

The Rise and Demise of the Convertible Arbitrage Strategy

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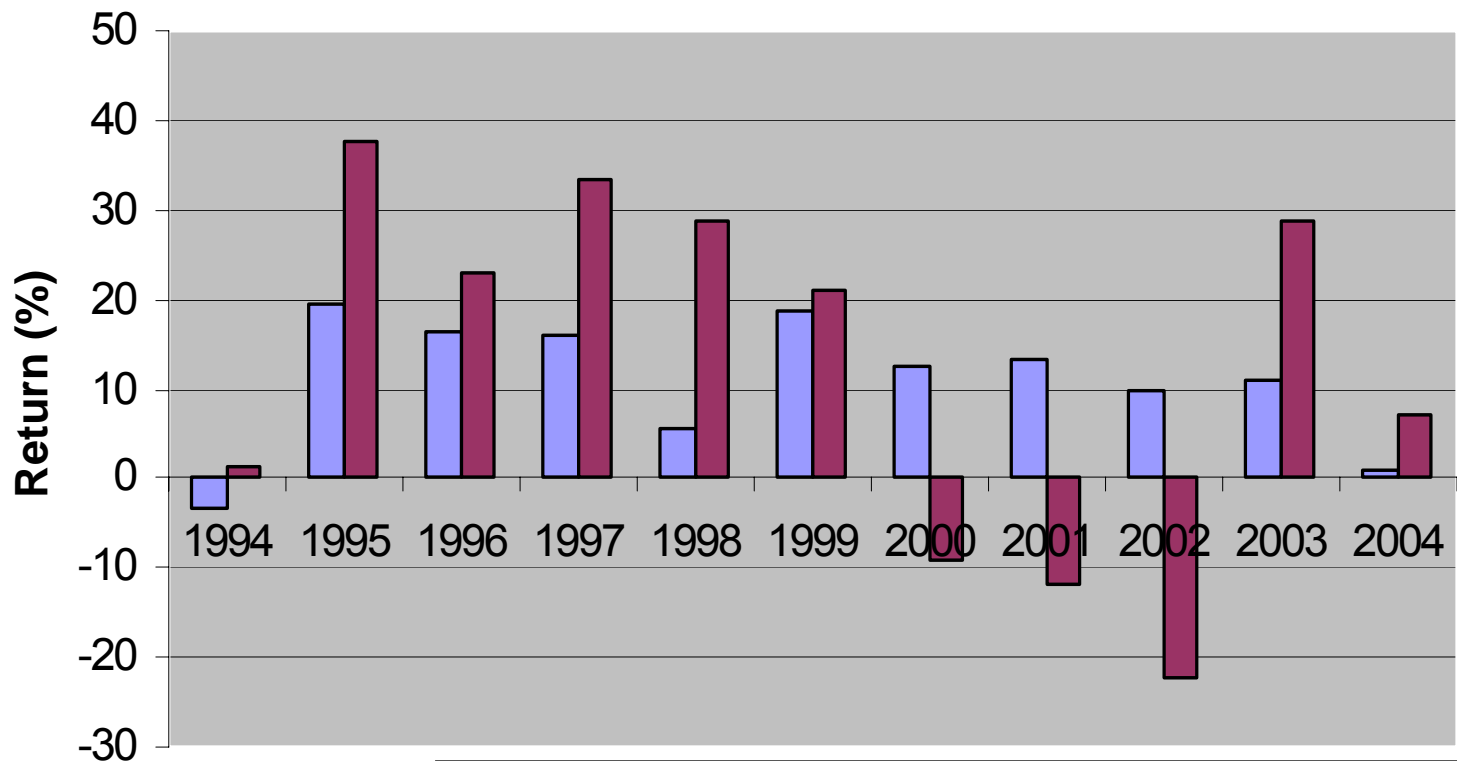
Aim of the Paper

- Identify Convertible Arbitrage Activities by Hedge Funds (for the Canadian Market)
- Document indirect evidence for Convertible Bond Arbitrage
- Determine the consequences for the capital markets

