interactions between different issuer characteristics.

Second, a firm with good growth opportunities should face reduced debt- and equity-related costs. De Jong and Veld (2001) argue that expectations in the market regarding the profitability of the firm's projects reduce the potential for both the asset substitution problems and adverse selection problems described earlier. We therefore expect that the following hypothesis should hold.

*Hypothesis 6: The market valuation effect is more favourable when the issuing firm has better growth opportunities.*

Finally, we investigate the effect of the stated use of the proceeds. In the offering prospectuses firms describe the purposes, for which the proceeds will be used, such as financing acquisitions, refinancing debt, capital and general expenditures.

### **3 Data and methodology**

#### **3.1 Sample selection**

Our sample consists of convertible bonds that were issued between January 1990 and December 2003 by Canadian companies, which were listed on the Toronto Stock Exchange. During that period there were 184 convertible bond issues in total. We excluded issues made by financial companies (SIC division H - Finance, Insurance and Real Estate) and were left with 136 issues by non-financial companies. Data on announcement dates and other features of the convertible bond issues were obtained from the SDC database and checked against press releases in Lexis-Nexis, Canadian newswires, company web sites and the SEDAR<sup>3</sup> database. For 22 issues in our final sample we have found discrepancies in the announcements dates. In those cases we used the earliest announcement date that we could find. The criteria for an issue to be included in our sample were:

- The announcement date had to be verifiable through a source other than SDC.

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<sup>3</sup>The SEDAR stands for "System for Electronic Document Analysis and Retrieval" and is a service of CSA (Canadian Securities Administration) providing public securities filings. (<http://www.sedar.com/>)

- The issuing firm’s stock price data had to be available in DataStream.
- The issuing firm’s accounting data had to be available in DataStream.
- The announcement should not confound with other corporate announcements.
- The conversion option relates to the equity of the issuing company (no exchangeable bonds).
- The issues of the same issuer had to be sufficiently apart in order for the estimation and even periods for different issuers not to overlap.

Given the criteria, the initial 136 issues by non-financial companies first shrink to 112 due to stock price data availability and further down to 81 issues due to accounting data availability. Of those 81 issues for 10 we could not verify the announcement date, 4 were exchangeable bonds or their conversion price relates to other than the underlying equity, 3 were too close together with the previous issues of the same issuer, causing the overlap, and 4 were joined together with the issues (by the same issuer) announced at the same or the previous day. This means that our final sample consists of 60 bond issues offered by 50 different companies. The breakdown of issues over the years is shown in Table 2 and the breakdown of issues according to industry in Table 3.

*⟨ Insert Table 2 here ⟩*

From Table 2 it appears that 50 percent of the issues in our sample were offered after the end of 1999. This is approximately comparable with the issue year breakdown of all the non-financial companies’ issues (136 of them) in the period, with somewhat better coverage in the sample towards the end of the sample period due to scarce data availability for the beginning of 1990s. Offerings seem to exhibit some bunching, with hot periods being 1993-1994 and the end of 1990s onwards.

*⟨ Insert Table 3 here ⟩*

As far as the industry breakdown is concerned, Table 3 shows that quite a few issues are offered by companies in mining business, followed by communications, i.e. 23.3% and 11.7% respectively. This suggests that companies with potential, but highly risky future growth opportunities, dominate the spectrum of companies that issue convertible bonds, at least in our Canadian sample.

### 3.2 Event study methodology

For measuring (estimating) abnormal returns we employ the market model (Campbell et al. (1997)), which relates the return of any asset to the return of the market portfolio. The model's specification is:

$$R_{it} = \hat{\alpha}_i + \hat{\beta}_i \cdot R_{mt} + \hat{\epsilon}_{it}, \quad (1)$$

with  $E[\epsilon_{it}] = 0$  and  $Var[\epsilon_{it}] = \sigma_{\epsilon_i}^2$ . Abnormal returns are defined as:

$$AR_{it} = \hat{\epsilon}_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i \cdot R_{mt}, \quad (2)$$

where  $R_{it}$  is an actual return on security  $i$  in the time interval  $(t-1, t)$ , defined as  $\ln \frac{P_{it}}{P_{it-1}}$  and  $R_{mt}$  is the return on the market portfolio in the same period.

For the market portfolio we used Standard and Poor's TSX (Toronto Stock Exchange) value-weighted price index, which is widely considered as the benchmark for Canadian equities. It accounts for more than 200 stocks listed on the TSX or about 70% of the total market capitalization. For each of the 60 issues we estimated the parameters of the market model using the stock and market return data of the estimation period between  $t-120$  and  $t-30$  days combined with the post event period between  $t+30$  and  $t+120$  days<sup>4</sup>, where  $t$  denotes the announcement date of the convertible bond issue. Using the parameter estimates, we computed the abnormal returns for all 60 issues. We proceeded by aggregating these abnormal returns over time for different event windows, which range between  $\tau_1$  and  $\tau_2$ , thus obtaining the cumulative abnormal returns (CAR)

$$CAR_i(\tau_1, \tau_2) = \sum_{t=\tau_1}^{\tau_2} AR_{it} \quad (3)$$

and variance

$$Var[CAR_i(\tau_1, \tau_2)] = \sigma_i^2(\tau_1, \tau_2) \quad (4)$$

Aggregating (averaging) across  $N$  events we get:

$$CAR(\tau_1, \tau_2) = \frac{1}{N} \sum_{i=1}^N CAR_i(\tau_1, \tau_2) \quad (5)$$

