VALUATIONS OF INTEREST RATE SWAPS FOR FINANCIAL REPORTING PURPOSES

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Introduction

Interest rate swap agreements are widely used by both publicly traded and closely held companies. The market for these agreements has increased substantially since they were introduced in the early 1980s, and currently the over-the-counter market for interest rate swaps exceeds $341 trillion.[1] These transactions can be complex and have a significant impact on a firm's financial performance. For this reason, special accounting standards have been established for reporting these agreements and other derivative instruments in a firm's financial statements.

Derivative instruments, such as interest rate swaps, are normally reported at fair value even when an organized, active market for the instrument does not exist. Generally accepted accounting principles (GAAP) also require that the fair value measurement include the consideration of nonperformance risk: that is, the risk that one of the counterparties may default in its performance obligation prior to final settlement of the contract.

This white paper presents a method for valuing the most common interest rate swap structure used in today's market and an introduction to nonperformance risk. This paper also describes BVI's valuation model, which is similar to the methodology used by dealer banks and can be efficiently applied to both publicly traded and closely held businesses. This method also can be applied to other derivatives such as foreign currency exchange contracts and other similar instruments.

Interest Rate Swaps, Nonperformance Risk, Credit Valuation Adjustment

Interest rate swap transactions usually involve two counterparties, a firm (or other entity) and a financial institution. The most common type of contract requires one counterparty to pay a fixed interest rate for the term of the contract, while the other counterparty pays a variable interest rate for the same term. Therefore, the value of the interest rate swap, excluding the impact of nonperformance risk, can be calculated using the following formula[2]:

Interest Rate Swap Value	=	Present Value of Fixed Interest Rate Cash Flows	-	Present Value of Variable Interest Rate Cash Flows

For example, Company A is a party to an interest rate swap contract with Bank X. Co. A has swapped its variable rate on debt for a fixed rate. Every quarter, the contract is settled in cash.

If interest rates decline below the fixed rate, Co. A will report the swap as a liability on its balance sheet. Alternatively, if interest rates increase above the fixed rate, Co. A will report the swap as an asset.

Since either future scenario is possible, nonperformance risk is considered when measuring the fair value of the interest rate swap. Nonperformance risk is defined as the risk that one of the counterparties could default prior to the final settlement of the transaction.[3] Since these contracts will be an asset for one party and a liability for the other party at any point in time, it is necessary to value nonperformance risk for both counterparties simultaneously.

Therefore, Co. A must include in its valuation of the swap a measure of its own potential nonperformance if the swap is a liability, or a measure of the bank's potential nonperformance if the swap is an asset. In either case, this *credit valuation adjustment* (CVA) reduces the reported asset or liability because the contract is worth less due to the possible default.

Summary of Accounting Requirements

Derivative instruments are required to be reported at fair value in financial statements by GAAP. Fair value is defined as follows:

> *The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.*[4]

If there is not an established, active market where the derivative instrument is traded, firms are required to use an appropriate valuation model to approximate the fair value. The model should use as its inputs the major assumptions that market participants would consider in pricing the derivative.[5]

Recent changes in GAAP provide explicitly for the consideration of nonperformance risk in the fair value of derivative instruments. The rationale for this consideration is the assumption that a potential buyer would pay less for the expected cash flows related to a contract as nonperformance risk increases, if the contract is an asset. A demand for symmetry causes the same logic to be applied when the contract is a liability even though the outcome (i.e., a lower reported liability) is less intuitive.

Specifically, the accounting standards provide the following guidance for the valuation of liabilities:

- The fair value of the liability shall reflect the nonperformance risk related to that liability;[6] and

- The reporting entity shall consider the effect of its credit risk (credit standing) on the fair value of the liability in all periods in which the liability is measured at fair value. That effect may differ depending on the liability, for example:

    a) Whether the liability is an obligation to deliver cash (a financial liability) or an obligation to deliver goods or services (a nonfinancial liability); and

    b) The terms of credit enhancements related to the liability, if any.[7]

Technically, nonperformance risk is a broader concept than credit risk: there could be nonperformance unrelated to credit. But in general, nonperformance risk is captured by measuring a CVA.

Role of an Independent Valuation Professional

Typically, firms receive a calculation of the value of their derivatives from their financial institution. In the past, firms would normally report that amount on its balance sheet. It should be noted, however, that financial institutions typically include a disclaimer that other models could yield different results and language along the lines of "this valuation may not represent the actual price at which any transaction could be terminated or any new transaction could be executed." In this case, the financial institution is basically acting as the appraiser of its own derivative instrument without providing the firm the underlying assumptions used to value the instrument. A firm's valuation of the same instrument could be substantially different if different assumptions are used.

