



Understanding Derivatives: Markets and Infrastructure

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Over-the-Counter (OTC) Derivatives

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Over-the-counter¹ (OTC) derivatives are bespoke contracts that are transacted in the way their name suggests: They are negotiated between the counterparties instead of being traded on an exchange. OTC derivatives contracts are often generically referred to as “swaps” because many OTC deals involve cash flows, or obligations, that are swapped or exchanged between two parties at defined intervals, such as interest-rate swaps, foreign exchange swaps, and credit default swaps. OTC derivatives contracts can also take the form of forward contracts or options.

Why Trade Over-the-Counter?

The demand for customized derivatives contracts, efficient trading of large contracts, and liquidity are the main drivers of OTC derivatives markets.

The primary reason to use an OTC contract, as opposed to an exchange-traded contract, is to create a “perfect” hedge, both for hedge accounting purposes (see Box 1) and to satisfy other requirements, such as a need for the physical delivery of a commodity at a location or date that may not exist at an exchange. Customized contract terms can minimize so-called basis risk, facilitating “perfect” hedging. Basis risk arises when exposure to the underlying asset, liability, or commodity that is being hedged and the hedge contract (the derivatives contract) are imperfect substitutes. Imperfections

arise because the assets are qualitatively different, the start and/or expiration dates of the respective “legs” (legs being the underlying exposure and the derivatives contract) of the hedge do not match up, or because the market prices of the legs of the hedge do not move at the same rate or in the same expected direction. An ideal hedge would be one that is market neutral, meaning that moves in market prices for the two legs are aligned. With OTC transactions, contract terms can be tailored to meet specific requirements and, thus, mitigate basis risk.²

The second reason why some choose to trade in OTC markets is for the opportunity to trade large contracts efficiently. Some market participants, particularly institutions whose business needs require them to take on or exit out of large derivatives positions on a regular basis prefer to trade in OTC markets. In OTC derivatives markets, these participants can trade large quantities of contracts at one price without significantly affecting the market or exposing themselves to manipulation techniques that arise when one participant places multiple orders for large quantities on a public exchange. These institutions prefer the certainty of entering into and out of large positions at prices that they negotiate, rather than participating in markets that offer greater transparency and better prices but no

Box 1 – Hedge Accounting

Basis risk has practical implications, as well as market risk implications. In the U.S., GAAP accounting imposes strict rules on how companies report gains or losses on derivatives transactions in financial statements.¹ These rules require companies to measure the fair value of assets as of a certain date, which for any forward-dated contract is a mark-to-market valuation. A hedge with insufficient correlation could result in excess gains or losses, which must be recognized in the quarter they occur. This situation may result in undesirable earnings volatility. However, if the company documents that the hedge is “effective,” which is when the fair value of the derivative offsets the fair value of the underlying asset or cash flows, the company may use so-called hedge accounting treatment and offset fair values in the profit and loss account.² Effective hedges often require customized OTC contracts.

¹The Generally Accepted Accounting Principles (GAAP) implement standards developed by the Financial Accounting Standards Board (FASB). FAS 133 is the relevant standard for derivatives.

²See www.fasb.org/summary/stsum133.shtml. This rule is not without controversy. See, for example, www.cmegroup.com/education/files/derivatives-and-hedge-accounting.pdf.

guarantees that the quantity of contracts that they need can be transacted at an acceptable price. These institutions are not speculating in the marketplace. They participate in the marketplace to insulate their business from often volatile commodity prices, interest rates, or foreign currency exchange rates.

Finally, OTC derivatives markets represent an alternative channel for finding willing counterparties, also known as “accessing liquidity.” Some transactions generally lack liquidity because of their unique economic terms, such as currency types, contract amounts, maturities, delivery locations, and underlying reference rates. OTC derivatives markets offer liquidity for some contracts that have no other trading venue. A trade can be done as long as there are at least two parties willing to negotiate a transaction.

Who Conducts OTC Trades?

The OTC derivatives market has two distinct segments—the customer market and the interdealer market. Customers are end-users of OTC derivatives, such as hedge funds, corporations, asset managers, and institutional investors, that need OTC contracts for one of the three reasons listed earlier. Customers execute OTC trades almost exclusively through dealers. Customers are not prohibited from trading directly with each other, but direct dealing (i.e., without involvement of a dealer) is relatively rare because of high transaction and search costs or lack of risk analysis expertise.