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<sup>4</sup>We also explored using only pre-issue period for parameter estimations of the market model and the results are virtually the same.

with variance:

$$Var[CAR(\tau_1, \tau_2)] = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(\tau_1, \tau_2) \quad (6)$$

Under the null hypothesis  $H_0$  the distribution of an individual security's CAR is  $CAR_i(\tau_1, \tau_2) \approx N(0, \sigma_i^2(\tau_1, \tau_2))$  and that of the aggregate (average) CAR across N events is  $CAR_i(\tau_1, \tau_2) \approx N(0, \bar{\sigma}^2(\tau_1, \tau_2))$ . For testing the null hypothesis, we use a standard parametric (J1) and a non-parametric (Wilcoxon signed rank) test. J1 is defined as:

$$J_1 = \frac{CAR(\tau_1, \tau_2)}{\sqrt{Var[CAR(\tau_1, \tau_2)]}} \approx N(0, 1) \quad (7)$$

### 3.3 Measure of the size of equity component of convertible debt

As previously shown and used in the literature (see, e.g., Burlacu (2000)) different approaches can be used to determine the size of the equity component embedded in a convertible bond design. Following Burlacu (2000), Lewis et al. (2003) and Dutordoir and Van de Gucht (2004), we estimate the structure of the convertible debt design (i.e. how debt- or equity like it is) by employing the delta measure. Delta measures the sensitivity of the convertible bond value with respect to the value of the underlying equity (stock price). Under standard Black-Scholes assumptions for the probability of conversion (option being in-the-money), the delta measure is computed as:

$$\Delta = e^{-\delta t} \cdot N\left(\frac{\ln\frac{S}{X} + (r - \delta + \frac{\sigma^2}{2}) \cdot T}{\sigma \cdot \sqrt{T}}\right) \quad (8)$$

S is the current price of the underlying stock, X is the conversion price,  $\delta$  is the continuously compounded dividend yield, r is the continuously compounded yield on a selected "risk-free" bond,  $\sigma$  is the annualized stock return volatility, T is the initial maturity of the bond and N(.) is cumulative normal probability distribution. The delta measure always takes value between 0 and 1. Values closer to 1 indicate a high sensitivity of the convertible bond value to the underlying equity (stock) value, implying a high probability of conversion.

Given the fact that the average maturity of the convertible bonds in the sample is around 8 years and the median around 7 years (see Table 6), we use the yield on a 10-year Canadian government benchmark bond as the "risk free" rate. This is an adequate approximation, especially given the fact

that differences between 5, 7 and 10 year yields are extremely small<sup>5</sup>. For the stock price volatility measure we use the volatility of stock returns over the period (-200,-60) relative to the announcement date of the offering.

In order to differentiate between equity and debt like convertibles we use a delta cut-off value of 0.5. We will denote the subsample with a delta smaller than 0.5 as more debt-like, while the subsample with a delta greater than (or equal) 0.5 will be referred to as the more equity-like sample. For comparison, Burlacu (2000) denotes convertibles with delta values below 0.33 as debt like and those with delta values above 0.66 as equity like. Lewis et al. (2003) use cut-off values for delta of 0.4 and 0.6 for classifying bonds as either debt or equity like. Dutordoir and Van de Gucht (2004) use the median delta value as a split for this classification.

## 4 Results and Analysis

### 4.1 Wealth effects associated with the announcement dates of Convertible Debt Offerings

In Tables 4 and 5 we present the Cumulative Abnormal Returns (CAR) and tests for Hypothesis 1 regarding the negative wealth effects associated with the announcements of the convertible debt offerings.

*⟨ Insert Table 4 here ⟩*

It appears from Panel A of Table 4 that the CARs are significantly negative over different event windows for the total sample. The size of the effect for the event window (-1,0) is -1.4% and is in line with the results from previous studies (see Table 1), in particular those for the U.S. market. The Panels B and C of Table 4 report the CAR for the subsamples with a delta measure smaller than 0.5 and greater than 0.5 respectively. Although statistically insignificant, the wealth effect in the event window (0,1) is more negative for more equity-like convertible bonds than for more debt-like, i.e. -5.105% versus -2.480% respectively.

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<sup>5</sup>They have been inspected, but we do not report them in the paper.

*⟨ Insert Table 5 here ⟩*

The non-parametric test results presented in Table 5 confirm the findings in Panel A of Table 4. The Wilcoxon signed rank test, which tests the difference in sums of ranks of the mean adjusted CAR above and below medium, gives significant differences. A similar result is obtained from the simple binomial sign test. Note that prior to the announcement of the convertible debt offering in the event window  $(-30,-2)$  there is a significant positive cumulative abnormal return of 1.611% for more equity-like convertibles and 8.797% for more debt-like convertibles. This suggests that issuers try to time their announcements after periods of favorable stock price movements. It also suggests that the market is more likely to perceive the issuers as overvalued at the announcements of the convertible debt offerings in our sample given the prior streak of positive abnormal returns, and therefore react more negatively to the announcement. In this respect it is rather surprising that the pre-announcement abnormal returns are higher for debt-like issues than for equity-like issues.

