Introduction to the Special Issue on Capital Structure Arbitrage in Banque et Marchés

Fan Yu
University of California, Irvine
August 2005

Capital structure arbitrage refers to trading strategies that take advantage of the mispricing across different classes of securities related to the same company. These securities can include common stocks, stock options, corporate bonds, and credit default swaps (CDS), among others. This type of relative value strategy has become increasingly common among hedge funds in the last few years, when traditional hedge fund strategies were suffering declining returns (Skorecki 2004). In May 2005, capital structure arbitrage even made headlines, as many hedge funds and investment banks lost money on the strategy when the General Motors equity and CDS unexpectedly rose at around the same time (Zuckerman 2005).

In traditional fixed income strategies such as the swap spread arbitrage, one could get away with a statistical analysis of the relationship between closely related debt securities (Duarte, Longstaff, and Yu 2005). However, the nature of capital structure arbitrage puts a premium on models that can explain the link between securities that seem to have very different characteristics (e.g., equity and debt). Therefore, structural models in the tradition of Merton (1974) and Black and Scholes (1973), which treat various corporate securities as contingent claims on the same underlying asset—the value of the firm, have played a central role in the development of this strategy. For example, the CreditGrades model, an industry benchmark for evaluating CDS spreads, is based on the structural model of Black and Cox (1976).

Perhaps no less important than the model itself is what inputs to use, or as the professionals call it, "calibration." For structural models, this is particularly relevant because many key inputs are difficult to measure. For example, should one use historical equity volatility or option-implied volatility? What should be the default boundary in relation to the face value of debt? Different answers to these questions tend to generate different predicted credit spreads, hedge ratios, and trading returns. For example, Yu (2005) finds that an implementation based on the CreditGrades model using historical volatility cannot account for rising CDS spreads during volatile periods, resulting in many losing trades being initiated. In fact, calibration is such an important issue that it often drives the innovation in modeling, much like the original motivation for reduced-form credit risk models.

The focus on modeling and calibration is the central theme of the recent Workshop on Capital Structure Arbitrage at Université d'Evry. For the very first time, this workshop brings together top practitioners and academics who share a keen interest in the subject. Four of the papers presented at the Workshop are collected in this special issue on capital structure arbitrage.

This issue starts with two papers that directly address capital structure arbitrage. First, Lardy (2005) gives an excellent overview of the "big picture" in this burgeoning field of research. He discusses the strength and weakness of the existing approaches through the eyes of an experienced practitioner. He also illustrates important practical aspects in pricing and risk management applications, such as the interpretation of the default event, the selection of an optimal hedge ratio, and the role of the company life cycles and macroeconomic conditions in these strategies. Turc (2005) then presents a novel approach to equity/credit modeling called the EC-Hedge. Intent on using stock options for calibration, he assumes that the stock price is a diffusion with jump-to-default, where the jump intensity is empirically linked to the stock price. This is a simpler approach than

the typical structural models in which stock options would have to be treated as compound options written on the firm value. Turc uses case studies and backtesting to show that the information contained in stock options helps to generate a better hedging performance compared to a structural model that does not incorporate this information.

The next two papers offer extensions to the basic first passage structural model. Huang and Tian (2005) present a method for inferring a deterministic default boundary curve from observables such as the term structure of historical default probabilities or credit spreads. Their construction takes advantage of the fact that the observed term structure is given as a discrete set of nodes. This approach allows the structural framework, often perceived to be too rigid, to generate richer term structure shapes. Patras (2005) extends the CreditGrades model to multiple obligors whose respective firm values are driven by correlated Brownian motions. Using a generalized reflection principle and series-expansion techniques, he derives closed-form formulas for first-to-default swaps in a setting of two obligors.

Each of the papers included in this issue advances our understanding of capital structure arbitrage and the models behind its implementation. However, this line of research has just begun, and many of the questions and concerns raised in these papers remain unanswered. I look forward to future empirical studies and theoretical advances that will shed light on this exciting new strategy.

References

Black, F., and J. Cox, 1976, "Valuing corporate securities: Some effects of bond indenture provisions," *Journal of Finance* 31, 351-367.

Black, F., and M. Scholes, 1973, "The pricing of options and corporate liabilities," *Journal of Political Economy* 81, 637-654.

Duarte, J., F. A. Longstaff, and F. Yu, 2005, "Risk and return in fixed income arbitrage: Nickels in front of a steamroller?" Working paper, UCLA.

Huang, H., and W. Tian, 2005, "Constructing default boundary," This issue.

Lardy, J.-P., 2005, "Capital structure arbitrage: A guided tour," This issue.

Merton, R. C., 1974, "On the pricing of corporate debt: The risk structure of interest rates," *Journal of Finance* 29, 449-470.

Patras, F., 2005, "Correlation and defaults: A closed formula for first-to-default swaps in a generalized Lardy-Finkelstein model," This issue.

Skorecki, A., 2004, "Hedge funds fill a strategy gap," *Financial Times*, July 21, p. 43.

Turc, J., 2005, "CDS vs stock - the quest for the optimum hedge ratio," This issue.

Yu, F., 2005, "How profitable is capital structure arbitrage?" Working paper, University of California, Irvine.

Zuckerman, G., 2005, "Hedge funds stumble even when walking–'Conservative' wagers turn sour, leading to fears of a shakeout; A one-two punch on a GM bet," *Wall Street Journal*, May 18, p. C1.