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Derivatives Primer

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Executive Summary

- Derivatives are contracts whose value is based on an observable underlying value—a security's or commodity's price, an interest rate, an exchange rate, an index, or an event.
- U.S. insurers primarily use derivatives to hedge risks (such as interest rate risk, credit risk, currency risk and equity risk) and, to a lesser extent, replicate assets and generate additional income.
- The primary risks associated with derivatives use include market risk, liquidity risk and counterparty risks.
- Derivatives use laws, NAIC model regulations, derivatives use plans and statutory accounting requirements are important components in the oversight of derivatives use by U.S. insurers.

What Are Derivatives?

Derivatives are contracts whose value, at one or more future points in time, is based on an observable underlying value—a security's or commodity's price, an interest rate, exchange rate, index, or event, such as a credit default. The derivatives contract is between two parties and specifies terms under which payments are to be made, depending on fluctuations in the value of the underlying. Specified terms typically include notional amount, price, premium, maturity date, delivery date, and reference entity or underlying asset.

Statement of Statutory Accounting Principles (SSAP) No. 86 – Derivatives defines a “derivative instrument” as “an agreement, option, instrument or a series or combination thereof:

- a. To make or take delivery of, or assume or relinquish, a specified amount of one or more underlying interests, or to make a cash settlement in lieu thereof; or
- b. That has a price, performance, value or cash flow based primarily upon the actual or expected price, level, performance, value or cash flow of one or more underlying interests.”

Derivatives come in a variety of different structures designed to meet specific needs and to mitigate or assume specific forms of risk. The structural nuances can lead to significant differences in the obligations and exposure of the parties, as well as the potential liquidity of the position. Most derivatives are traded

between two parties, either over-the-counter or on an exchange. Some derivatives are custom-tailored, while others are standardized. A short list of common derivative instruments includes:

- Options
- Forwards
- Futures
- Swaps
- Credit default swaps
- Caps and floors
- Collars
- Warrants

For the U.S. insurance industry, there are three basic allowed uses for derivatives under the various state investment laws, though most also allow a small basket for other uses. The three primary uses are:

1. Hedging—managing or reducing risk;
2. Replication—to reproduce the investment characteristics of otherwise permissible investments assets, and;
3. Income generation—sale of a derivative to generate additional income.

The primary use is *hedging* of a risk, on either the asset side or the liability side of the balance sheet. Examples of risks that are hedged by insurance companies are interest rate risk, credit risk, currency risk and equity-related risk (related to variable annuities, for example).

Types of Derivatives

Forwards

A forward is an agreement for the future delivery of a specific quantity of an asset at a specified price, at a designated time. Although payment and delivery are made in the future, the price is determined on the initial trade date. Forwards can be customized to meet the specific needs of the parties and are bilateral contracts that trade over-the-counter. Examples include foreign currency forwards and interest rate forwards.

Futures

A futures contract is an agreement to buy or sell, in the future, a specific quantity of an asset at a specific price at a designated time. It is a standardized agreement (so terms cannot be customized) that can be closed or terminated prior to expiration. Futures are similar to forwards, but they are standardized and trade on an exchange. They are, therefore, subject to margin (a deposit of cash or other collateral) and other requirements of the exchange, but because they are standardized and exchange-traded, they possess greater liquidity and transparency than forwards. Examples of typical assets underlying futures contracts include commodities, foreign currencies, interest rates and stock indices.

Swaps

A swap is an agreement in which counterparties agree to exchange future streams of cash flows over a set period of time. The cash flows are calculated based on a notional amount. Typically, the only dollars that are exchanged between the parties are the cash flows, not the notional amount—except for currency swaps, where the notional principal is also exchanged. Certain “plain-vanilla” (commonplace) swaps now are standardized and trade on exchanges, while others are over-the-counter contracts negotiated between parties. Swaps are primarily used to mitigate or add exposure to certain risks such

as interest rate risk—useful for insurers in adjusting portfolio duration—or foreign exchange risk. Examples of swaps are interest rate swaps and currency swaps.

Swap Type	Description
Interest Rate Swap	Exchange of a fixed rate stream of cash flows for a floating rate stream of cash flows or vice versa.
Currency Swap	Exchange of a notional principal and a series of specified payment obligations denominated in one currency for that in another currency.