*⟨ Insert Figure 1 here ⟩*

Figure 1 shows the evolution of the CARs over the event window  $(-15, 15)$  for the total sample as well as for the two subsamples with a delta measure above or below 0.5. A striking result is that the wealth effect continues to grow negatively after the announcement date. For the total sample, we find a CAR of -1.40% over the event window  $(-1,0)$ , while over the event window  $(-1,2)$  the CAR drops to -4.28% and continues to fall to -4.99% over the event window  $(-1,10)$ . From the analysis of the two subsamples it appears that the more debt-like convertible issues (delta below 0.5) experience negative abnormal returns somewhat prior to the announcement, i.e. -1.63% over the event window  $(-1,0)$ , and this stabilizes after the announcement of the offering around -2.70%. Conversely, the more equity-like convertible issues (delta above 0.5) also exhibit a negative abnormal return reaction prior to the issue announcement (-1.25%), but this becomes more negative afterwards by decreasing to -4.79% over the event window  $(-1,2)$  and further decreases to even -6.10% over the event window  $(-1,10)$ .

Arshanapalli et al. (2004) mention that in the U.S. up to 70 percent of the issues of convertible bonds are bought by hedge funds. Kang and Lee (1996) and Ammann et al. (2003) provide some evidence that convertible bonds tend to be underpriced. Hedge funds therefore potentially engage in

profitable strategies (see for example Arshanapalli et al. (2004)) of convertible arbitrage, where they take long positions in the convertible bonds and short positions in the underlying stock. In order to examine whether arbitrage strategies of hedge funds (or other kinds of investors) potentially affect the wealth effects of convertible bonds issues, we also examine the wealth effect associated with the issue date of the bond.

## 4.2 Inspection of the wealth effects associated with the issue date

In Figure 2 we show the evolution of the CAR's around the actual issue date of the convertible bonds for the total sample as well as the two subsamples with a delta below or above 0.5. Note that the time between the announcement date and the issue date is different among issues, but in general it is between 15 to 20 days.

*⟨ Insert Figure 2 here ⟩*

As observed in Figure 2 there is a difference in the market reaction to more debt- versus equity-like convertible debt issues starting from the announcement date onwards. For the issues with a delta measure greater than 0.5, denoted as the equity-like issues, the CAR is equal to -8.67% over the event window (-10,0) and this drops even further to -12.24% over the event window (-10,5). This indicates that the equity-like issues are characterized by a constant downward pressure on the stock price (and therefore abnormal returns) between the announcement date and up to five days after the issue date. For the issues with a delta smaller than 0.5, denoted as the debt-like issues, the wealth effect is much smaller. The CAR is equal to -2.57% over the event window (-10,0), and decreases to -4.24% for the event window (-10,5). Apparently, the debt-like issues are less plagued with a downward pressure on the stock price. Our explanation for this finding is related to the potential investors in the convertible bonds.

The actions by hedge funds following a convertible arbitrage strategy might explain the observed constant downward pressure on the stock price. Most convertible arbitrage strategies are implemented by combining a long position in the convertible and a short position in the underlying stock. The key parameter in this strategy is the delta which measures the bond's price sensitivity to movements in the share price. A long position in a convertible bond can therefore be hedged by selling short

delta shares. Note that the difference between more debt-like and equity-like convertible issues can be attributed to the size of the equity component. If the equity component is large, as is the case with more equity-like convertibles, relatively more stock has to be sold short and therefore the longer and larger the downward pressure on the stock price<sup>6</sup> as opposed to more debt-like convertibles, where relatively less stock has to be sold short due to a smaller equity component.

### 4.3 Inspection of Issue and Issuer characteristics

In order to explore the characteristics of the issues and the issuing companies we examine some descriptive statistics for the total sample and the two subsamples according to the delta measure. Selected descriptive statistics are presented in Table 6.

*⟨ Insert Table 6 here ⟩*

From Table 6 it appears that the more debt-like convertible issues (panel C) have significantly<sup>7</sup> higher conversion premiums (ratio between conversion price and stock price at the announcement date of the issue) and shorter maturities than more equity-like convertibles (panel B), i.e. a conversion premium of 1.479 versus 1.225, and a maturity of 5.308 years versus 9.753 years. The higher conversion premium and the shorter maturity imply a lower probability that the call option incorporated in the convertible bond will be exercised, such that bondholders would convert the bond into equity.

A difference of 0.24 between the Q ratios of equity-like and debt-like issues indicate that more equity-like convertible issues have somewhat better growth opportunities. This higher Q ratio is accompanied with more risk, as indicated by a higher volatility of respectively 27.1% versus 19.3% (annually). Note that issuers of equity-like convertibles are characterized as those that might have wanted to issue equity, but due to adverse selection and agency problems this would have been too costly or impossible.

Although the difference is not statistically significant<sup>8</sup> this is in line with some of the motives for convertible debt issue (Stein (1992) and Mayers (1998)), since they are used as a signaling and

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<sup>6</sup>Unfortunately we do not have data available on the kind of investors in Canadian convertible bonds.

<sup>7</sup>Significance not reported in the table.

<sup>8</sup>Note that due to low sample size and even lower subsample sizes standard errors of mean are quite large.

commitment device. Although the difference is not statistically significant, the level of slack is on average higher for equity-like convertibles (9.4% of total assets versus 6.4% of total assets for debt-like issuers). At the first glance this is somewhat surprising given the higher Q values that signal better future growth (and investment) opportunities. But given the adverse selection problems as Lucas and McDonald (1990) point out, when it is costly for high-growth / high-risk firms to obtain external finance, it is reasonable to expect that these firm would want to maintain a certain higher level of internal funds for investment options that turn to be valuable, but on the other hand agency reasons make slack costly. For estimating the impact of slack on the size of the wealth effect we have to explore it together with other variables that affect the valuation at convertible offering announcements.

