Derivatives: The Next Shoe to Drop?

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According to the Bank for International Settlements (BIS) Triennial Survey, in June of last year there was $517 TRILLION in notional over-the-counter derivatives outstanding globally.

A number of analysts have expressed alarm at the size of this number and have suggested losses in the derivatives arena could be the next financial shoe to drop in the credit crisis. This concern motivated us to take a look at how the derivative markets operate and to assess the risk of major losses coming from this area. For those that do not want to work through the minutia, we conclude that, although there is some risk of loss from derivatives in the current credit market environment, the risk exposure has been overstated. Outside of an extreme derivative market failure, we believe any losses should be manageable. The following table summarizes how we reduce the nominal derivative exposure down to a relevant size, while the rest of our piece explains what derivatives are, how the notional amount of derivatives outstanding is overstated, what the gross market value of outstanding derivatives is, what netting agreements are, how derivatives are collateralized and what risks derivatives actually have.

CUTTING DERIVATIVE EXPOSURE DOWN TO SIZE

Global Derivative Positions in June 2007	Amount
Notional amount of derivatives outstanding	$517.0 trillion
Gross market value of underlying contracts	$11.0 trillion
Net market value of underlying contracts	$2.5 trillion
Net after-collateral market value	$1.1 trillion

Source: Bank for International Settlements ISDA Survey.

What is a derivative?

Derivatives are **risk shifting agreements** and tools for investors to manage risk exposures. They are a way for one investor to contractually shift risk exposure to another party. They can be used not only for hedging risk but for taking on risk as well.

What are over-the-counter (OTC) derivatives?

OTC derivatives include foreign currency contracts, interest rate contracts, credit risk derivatives and commodity and equity derivatives. As of June 2007, interest rate contracts were the largest category with a total notional amount outstanding of $388.6 trillion, followed by foreign exchange contracts at $57.5 trillion and credit derivatives at $51.1 trillion. Equities and commodities each had about $10 trillion in contracts outstanding.

Interest rate swaps are the largest component of interest rate contracts. Interests rate swaps are transactions where the parties agree to exchange certain cash flows (e.g. a floating rate for a fixed rate). The notional amount of interest rate swaps outstanding was $306 trillion or 79% of interest rate contracts in June of 2007.

Credit default swaps are the largest component of the credit derivatives category, covering 88% or $45 trillion of all credit derivatives in June of 2007. Credit default swaps hedge the risk of default by a single underlying credit or multi-name group of credits. In a credit default swap, one party pays a periodic fee to another party for protection from default of an underlying entity. Another type of swap is a total return swap where parties exchange total return exposures including interest and fees, gains and losses from market movements and credit losses.

Notional amount outstanding is not risk exposure.

The notional amount of derivatives outstanding is the face value of the underlying securities of all open contracts. As mentioned above, the BIS survey counted

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Musings from the Chief Economist

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$517 trillion in derivatives outstanding in June of 2007. The first problem with this number is that there is a lot of double counting, since dealers usually lay off part of their risk on to other parties to control overall portfolio risk. For example, to reduce a $10 million credit risk, an investor enters into a contract with a dealer. This dealer may in turn hedge (lay off) $5 million with another entity, which may turn around and hedge $2 million with someone else. So, instead of one swap with a $10 million notional exposure, there are three contracts with a total of $17 million in notional value outstanding. In this way, the notional amount of derivatives outstanding inflates the overall exposure.

Of more importance, the notional amount of contracts outstanding is not what is at risk. What is at risk is the difference between cash flows of securities, the total return differentials between securities, or the default by an underlying credit. One measure of risk exposure is gross current market value, which is the replacement cost of all existing contracts at prevailing market prices. As of June 2007, according to BIS, the **gross market value of OTC derivatives was $11 trillion** or about 2% of the notional amount outstanding. This is a big number, but not $517 trillion! The gross market value would be the risk exposure if counterparties did not fulfill their contracts and there were no netting agreements.

Netting agreements adjust for overlapping contracts.

Given the size of the derivative market, there are many overlapping contracts. Counterparties may have a number of contacts with each other. In the event of default by a counterparty, the exposures between the two parties are netted if they have a netting agreement. If there is no netting agreement, each contract is settled separately. For example, let's assume a counterparty owes an institution $2 million on a contract, and the institution owes the counterparty $3 million on another contract. If the counterparty failed to pay the institution, without a netting agreement, the institution would have to pay the counterparty $3 million and the institution would have a $2 million loss or replacement cost in its existing portfolio. With a netting agreement, the institution is only obligated to pay the counterparty the $1 million difference since the contracts are netted. With a netting agreement, an institution is only out the difference between what it owes and what it is owed. According to BIS, when you take into account netting agreements (but before taking into account collateral), **the net credit exposure in June 2007 was 0.49% of the notional amount outstanding or $2.5 trillion.**

Derivatives are collateralized.

OTC derivatives are often collateralized, with the amount of collateral determined by the underlying market value of the contract. Collateral is adjusted periodically to reflect underlying market values and can change daily and flow back and forth between parties. Collateral taken is usually cash or securities such as government or corporate bonds and equities. When lower quality collateral (such as corporate bonds or equities) is used, more collateral is usually required. According to the International Swaps and Derivatives Association's 2007 Margin Survey, there was $1.329 trillion of collateral in circulation. About 65% of interest rate swaps and credit default swaps are collateralized. After netting contracts and adjusting for collateral, the loss from the default by a counterparty is usually small. **Total risk exposure after netting and taking into account collateral was just over $1 trillion.**

Historically, only a small portion of derivative exposure has ever experienced defaults. The worst write-off taken by banks for derivative exposure was $450 million during the "ruble crisis" in 1998. We believe an unprecedented level of defaults for derivatives would have to occur before they posed a serious threat to the financial system.

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What are the risks?

Counterparty Risk: The biggest risk from over-the-counter derivatives is default by a counterparty. The risk exposure as shown above is the market value of the contract, minus any netting arrangements and less any collateral. Outside of an unpredictable systemic failure, we believe this risk is small.

Influence on real capital markets: Of greater concern for many investors is the fact that the size and turnover in the derivative market is so large that strategies in the derivative market can drive moves in the real capital markets. For example, computer driven program trading in 1987 led to a dramatic decline in the stock market.

Risk model failure: Another concern is that institutions use risk models to determine the value at risk in their portfolios. If the risk models break down as was the case with Long-Term Capital Management, institutions can fail and fears heightened by uncertainty can spread to other markets, driving them lower.

Improper use of derivatives: Derivatives can also be used improperly by traders and individuals. Since payouts from derivatives can be large, it is enticing for individuals and speculators to take outsized bets in the hopes of outsized gains. Trader abuse has also led to the bankruptcy of a number of institutions. In 1994, Nick Leeson, a trader with Barings Securities, sank that institution with rogue trades that went bad. In 2006, a $6.4 billion loss at Amaranth Advisors led to bankruptcy, as a net-long natural gas trade unraveled when prices fell. In 2008, a trader at Societe Generale racked up a $7.2 billion loss for his employer.

Conclusion: Looking at the notional amount of derivative contracts outstanding is a misleading way to assess risk exposure. What is important is the market value of all contracts, netted for overlapping contracts and adjusted for collateral. Given the smaller level of risk exposure, we believe a complete failure of the derivative markets would be required to create devastating losses. Historically, significant derivative losses have been isolated events that didn't create long-term systemic risk in financial markets. Outside of the failure of a major counterparty, systemic failure is unlikely and any writedowns that occur are likely to be manageable.

Sources: Bailard Research, ISDA Surveys, BIS Triennial Central Bank Survey.

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