Outline

- Introduction
 - What is Convertible Arbitrage?
- Related Literature
- Data and Sample Selection
- Wealth Effects
- Determinants of Convertible Arbitrage Returns
 - Underpricing of Convertibles at issuance
 - Development of Short Positions around issuances dates
- Conclusion

Annual Returns Convertible Arbitrage



■ Convertible Arbitrage

■ S&P 500

Convertible bonds (convertibles)

- A convertible bond is a bond that, at the option of the holder, can be exchanged into shares of the issuing company
- Example, General Motors, 2003
 - Bonds with 6.25% coupon
 - Maturity date: choice between \$ 1,000 or 21 shares of GM
 - Conversion price: $1,000/21 = \$ 47.61$

Convertible arbitrage

- Convertible Arbitrage (CA): profit from (perceived) convertible underpricing, by taking a long position in a convertible and a short position in the underlying stock
- Option pricing theory (Black/Scholes, 1973): a long position in a call option and a short position in delta ($\delta C / \delta S$) underlying shares gives a (temporarily) risk-free position

Cash flows of the strategy

- Cash inflows from coupon payments
- Cash inflows from the short interest credit on the short stock account
- Cash outflows in the form of dividend payments on shorted stock
- If convertibles are underpriced: additional potential for arbitrage profits
 - If convertibles become more equity-like ($S \uparrow$), more stock needs to be shorted to maintain the neutral hedge ratio

Related Literature

- **Valuation Studies:**
 - Structural approach: debt is viewed as an option on the firm's assets (Brennan and Schwartz (JFQA, 1980))
 - Reduced-form approach: convertible bond value can be modeled as a function of the stock price (e.g. Tsiveriotis and Fernandes (JFI, 1998))
 - Split CB in straight debt and equity part
 - Advantage: allows for inclusion of call, put and conversion features
- **Underpricing Studies**
 - e.g. Ammann, Kind, and Wilde JBF 2003, Chan and Chen, WP 2005
- **Convertible Arbitrage Studies:**
 - Agarwal, Fung, Loon and Naik (wp, 2007)
 - Choi, Getmansky, Tookes (wp, 2007)

Data and sample selection

- Canadian market: 1998-2004
- Issues and characteristics
 - SDC New Issues database
 - Prospectuses of issuers (SEDAR)
- Datastream
 - Stock and (convertible) bond prices
 - Government bond yields
 - Dividends
 - Number of shares outstanding
- Short sales: TSX (Ventures)
- Final sample: 61 CB issues