As already shown in the previous section, both types of issuers experience significant positive abnormal returns, which are higher for debt-like issuers. The same conclusion can be inferred from Table 6, given that stock price run-up over the period (-60,-1) day prior to the announcement is larger by 7.4 percentage points for debt-like issuers (albeit the difference is not significant). Both types of issuers seem to have similar leverage on average (0.230 for equity-like and 0.206 for debt-like).

#### **4.4 Cross sectional analysis of determinants of the size of the wealth effect**

In order to examine the impact on the size of the wealth effect due to the implicit design of convertibles (e.g. delta) and the issuer characteristics associated with debt- and equity-related costs, we perform a number of cross sectional regressions. In all the models we consider, the dependent variable is the announcement date abnormal return. Following De Roon and Veld (1998) we estimated cross sectional regressions by using Weighted Least Squares, given that simple OLS would yield inefficient parameter estimates due to heteroskedasticity caused by variance of idiosyncratic risk.

*< Insert Table 7 here >*

In the first specification we test our hypotheses regarding the effects of debt-related costs (hypotheses 3a and 3b), equity related costs (hypotheses 4a and 4b), the effect of tax burden (hypothesis 5) and the mitigating effect of growth opportunities (hypothesis 6) for the total sample of convertible debt issues over the period 1990 - 2003.

For debt-related cost proxies we use variables that capture leverage (debt over total assets) and annualized stock return volatility as measured over the window (-200, -60) relative to the announcement date (SPVOL). For equity-related cost proxies we use the level of slack (SLACK=cash and equivalents over total assets) and cumulative raw stock price run-up, measured over the window (-60, -1) relative to the announcement date (SPRUN). For the tax burden proxy we use a simple measure of income tax over total assets. Growth opportunities are measured as the Tobin's Q ratio, defined as the sum of total assets and market value of equity, less book value of equity, divided by total assets (MB). As the control variable we employ the natural log of firm size (LNSIZE). Based on the results of the first regression specification in the Table 7<sup>9</sup> we only find support for hypothesis 4b, namely that market valuation is worse for the issuers with more financial slack (coefficient of -0.1320).

Note that such an analysis for the total sample is not the most appropriate, since the design of the convertible has to be taken into account as we argued in Section 2.2. We therefore also estimate the second specification in Table 7, where we include control for implicit issue characteristic by adding the delta measure as an explanatory variable. The delta measure reflects how debt- or equity-like the convertible issue is, and therefore it captures the issue characteristics comprehensively. Since a value of delta closer to 1 indicates a more equity-like convertible issue, we expect to find a negative relationship between the size of the wealth effect and the value of delta.

The results of the second specification in Table 7 maintain support for our hypothesis 4b regarding the effect of financial slack on the valuation, but also give support to the mitigating effect of growth opportunities (significant positive regression coefficient for Q variable of 0.0102). A significant negative effect of the issue characteristics measured by delta is in line with expectations, since the higher the delta, the more equity-like the issue is and therefore the more negative the abnormal return is. The results therefore suggest that only equity-related cost (slack) and future growth opportunities significantly affect the size of the wealth effect. This is however due to the fact that most of the issues in our sample are more equity- than debt-like. In order to test hypotheses related to impact of debt-related and equity-related costs on the size of wealth effects we estimate the regressions separately for two subsamples split according to implicit issue characteristics (delta).

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<sup>9</sup>Note that number of observations is less than 60 (initial sample) due to missing accounting items or delta measures for some issues.

*⟨ Insert Table 8 here ⟩*

In Panel B of Table 8 we present the estimation results of these two specifications, without dummies for the proceeds, for the two subsamples split by the cut-off value of 0.5 for the delta measure. Note that convertible issues with a value of delta below 0.5 are denoted as more debt-like, while those with a value of delta above 0.5 as more equity-like. We expect that debt-related costs will have a significant impact for more debt-like convertibles and equity-related costs a significant impact for more equity-like convertibles. As the results in Panel B of Table 8 show, stock price volatility as a proxy for risk of the company has a significant negative impact for debt-like convertibles (coefficient of -0.1912), yielding support for hypothesis 3a. We find support for the positive effect of the tax burden (hypothesis 5) on the valuation (coefficient of 1.2431), as firms with a higher tax burden are likely to benefit more from the tax shield provided by the convertible debt. Somewhat surprisingly we find a significant negative effect of the firm size (coefficient of -0.0285). As stated earlier, firm size might not only mitigate adverse selection and agency problems, but could actually make them more acute, since the opaqueness increases with the size. For more equity-like convertibles (delta above 0.5) we find a significant negative effect of equity-related costs (coefficient of -0.1351), proxied for by slack (support for hypothesis 4b), that is mitigated by a positive effect of future growth opportunities (coefficient of 0.0116). In support of the tax motivation for the use of convertible debt suggested by Jalan and Barone-Adesi (1995) we find a significant positive effect of the tax burden (coefficient of 0.2519), which is less than in the case of debt-like convertibles.

As argued by De Jong and Veld (2001), the profitability of the projects reduce the potential for asset substitution problems and adverse selection. In order to examine the effect of the stated use of the proceeds of the convertible issue on the wealth effect, we estimate a number of specifications where we include dummy variables for Merger and Acquisitions (MandA), Refinancing, and Capital Expenditure (CAPX) or General Expenditure (GENX)<sup>10</sup>. In panel A of Table 8 we present the estimation results of the specifications with dummies for the proceeds for the total sample of convertible debt issues over the period 1990 - 2003.