Credit Default Swaps (CDS)

A credit default swap is a derivative instrument in which there is a transfer of credit risk from one party to another. The buyer purchases credit protection on a reference entity—typically an individual corporate issuer (a single-name CDS)—in exchange for a stream of payments. If any specified credit event occurs, the buyer delivers the instrument it holds to the seller of protection in exchange for the full notional value. Alternatively, the seller of protection pays an amount that constitutes the loss in case of default. When you buy CDS or buy credit protection, you reduce, or *hedge* credit risk. When you sell CDS or write protection, you assume credit risk.

Index-Based CDS

An index-based CDS is a credit default swap whose underlying is an index that is generally accepted as a key benchmark of the overall market's credit risk. One such group, the CDX indices, tracks the performance of specific baskets of single-name CDS. For example, the IG CDX consists of a basket of CDS on 125 individual investment grade credits, and the HY CDX consists of CDS on 100 high yield credits. The CDX indices have fixed composition and fixed maturities. A new series of CDX indices is established approximately every six months with a new underlying portfolio and maturity date to reflect changes in the credit market and to help investors maintain a relatively constant duration, if needed. Investors can use CDX indices to hedge a portfolio's credit risk or to gain exposure to a diversified portfolio of IG or HY corporate credits.

Customized CDS can also be created to hedge specific risks. For instance, if an investor wants to hedge exposure to five individual credits in its portfolio, it could enter into a *first to default swap* where the reference basket consists of the five specific credits. If and when any one of these five reference credits defaults during the term of the contract, the counterparty will be required to make the investor whole, and the contract will be terminated.

Options

Options are contracts in which the writer (seller) of the option grants the buyer of the option the *right but not the obligation* to buy from or sell to the writer a specified quantity of a designated instrument, at a specified price (the *strike*) within a specified period. The writer of the option grants this right to the buyer in exchange for a certain sum of money (the *premium*). There are two types of options: a call option and a put option.

Option Type	Description
Call	Gives the buyer the right to buy the designated instrument from the writer.
Put	Gives the buyer the right to sell the designated instrument to the writer.

The buyer of a call is betting the market price of the underlying will rise, while the buyer of a put is betting the price will fall. If the market price rises, the call buyer has the right to buy the underlying at the strike price, which is lower; so a call buyer profits if the price rises. If the market price falls, the put buyer has the right to sell the asset at the strike price (which is higher); so a put holder profits if the market price falls. An option whose underlying is trading at a price that is profitable for the holder is referred to as *in the money*. An option whose underlying is trading at the strike prices is deemed *at the money*, and an option whose underlying is trading at a price that is unprofitable relative to the strike is *out of the money*.

The risk of investing in options is very different for buyers and writers. To begin with, option buyers have the *right, but not the obligation*, to *exercise* the option (i.e., buy or sell the underlying at the strike price). Consequently, if you buy either a call or put option, only the premium paid is at risk and thus is your maximum potential loss if it expires worthless. However, the writer of an option is *obligated* to honor its terms if it is exercised. Thus, the call writer's maximum loss is potentially infinite because he or she must deliver the asset to the buyer at the strike price irrespective of its current market price. The put writer's maximum potential loss is the difference between the strike price and zero because she must pay the strike price for the asset irrespective of the current market price.

The above scenarios, however, only apply to *naked* call or put writing, where the writer does not have a position in the underlying asset. More common is *covered* option writing, where, for example, the writer of a call option owns the underlying asset and is willing to bet that its market price will not rise above the strike price, and takes in the option premium. If it does, the writer gives up any potential profit above the strike price, but keeps the premium. Covered call writing is a common income generation strategy used by many investors, including insurance companies.

Other Derivatives-Related Terminology

Notional Value

Notional value is the nominal or face amount of a financial instrument that is used to calculate payments made on that instrument. Notional values often are not indicators of true economic exposure, but they serve as a more consistent indicator of market activity and scale than book/adjusted carrying value (BACV) or fair value, both of which can be affected by factors such as market prices and accounting treatment. The concept of notional value is very important in some derivatives, such as CDS, but not as much in others, such as interest rate swaps where, for example, the notional value is only used as part of the formula for determining the regular exchange of payments; the notional value itself never changes hands.

Counterparty

A counterparty is an entity that has exposure to a derivative contract's financial risk; in other words, it is the parties on either side of a trade. When two counterparties enter into any financial contract, it gives rise to counterparty risk—the risk faced by one party that the other will not satisfy the obligations of the contract. Counterparty risk is dependent on the credit risk, or credit worthiness, of the parties involved

in the financial transaction. Exchange-traded derivatives have margin (or collateral) requirements, which can reduce counterparty risk because the collateral can be used to satisfy obligations if needed.