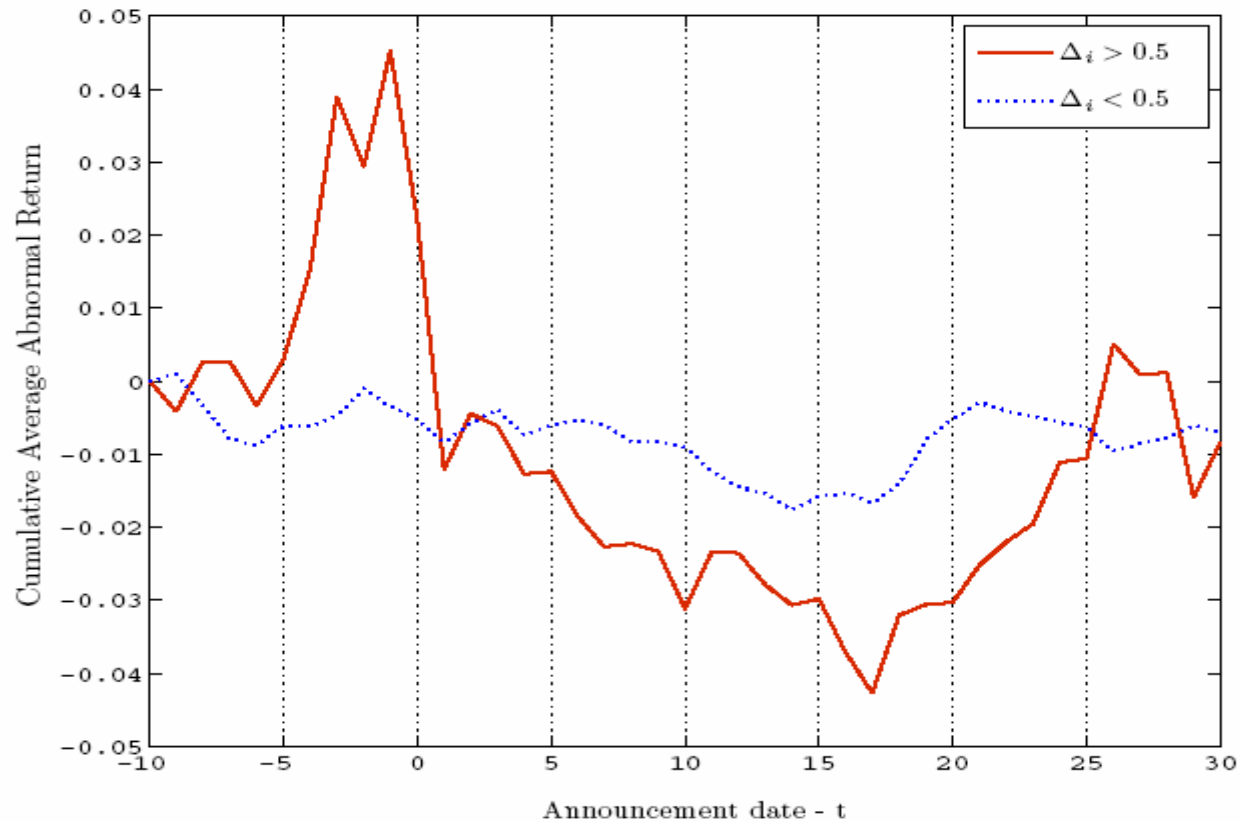
Identification of the strategy

- We expect:
 - Convertible bonds to be underpriced at issuance
 - Short sales of the underlying stocks will increase
 - Effect in short sales will be higher for more equity-like issues

Wealth effects CB announcement

- Wealth effect = average abnormal return = return corrected for market movement and 'normal' stock price movement
- Studies usually focus on day -1 and day 0
- This paper: study CAAR between announcement and issuance dates and on issuance dates

Announcement date wealth effects



Underpricing and short sales

- The underpricing of the CBs on the issuance dates is calculated as the difference between the model price and the trading price divided by trading price
- Model price calculated using TF-model

Underpricing of CB's

Period	Mean Underpricing	
	Equity-like issues	Debt-like issues
ID	25.2%	5.40%
ID+10	20.3%	3.60%
ID+20	20.8%	3.10%
ID+60	20.1%	4.40%
ID+220	18.9%	5.30%

Underpricing and Short Sales

- The evidence so far shows that more equity-like CBs are more underpriced and also show more negative CAARs
- Equity-like CBs are potentially more profitable candidates for convertible arbitrage
- An increase in short sales of the underlying shares can be interpreted as evidence that CA is affecting the CAARs between the announcement and issuance dates

Short sales (Relative Short Interest)