It appears from panel A of the Table 8 that in case the stated use of the convertible issue proceeds are capital and general expenditures, we find a significant impact on the abnormal returns, while

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<sup>10</sup>If issuers stated more potential uses of proceeds we recorded the first use stated as predominant.

mergers and acquisitions or refinancing does not significantly affect the size of abnormal returns. This significant positive effect (coefficient of 0.0169) is supported by McConnell and Muscarella (1985), who document significant positive abnormal returns at the announcements of increases in planned capital expenditures.

Finally, in Panel C of Table 8 we present the estimation results of two specifications, without dummies for the proceeds, for two subsamples split by the year of issue (before and including 1999 or after). The table shows significant effects of debt- and equity-related costs, as well as size only for the issues after 1999. More careful inspection of the sample reveals that this is due to very little variations in the convertible bond design before and including 1999, when most of the issues had a high delta and were more equity-like.

In general our results suggest that debt- and equity-related costs negatively affect the size of the wealth effects associated with the announcements of convertible debt offerings, in particular if issues are split according to its design characteristics (either more debt- or equity-like). We also find that future growth opportunities mitigate the impact of these costs. In addition we find support for tax motivations for the use of convertible debt (either debt- or equity-like) as well as support for the previously documented positive effect of increased capital and general expenditures.

## 5 Conclusion

In this paper we analyze the size and determinants of wealth effects associated with the announcements of convertible debt offerings on the Canadian market in the period between 1990 and 2003. To our knowledge this is the first study conducted for the Canadian market. Similarly to previous research for other markets, in particular U.S., we find a significant negative wealth effect associated with the announcement date of convertible debt offerings. We also find support for the hypotheses related to the negative impact of debt- and equity-related costs on the size of the wealth effect, which are being mitigated by future growth opportunities. In particular, we find that the determinants of the size of the wealth effects reflect the hybrid nature of convertible debt. With respect to that we find evidence that it can be structured to be either more debt- or equity-like, although most of the issues in our sample are more equity-like (this in turn can be interpreted as favouring Stein's (1992) delayed equity hypothesis and Mayers' (1998) sequential financing hypothesis). Existence of debt-like

convertibles and the effect of the riskiness of the issuer on the valuation gives some (albeit not direct) support to risk estimation (Brennan and Kraus (1987) and Brennan and Schwartz (1988)) and risk shifting (Green (1984)) motivations for the use of convertible debt. In addition, we interpret the results relating to the effect of the tax burden as support for the tax motive behind the use of convertible debt as suggested by Jalan and Barone-Adesi (1995). In support to McConnell and Muscarella (1985) we find a significant positive valuation effect when the proceeds from the convertible debt offering are stated to be used for capital and general expenditure. Finally, we investigated the wealth effects associated with the issue dates of convertible offerings and provide some preliminary and intuitive (albeit not conclusive) explanations for the difference in the market response to debt-like versus equity-like convertibles. This explanation is based on the convertible arbitrage by the hedge funds, which at least in the U.S. seem to be important investors in convertible securities.

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Table 1: Previous studies on wealth effects of convertible debt announcements. CAR denotes cumulative abnormal return.

Study	Period	Sample size	CAAR (-1,0) (%)	CAAR (0,1) (%)
<b>U.S. domestic market</b>				
Dann and Mikkelson (1984)	1970-1979	132	-2.31	***
Mikkelson and Partch (1986)	1972-1982	33	-1.97	***
Eckbo (1986)	1964-1981	75	-1.25	***
Hansen and Crutchley (1990)	1975-1982	67	-1.45	***
Long and Seftick (1990)	1965-1984	134	-0.61	***
Billingsley, Lamy and Smith (1990)	1971-1986	104	-2.04	***
Kim and Stulz (1992)	1970-1984	259	-1.66	***
Davidson, Glascock and Scharz (1995)	1980-1985	146	-1.40	***
Jen, Choi and Lee (1997)	1976-1985	158	-2.15	***
Lewis, Rogalski and Seward (1999)	1977-1984	203	-1.51	**
Lewis, Rogalski and Seward (2003)	1978-1992	588	-1.09	NA
Arshanpalli, Fabozzi, Switzer and Gosselin (2004)	1993-2001	229	-3.07	***
<b>Japanese domestic market</b>				
Kang and Stulz (1996)	1985-1991	561	0.83	***
Christensen, Faria, Kwok and Bremer (1996)	1984-1991	35	0.60	-
<b>Taiwanese market</b>				
Chang, Chen and Liu (2004)	1990-1999	109	0.42	-
<b>Australian market</b>				
Magennis, Watts and Wright (1998)	1986-1995	45	-1.08	**
<b>Dutch market</b>				
de Roon and Veld (1998)	1976-1996	47	0.63	**
<b>UK market</b>				
Abhyankar and Dunning (1999)	1982-1996	129	-1.20	***
<b>French market</b>				
Burlacu (2000)	1981-1998	141	-0.20	***
<b>Western European markets</b>				
Dutordoir and Van de Gucht (2004)	1990-2002	222	-1.18	***
<b>German and Swiss markets</b>				
Amman, Fehr and Seiz (2004)	1996-2003	55	-0.18	**