International Swaps and Derivatives Association (ISDA)

ISDA is a trade organization of participants in the market for over-the-counter derivatives, which was formed in 1985 and has more than 800 members from 64 countries. It worked to standardize definitions and documents, allowing for more efficient trading and liquidity in the market. Without standardization, derivative positions would be extremely difficult to trade after origination. Also, for CDS, ISDA's Designations Committee decides on whether trigger events have occurred that would require a payment.

Master Agreements

Until recently, most derivatives were bilateral contracts negotiated between two counterparties that face each other directly, and thus traded over the counter. It is rare, however, that an entity will enter into only one derivatives transaction and never be in the market again, so normally, derivatives trading falls under a master agreement that covers all trades between those two counterparties, and each individual trade will be conducted using a simple confirmation. The master agreement will define important terms including collateral requirements and the types of eligible derivatives, and individual confirmations will cite prices and maturity dates. If a master agreement requires amending, a schedule is used to add to or amend the standard terms.

Risks and Regulatory Oversight

The use of derivatives entails various risks, including market risk, liquidity risk and counterparty risk. These risks can be magnified because derivatives inherently employ *leverage*, meaning investors can take large positions or exposures in the underlying for little or even no financial outlay. In a stressed market environment, the market risk of derivatives is heightened as the value of derivatives can be very volatile, and liquidity can dry up quickly. In addition, it can be difficult at times to effectively hedge a given risk exposure due to differences in specified contract terms, such as duration mismatches. From the standpoint of state insurance regulation, there are a number of components that are key to the oversight of derivatives use by domestic insurers.

The NAIC *Derivative Instruments Model Regulation* (#282) sets standards for the prudent use of derivative instruments by insurance companies. It requires insurance companies to establish written guidelines for transacting in derivative instruments. Internal control procedures must be outlined describing elements such as the monitoring of derivative positions and the credit risk management process.

Derivatives use laws vary from state to state, just as investment laws vary. Some are extremely limiting, not only in the permitted uses of derivatives, but also in the individual and aggregate exposures allowed. Others allow for greater flexibility, including allowance under certain basket provisions.

States also generally require the filing of a *derivatives use plan* by the insurer, although it is not a requirement in all states. Although the specific requirements vary from state to state, for the most part, in a derivatives use plan, the insurer needs to provide evidence that it has a management plan and the infrastructure in place to control the use of derivatives. It also has to describe the way it intends to value and monitor derivatives positions.

Statutory accounting requires detailed reporting of derivatives transactions and positions in *Schedule DB*. The reporting requirements were substantially updated in 2010 and further refined in 2012. As in other investment schedules, insurers are required to report all open derivative positions, on an individual transaction basis, at the end of each reporting period. Schedule DB also details counterparties to derivatives transactions and the effectiveness of hedges. Detail on terminated transactions and a verification between years are also provided.

Insurance Industry Derivatives Practices

Recall that there are three basic permitted uses for derivatives under the various state investment laws, though most also allow a small basket for other uses. The three primary uses are: 1) hedging; 2) replicating assets; and 3) generating income. Insurance companies primarily use derivatives for hedging the asset side or the liability side of the balance sheet—for example, managing or reducing interest rate risk, credit risk, currency risk and/or equity risk.

Insurance companies typically engage in the following types of hedges: fair value hedges, cash flow hedges, or hedges related to currency exchange rate risk. Fair value hedges are meant to offset changes in the fair value of an asset or liability, while cash flow hedges are designed to offset the variability in expected future cash flows of an asset or liability. Hedges related to currency exchange rate risk focus on reducing the degree of foreign currency exposure in assets and liabilities. As an example of a fair value hedge, if a company holds a put option on common stock, the value of the put option should go up in roughly the same proportion as the value of the stock goes down, even if there is no actual exercise of the put. The most common example of a cash flow hedge is an interest rate swap, where the cash flows actually change hands, although in the case of an interest rate swap, its value also changes based on shifts in the shape of the yield curve. If the yield curve flattens or steepens, that will change the value of the interest rate swap (offsetting changes in the value of the hedged asset or liability).