One critical assumption made by financial institutions is related to credit risk. Most financial institutions take credit risk into account on a total portfolio level, or by grouping contracts that have similar characteristics. As a result, an adjustment for credit risk for specific derivative agreements is not usually included in the financial institution's calculation provided to the client. Therefore, it becomes necessary for the firm's management to estimate the CVA as a component of the derivative valuation for financial reporting purposes.[8]

The CVA estimate is inherently complicated because it must look to the future and consider the numerous factors that affect the value of a derivative instrument. Many of these are subtle and difficult to measure. Examples of issues that are specifically taken into consideration in the valuation include:

- The credit and nonperformance risk for both counterparties to the agreement;
- The specific terms of the credit agreement; and
- The impact of any master netting agreements, credit enhancements, or other issues.

Add to this analysis the extreme volatility that many derivative instruments display over time, and the calculation of the CVA becomes a difficult task for a firm's management team. As a result, many firms consult with an independent valuation firm when calculating a CVA.

Valuation Model

BVI has developed a proprietary valuation model that is similar to the methodology used by dealer banks. The method is audit-tested, and considers the liability for both counterparties associated with the derivative contract. The process to calculate the CVA is:

1. Prepare an economic model of the key economic terms of the derivative agreement[11];
2. Obtain appropriate credit data (either raw credit data or credit spread data)[12] ;
3. Convert the credit data into a probability of default[13]; and
4. Determine the CVA by considering both the probability of default and the total expected exposure from the derivative.

Exhibit A illustrates the process of determining the fair value of an interest rate swap agreement.

Summary

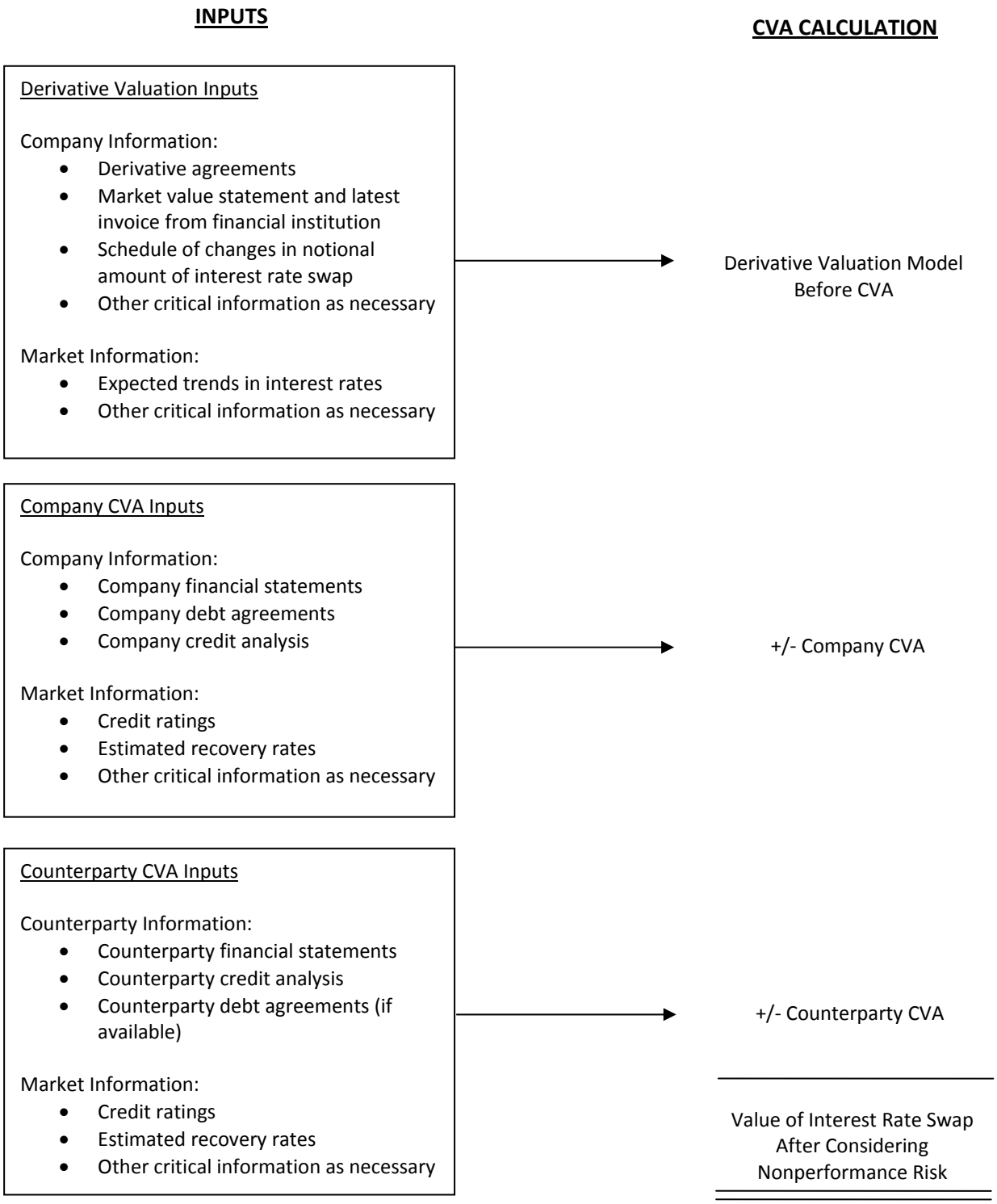
Firms are increasingly using derivative instruments, such as interest rate swaps, in the ordinary course of business. To comply with GAAP, these instruments must be reported at fair value, including a consideration of nonperformance risk. A credit valuation adjustment (CVA) captures this risk in most cases. This paper provides an introduction to the issues that should be considered when assessing the nonperformance risk of these contracts and calculating a CVA.