\*\*\* - denotes significance at 1% level

\*\* - denotes significance at 5% level

NA - not reported

Table 2: Breakdown of convertible debt issues according to year of the issue

Year	Frequency	Percent
2003	11	17.5
2002	9	14.3
2001	7	11.1
2000	3	4.8
1999	6	9.5
1998	2	3.2
1997	3	6.3
1996	1	1.6
1995	2	3.2
1994	7	11.1
1993	3	7.9
1992	2	3.2
1991	3	4.8
1990	1	1.6
<b>Total</b>	<b>60</b>	<b>100.0</b>

Table 3: Breakdown of convertible debt issues according to issuer's industry

SIC	Description	Frequency	Percent
01	Agricultural Production Crops	1	1.7%
10	Metal Mining	14	23.3%
12	Coal Mining	1	1.7%
13	Oil and Gas extraction	3	5.0%
20	Food and Kindered Products	1	1.7%
22	Textile Mill Products	1	1.7%
26	Paper and Allied Products	2	3.3%
27	Printing, Publishing and Allied Industries	1	1.7%
28	Chemicals and Allied Products	3	5.0%
33	Primary Metal Industries	3	5.0%
34	Fabricated Metal Products, Except Machinery And Trans. Equip.	1	1.7%
36	Electronic And Other Electrical Equipment And Components	4	6.7%
37	Transportation Equipment	5	8.3%
40	Railroad Transportation	1	1.7%
46	Pipelines, except Natural Gas	1	1.7%
47	Transportation Services	1	1.7%
48	Communications	7	11.7%
50	Wholesale Trade - durable Goods	1	1.7%
51	Wholesale Trade- non-durable Goods	1	1.7%
53	General Merchandise Stores	2	3.3%
56	Apparel and Accesory Stores	1	1.7%
70	Hotels, Rooming Houses, Camps, And Other Lodging Places	2	3.3%
79	Amusement and Recreation Services	3	5.0%
	<b>Total</b>	<b>60</b>	<b>100.0%</b>

Table 4: Cumulative Abnormal Returns (CAR) for different event windows Under the null hypothesis CAR equals 0. \*\*\* - denotes significance at below 1% level

CAR window	Panel A - Total Sample		Panel B - delta above 0.5		Panel C - delta below 0.5		Panel B - Panel C diff.	p-value
	CAR	J1 stat.	CAR	J1 stat.	CAR	J1 stat.		
-30	3.277%	8.36	1.611%	3.64	8.797%	8.41	-7.186%	0.0935
-1	-1.402%	-3.87	-1.250%	-2.83	-1.630%	-2.02	0.380%	0.8085
-1	-3.949%	-8.12	-4.223%	-6.86	-3.055%	-3.46	-1.167%	0.5288
-1	-4.279%	-9.26	-4.791%	-8.16	-3.282%	-4.09	-1.509%	0.4383
0	-4.357%	-10.13	-5.105%	-9.41	-2.480%	-2.95	-2.625%	0.1337
0	-4.688%	-11.08	-5.673%	-10.56	-2.706%	-3.60	-2.967%	0.1427

Table 5: Non-parametric test for Cumulative Abnormal Returns (CAR) for different event windows

CAR window	Total Sample			
	Wilcoxon signed rank	p-value	Positive	Negative
-30	-2	1.90	37	23
-1	0	0.0580	21	39
-1	1	0.0070	13	47
-1	2	0.0000	14	46
0	1	0.0000	13	47
0	2	0.0000	13	47

Table 6: Descriptive statistics for issue and issuer characteristics for total sample, subsample with  $\delta < 0.5$  and subsample with  $\delta > 0.5$

Leverage is computed as the ratio between total debt and total assets. SPVOL is annualized stock returns volatility estimated over the window  $(-200, -60)$  relative to the announcement date. SLACK is the ratio of cash and equivalents over total assets. SPRUN is the cumulative raw stock return measured over the window  $(-60, -1)$  relative to the announcement date. Q is a Tobin's Q ratio measured as  $(\text{total assets} + \text{market value of equity measured as average between } (-15, -5) \text{ days relative to the announcement date} - \text{book value of equity}) / \text{total assets}$ . TAX is the ratio of income tax over total assets. LNSIZE is the natural logarithm of total assets. DELTA is the measure of sensitivity of the value of convertible bond with respect to underlying equity (see equation 8). CPREM is conversion premium as ratio between conversion price and stock price at the announcement date. MAT is initial maturity of the issue in years.

Panel A: Total sample						
	Mean	Median	Maximum	Minimum	Std. Dev.	N
<b>LEVERAGE</b>	0.233	0.183	1.247	0.000	0.218	60
<b>SPVOL</b>	0.255	0.211	0.687	0.074	0.150	60
<b>SLACK</b>	0.094	0.069	0.612	0.000	0.109	60
<b>SPRUN</b>	0.035	0.036	0.898	-0.572	0.238	60
<b>TAX</b>	0.006	0.003	0.056	-0.075	0.024	59
<b>Q</b>	1.630	1.325	6.795	0.413	1.229	60
<b>LNSIZE</b>	13.910	14.039	17.957	10.245	1.596	60
<b>DELTA</b>	0.644	0.715	1.000	0.000	0.274	55
<b>CPREM</b>	1.277	1.197	2.804	1.000	0.341	56
<b>MAT</b>	8.651	7.005	49.055	0.252	7.653	60