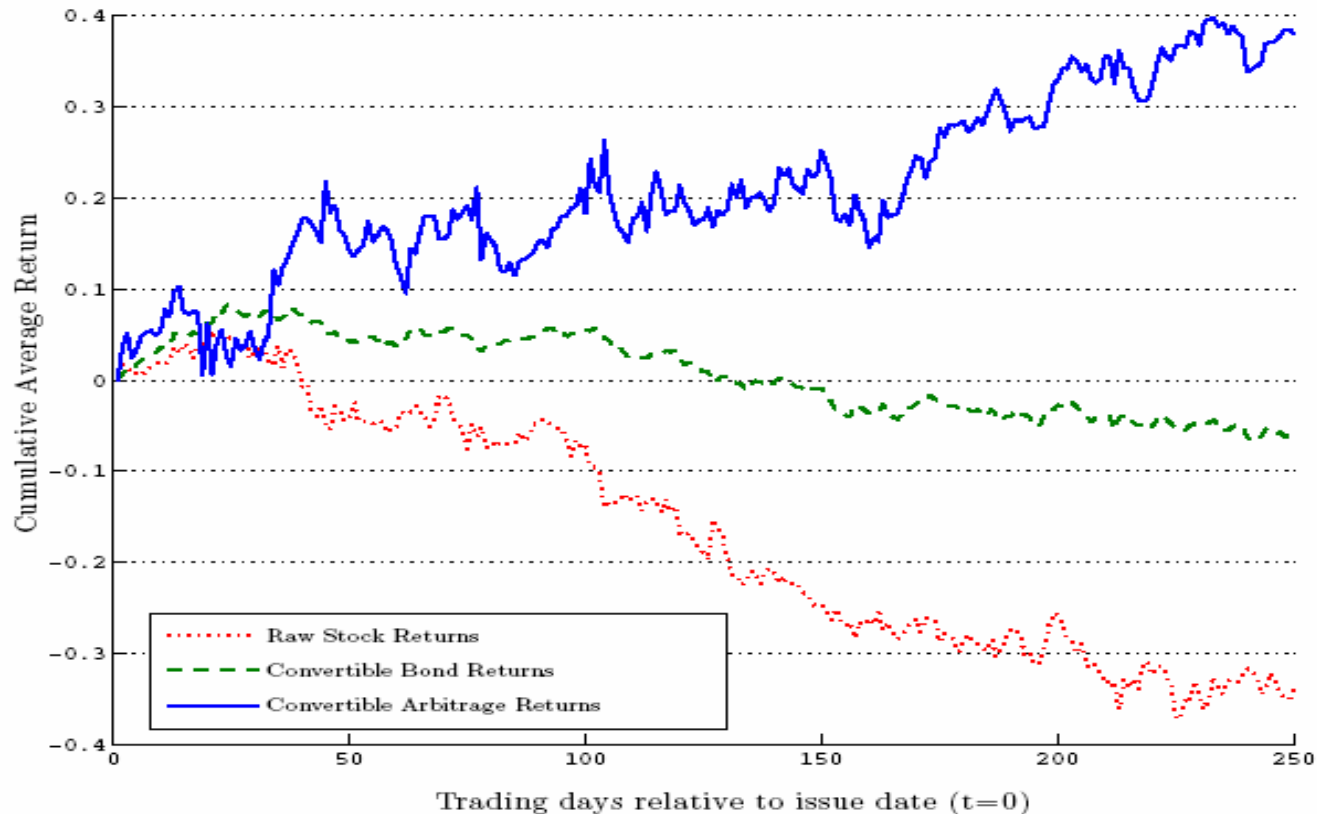
period	Mean	Mean
	Equity-like issues	Debt-like issues
t = -2	3.7%	8.6%
t = 0	10.7%	11.0%
t = 2	25.0%	9.7%
t = 4	30.6%	9.1%
t = 6	34.5%	9.4%
t = 8	35.4%	8.7%
t = 16	31.6%	14.0%
t = 24	28.5%	13.1%

Replicate the Strategy

- Convertible Arbitrage-strategy
 - Long in convertible at issuance date
 - Short in shares
 - Gives delta-neutral hedge ratio
 - Short position is balanced over time (as delta changes)
 - Borrowing costs are taken into account (proceeds from shorted stock do not suffice for purchase of convertible)