While insurance companies may enter into derivatives transactions with the idea of hedging certain risks, the effectiveness of that hedge is a different matter and sometimes difficult to prove. According to *SSAP No. 86*, “the measurement of hedge effectiveness for a particular hedging relationship shall be consistent with the entity’s risk management strategy and the method of assessing hedge effectiveness that was documented at the inception of the hedging relationship.” A fair value hedge generally is considered effective when the change in fair value of the derivative hedging instrument is within 80% to 125% of the opposite change in fair value of the hedged item. The effectiveness of cash flow hedges is determined in an analogous manner. The accounting for derivative instruments utilized in an effective hedge is consistent with the accounting for the hedged asset or liability, referred to as hedge accounting. For example, if the hedged asset is valued and reported at amortized cost, then the derivative instrument would also be valued and reported at amortized cost. Strict accounting criteria must be met and extensive documentation is required to report an effective hedge, and so many hedges are not deemed effective for accounting purposes, even though these hedges provide strategic value to the insurer in that they still have the intended effect of mitigating risk.

Consider a simple example of a derivative hedge transaction that is not defined as hedge effective: A company owns a 10-year bond and buys one-year credit protection. If the obligor defaults or has serious credit deterioration in that one year, the insurer will obviously benefit, and thus this clearly is a hedge strategy. But because of the big difference in term, it is difficult to prove that it is hedge effective, and thus the CDS will be accounted for at fair value, and the changes in fair value will be recorded as unrealized gains or losses (under fair value accounting).

A replication (synthetic asset) transaction (RSAT) is a derivative transaction that is entered into in conjunction with other instruments in order to reproduce the investment characteristics of an otherwise permissible investment. The idea is to allow insurance companies to use derivatives to synthetically create assets that are generally permitted, but where the specific exposure desired does not exist in the marketplace or is not readily available at an attractive price. For example, an investor might want exposure to a corporate credit issuer that does not have bonds outstanding, but borrows in the bank loan market. The investor can write a CDS contract (sell credit protection) and combine it with (typically) a risk-free or highly rated fixed income security (a host bond) so that the cash flows replicate that of a bond that might be issued by the desired credit. For insurers, the key is that there has to be a cash instrument linked to the derivative; replication transactions involving *naked*, or unattached, derivative instruments are not allowed.

Income generation refers to a derivative transaction that is entered into to generate additional income. Typically this involves writing an option, which exposes the writer to potential future liabilities in exchange for the upfront premium (the income). Because of this risk, insurance companies are required to own the underlying asset so that it can be used to satisfy the potential obligation. For example, an insurer can write an equity call option on a stock that it already owns (i.e., the covered call transaction described earlier).

Key Terminology

Call Option

A contract that gives the buyer the right to buy a specified asset from the seller

Caps and Floors

Contracts used to hedge against fluctuations in the underlying asset

Collar

An options strategy designed to protect investors against large losses, but also limits gains

Counterparty

An entity that participates in a financial transaction which results in exposure to financial risk

Credit Default Swap (CDS)

An agreement in which counterparties agree to exchange future streams of cash flows over a set period of time

Derivatives

Contracts whose value is based on an observable underlying value, such as a security's or commodity's price, an interest rate, exchange rate, index or event

Exchange-Traded Derivatives

Contracts that are standardized and trade on a regulated exchange

Forward

An agreement for the future delivery of a specific quantity of an asset at a specified price and time

Future

A standardized agreement to buy or sell a specific quantity of an asset at a specific price and time

Hedging

Managing or reducing risk

Index-Based CDS

A credit default swap whose underlying is an index that is a key benchmark of the market's credit risk

Initial Margin

Initial amount of cash, securities or other collateral required by a clearinghouse to trade securities

Master Agreement

A document that sets out standard terms that apply to all financial transactions entered into between two parties

Notional Value

The nominal or face amount that is used to calculate payments made on a financial instrument

Option

An agreement in which the buyer of the option has the right, but not the obligation, to buy or sell a specified quantity of an asset, at a specified price and time

Over-the-Counter (or OTC) Derivatives

Bilateral contracts that are negotiated and customized to suit the counterparties' specific needs and traded in the over-the-counter market

Put Option

A contract that gives the buyer the right to sell a specified asset to the seller

Replication (Synthetic Asset) Transaction (RSAT)

A derivative transaction entered into in conjunction with other instruments to reproduce the investment characteristics of an otherwise permissible investment

Strike Price

The price at which a derivative instrument can be exercised

Swap

An agreement in which counterparties agree to exchange future streams of cash flows over a set period of time

Swaption

An agreement that grants the buyer the right, but not the obligation, to enter into an underlying swap

Variation Margin

A daily payment made to the clearinghouse based on adverse price movements

Warrant

A derivative instrument that gives the right, but not the obligation, to buy or sell a security (typically equity) at a certain price before expiration. Unlike an option, a warrant is issued by a company (not a third party); is dilutive as new shares of stock are delivered if the warrant is exercised; and tends to expire in years rather than months