Panel B: Delta>0.5						
	Mean	Median	Maximum	Minimum	Std. Dev.	N
<b>LEVERAGE</b>	0.230	0.165	1.247	0.000	0.243	43
<b>SPVOL</b>	0.271	0.231	0.687	0.074	0.159	43
<b>SLACK</b>	0.104	0.070	0.612	0.000	0.121	43
<b>SPRUN</b>	0.029	0.036	0.898	-0.572	0.257	43
<b>TAX</b>	0.007	0.002	0.056	-0.075	0.023	42
<b>Q</b>	1.770	1.411	6.795	0.413	1.361	43
<b>LNSIZE</b>	13.757	13.735	17.957	10.245	1.631	43
<b>DELTA</b>	0.765	0.787	1.000	0.527	0.134	43
<b>CPREM</b>	1.225	1.197	2.572	1.000	0.238	43
<b>MAT</b>	9.753	7.016	49.055	3.003	8.277	43

Panel C: Delta<0.5						
	Mean	Median	Maximum	Minimum	Std. Dev.	N
<b>LEVERAGE</b>	0.206	0.176	0.463	0.000	0.149	12
<b>SPVOL</b>	0.193	0.176	0.359	0.079	0.084	12
<b>SLACK</b>	0.063	0.034	0.198	0.000	0.070	12
<b>SPRUN</b>	0.103	0.094	0.417	-0.259	0.177	12
<b>TAX</b>	0.002	0.007	0.028	-0.051	0.026	12
<b>Q</b>	1.324	1.008	3.726	0.621	0.845	12
<b>LNSIZE</b>	14.150	13.993	17.299	11.340	1.747	12
<b>DELTA</b>	0.212	0.217	0.492	0.000	0.194	12
<b>CPREM</b>	1.479	1.214	2.804	1.001	0.552	12
<b>MAT</b>	5.308	5.052	20.989	0.252	5.415	12

Table 7: WLS regressions of abnormal returns at the announcement date on issue and issuer characteristics

Dependent variable is abnormal return at the announcement date of convertible debt offering. Leverage is computed as ratio between total debt and total assets. SPVOL is annualized stock returns volatility estimated over the window (-200, -60) relative to the announcement date. SLACK is the ratio of cash and equivalents over total assets. SPRUN is the cumulative raw stock return measured over the window (-60,-1) relative to the announcement date. Q is a Tobin's Q ratio measured as (total assets+market value of equity measured as average between (-15,-5) days relative to the announcement date-book value of equity) over total assets. TAX is the ratio of income tax over total assets. LNSIZE is the natural logarithm of total assets. DELTA is the measure of sensitivity of the value of convertible bond with respect to underlying equity (see Equation 8). All the standard errors are White heteroskedasticity corrected and weights used in WLS regression are inverses of standard deviations of market model residuals.

	1			2		
	Coeff.	t-stat		Coeff.	t-stat	
Const.	-0.0022	-0.03		-0.0149	-0.21	
LEVERAGE	-0.0089	-0.37		-0.0085	-0.36	
SPVOL	-0.0480	-1.27		-0.0300	-0.65	
SLACK	<b>-0.1320</b>	<b>-2.05</b>	**	<b>-0.1383</b>	<b>-2.20</b>	**
SPRUN	-0.0198	-0.75		-0.0272	-0.97	
Q	0.0081	1.55		<b>0.0102</b>	<b>1.80</b>	*
TAX	0.1748	1.45		0.1579	1.37	
LNSIZE	-0.0002	-0.06		0.0015	0.34	
DELTA				<b>-0.0312</b>	<b>-2.58</b>	**
N		59			54	
Adj. $R^2$		0.040			0.130	

Table 8: WLS regressions of abnormal returns at the announcement date of convertible debt offering on issue and issuer characteristics for split samples

Dependent variable is abnormal return at the announcement date of convertible debt offering. Leverage is computed as ratio between total debt and total assets. SPVOL is annualized stock returns volatility estimated over the window (-200, -60) relative to the announcement date. SLACK is the ratio of cash and equivalents over total assets. SPRUN is the cumulative raw stock return measured over the window (-60,-1) relative to the announcement date. Q is a Tobin's Q ratio measured as (total assets+market value of equity measured as average between (-15,-5) days relative to the announcement date-book value of equity) over total assets. TAX is the ratio of income tax over total assets. LNSIZE is the natural logarithm of total assets. DELTA is the measure of sensitivity of the value of convertible bond with respect to underlying equity (see Equation 8). All the standard errors are White heteroskedasticity corrected and weights used in WLS regression are inverses of standard deviations of market model residuals.

Panel A: Stated use of proceeds split

	M&A			REF			CAPX and GENX		
	Coeff.	t-stat		Coeff.	t-stat		Coeff.	t-stat	
C	-0.0163	-0.25		-0.0021	-0.03		0.0084	0.12	
LEVERAGE	-0.0077	-0.32		-0.0124	-0.52		-0.0240	-1.07	
SPVOL	-0.0153	-0.30		-0.0366	-0.78		-0.0554	-1.20	
SLACK	<b>-0.1331</b>	<b>-2.31</b>	<b>***</b>	<b>-0.1185</b>	<b>-1.86</b>	<b>*</b>	<b>-0.1135</b>	<b>-1.86</b>	<b>*</b>
SPRUN	0.0035	0.10		0.0036	0.11		-0.0023	-0.06	
Q	0.0081	1.57		0.0074	1.42		0.0079	1.53	
LNSIZE	0.0532	0.38		0.1492	1.24		0.1224	1.05	
TAX	0.0005	0.12		0.0007	0.17		0.0003	0.06	
DELTA	-0.0139	-1.13		<b>-0.0239</b>	<b>-1.87</b>	<b>*</b>	<b>-0.0305</b>	<b>-2.35</b>	<b>**</b>
D_MA	0.0202	1.56							
D_REF				-0.0063	-0.59				
D_CGX							<b>0.0169</b>	<b>2.05</b>	<b>**</b>
N		54			54			54	
Adj. R <sup>2</sup>		0.148			0.069			0.111	