Companies that use these derivative instruments typically do not have the resources or the expertise to evaluate nonperformance risk using models that are commonly utilized by market participants. For this reason, many firms consult with an independent valuation firm to assist in this process.

Dealer banks typically assess nonperformance risk by analyzing the credit risk of both counterparties to the derivative transaction, and estimating the total exposure for both parties as of a certain date. BVI has developed a proprietary valuation model that is: (1) similar to the methodology used by the dealer banks, and (2) can be efficiently applied to either public or private companies.

EXHIBIT A

Interest Rate Swap Valuation Including Nonperformance Risk



End Notes

[1] The size of the interest rate swap market can be estimated based on the notional amount of outstanding principal. In this paper, the size of the market is estimated using data published by the Bank for International Settlements (www.bis.org/statistics/otcder/dt07.pdf).

[2] This method is also referred to as the "Zero Coupon Method" described in ASC 815-25-20. Other methods for valuing interest rate swaps are described in academic textbooks, such as *Options, Futures, and Other Derivatives, Seventh Edition* by John C. Hull

[3] Also referred to as counterparty risk, as defined in *Counterpart Credit Risk Modeling*, edited by Michael Pykhtin, pg. 148.

[4] The Accounting Standards Codification ("ASC") replaces FASB statements and other authoritative non-governmental U.S. generally accepted accounting principles for interim and annual periods ending after September 15, 2009.

The definition of fair value is described in ASC 820-10-20. The definition of fair value was previously contained in Statement of Financial Accounting Standards No. 157.

[5] Refer to ASC 820-10-35-5 and 820-10-35-9
[6] Refer to ASC 820-10-35-17
[7] Refer to ASC 820-10-35-18

[8] BVI has confirmed this with several leading financial institutions. The firm should contact their financial institution to confirm whether the CVA is included in the market value statements provided by the institution.

[9] Refer to discussions in *Options, Futures, and Other Derivatives, Seventh Edition* by John C. Hull and *Counterparty Credit Risk Modeling* edited by Michael Pykhtin for more information about the financial models typically used by market participants to price derivative instruments. In practice, the value of the derivative is usually calculated independently and compared to the market value provided by the financial institution. The reason for this recalculation is that the financial institution only provides a summary of the value to the company, and not the underlying assumptions. These assumptions are necessary to calculate the CVA.

[10] CVA calculations are available for certain companies through data providers such as Bloomberg, however, this data is costly to obtain. These calculations are proprietary also, and not available for privately held firms.

Other data that is typically used to calculate the CVA include: credit spreads, bond spreads, credit default ratings, debt recovery rates, and credit default swaps. The data used in this analysis is derived from a variety of sources including Standard & Poor's, Bloomberg, or niche data providers.

[11] Refer to discussions in *Options, Futures, and Other Derivatives, Seventh Edition* by John C. Hull for a discussion of these models.

Business Valuation Inc. specializes in providing business appraisal, corporate financial reporting valuation, financial advisory, and litigation support services. BVI is a full service valuation firm and has provided comprehensive, quality valuation services for companies of all sizes, and across a broad spectrum of industries.

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