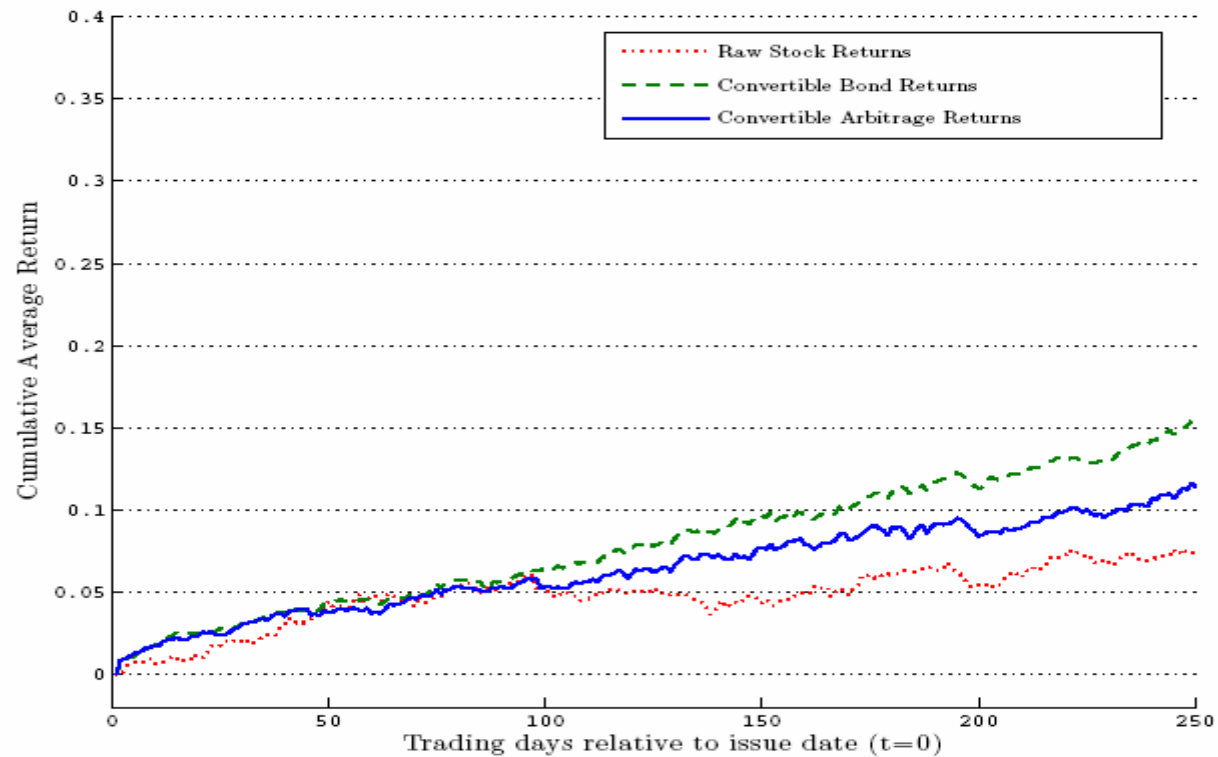
Convertible Arbitrage Returns

Equity-like issues



Convertible Arbitrage Returns

Debt-like issues



Why the Demise of the Strategy?

- A possible explanation for this that until today it has been overlooked that convertibles have become more debt-like
 - Mean delta 1998: 0.453
 - Mean delta 2004: 0.068
- Since debt-like CBs are less underpriced than equity-like CBs they also offer less possibilities for CA
 - 1998: 7.2%
 - 2004: 4.7%

Demise of the Strategy (2)

- The fact that convertibles have become more debt-like over the years and the fact that they are less underpriced are likely to be related
- This probably explains the declining CA returns over the years

Conclusion

- We find (indirect) evidence for CA arbitrage in the Canadian market
 - CBs are underpriced at the issuance date
 - This underpricing is larger for equity-like CBs than for debt-like CBs
 - Short positions in the underlying stocks increase between the announcement and the issuance dates
 - There is some evidence for decreasing CAARs between the announcement and the issuance dates

Conclusion (2)

- CA profits are declining over the years.
 - We find that this is probably caused by the fact that CBs have become more debt-like over the last years, leading to lower potential CA profits