Panel B: Delta split

	Delta<0.5			Delta>0.5		
	Coeff.	t-stat		Coeff.	t-stat	
Const.	<b>0.4467</b>	<b>3.55</b>	<b>**</b>	-0.1110	-1.35	
LEVERAGE	-0.1020	-1.71		-0.0180	-0.64	
SPVOL	<b>-0.1912</b>	<b>-2.09</b>	<b>*</b>	-0.0070	-0.13	
SLACK	-0.1400	-1.08		<b>-0.1351</b>	<b>-1.97</b>	<b>*</b>
SPRUN	0.0594	1.32		-0.0063	-0.16	
Q	0.0041	0.36		<b>0.0116</b>	<b>2.18</b>	<b>**</b>
TAX	<b>1.2431</b>	<b>3.01</b>	<b>**</b>	<b>0.2519</b>	<b>1.97</b>	<b>*</b>
LNSIZE	<b>-0.0285</b>	<b>-2.80</b>	<b>**</b>	0.0063	1.28	
N		12			42	
Adj. R <sup>2</sup>		0.371			0.145	

Panel C: Year split

	Year<=1999		Year>1999		
	Coeff.	t-stat	Coeff.	t-stat	
Const.	-0.1025	-1.12	<b>0.1905</b>	<b>1.91</b>	<b>*</b>
LEVERAGE	0.0251	0.86	<b>-0.0541</b>	<b>-1.69</b>	<b>*</b>
SPVOL	0.0341	0.42	<b>-0.1628</b>	<b>-2.47</b>	<b>**</b>
SLACK	-0.0169	-0.26	<b>-0.2662</b>	<b>-3.11</b>	<b>***</b>
SPRUN	-0.0292	-0.46	0.0374	0.76	
Q	0.0047	0.87	0.0097	1.34	
TAX	0.3470	1.15	0.2340	0.90	
LNSIZE	0.0050	0.81	<b>-0.0121</b>	<b>-1.79</b>	<b>*</b>
DELTA	-0.0122	-0.75	0.0395	1.14	
N		25		29	
Adj. R <sup>2</sup>		-0.030		0.350	

Figure 1: Cumulative Abnormal Returns for the total and two subsamples over the event window (-15, 15)

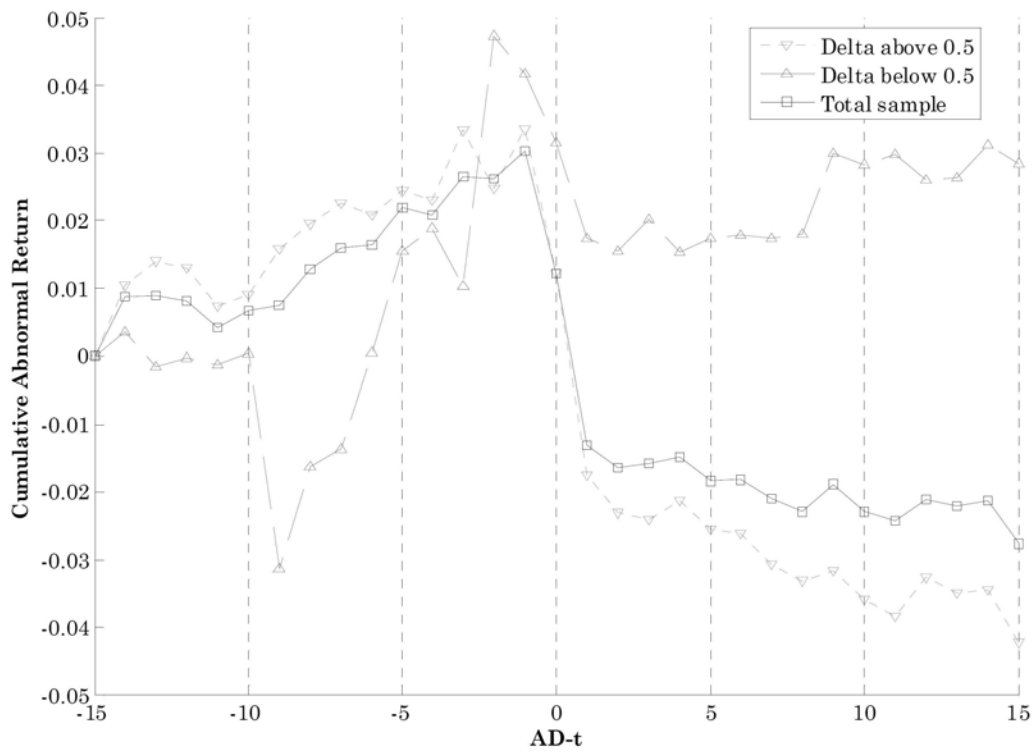


Figure 2: Cumulative Abnormal Returns around the issue date of convertible bonds for the total and two subsamples over the event window  $(-25, 25)$