Dealers, in turn, are large financial institutions that have the capital and expertise to arrange complex, large-value trades. Dealers execute trades for end-users and then hedge their own risk by transacting in the interdealer market, or in exchange-traded markets. Dealers may also trade for their own account or act as market makers for OTC contracts. Table 1 lists the largest OTC dealers.

Interdealers are brokers that facilitate price discovery, risk management, and trade execution between the dealers. Interdealer brokers do not trade for their own accounts or participate in market-making activities. The interdealer market is global and over the last decade, it has been dominated by five publicly traded companies: ICAP plc, Tullett Prebon plc, BGC Partners Inc., GFI Group Inc., and Compagnie Financiere Tradition SA (Jeffs, 2012).

Table 1. Largest Dealer Banks

Bank of America Merrill Lynch
Barclays
BNP Paribas
Citigroup
Credit Suisse
Deutsche Bank
Goldman Sachs
HSBC
JP Morgan Chase
Morgan Stanley
Nomura
Societe Generale
The Royal Bank of Scotland
UBS
Wells Fargo

Source: ISDA Margin Survey, 2012, available at <https://www2.isda.org/functional-areas/research/surveys/margin-surveys/>.

How Are OTC Trades Conducted?

Historically, OTC transactions were conducted over the phone (so-called voice brokering). Price discovery was a somewhat manual process, as dealers sometimes talked to multiple counterparties in search of the best price for a trade. This process is still in place today for complex, highly customized transactions. However, beginning in the late 1990s, electronic platforms began to emerge for both the customer and interdealer segments. These platforms functioned like bulletin boards for posting bids and offers. Today, the electronic trading platforms are still separate for the two segments. In the customer segment, the platforms connect dealers to clients but don't allow clients to trade directly with each other. Conversely, in the interdealer segment, platforms function much like exchanges, where dealers can trade directly with each other.

From 2013 onwards, as a result of OTC market reforms dictated by legislation (see Box 2), certain OTC trades must be conducted on electronic trading platforms that qualify as “swap execution facilities” or SEFs for short. SEFs operate more like exchanges, with an order book of multiple bids and offers.³

The Key Role of the Master Agreement

For exchange-traded futures and options contracts, terms are standard and negotiable only with respect to price and quantity. OTC transactions, by contrast, involve contracts that are uniquely designed to manage a specific risk. For efficiency's sake, most OTC derivatives transactions are conducted using a template developed by the International Swaps and Derivatives Association (ISDA). The template is called the "Master Agreement." Individual transactions are "incorporated by reference" into the Master Agreement, which allows counterparties to enter into OTC transactions more expeditiously because many of the terms of trade have been outlined in advance. Annexes to the Master Agreement, such as the Credit Support Annex, are used to further define terms and conditions of individual transactions. Importantly from a counterparty exposure perspective, netting provisions in the Master Agreement permit parties to calculate a single bilateral financial exposure on a net basis, typically on a daily mark-to-market basis. Netting means that bilateral payments due to and from the parties are canceled out with only a residual amount remaining. As a result of these netting and contracting efficiencies, the Master Agreement has been called "the most important standard market agreement used in the financial world."⁴

Clearing and Settlement

Clearing and settlement of OTC contracts happens either at a central counterparty clearing house (CCP) or on a bilateral basis. Whether or not an OTC trade is cleared on a CCP depends on the degree of standardization of contract terms. Interest-rate swaps ("plain vanilla swaps") and credit default swaps tend to have the highest degree of standardization (FSB, 2013). A CCP, in turn, has discretion over whether to clear a contract based on its risk management policies. If not cleared at a CCP, open positions are held between the counterparties. In many cases, counterparties will post collateral to cover bilateral credit risk. Most foreign-exchange (FX) swaps, commodity swaps, and equity-based swaps are cleared bilaterally.

Box 2: Regulatory Pressure to Clear More OTC Trades

The story of financial market reform in the aftermath of the 2007 global financial crisis is by now widely known. Finance ministers and central bank governors of 19 major economies and the European Union, a group called the G-20, met in November 2008 in Washington, DC, with the intent of cooperating to “restore global growth and achieve needed reforms in the world’s financial systems.”¹ The group proposed an ambitious 47-step action plan that included reforming accounting practices, reforming credit rating agencies, reviewing bank capital requirements, strengthening bank risk management practices, and strengthening cross-border crisis management. One of the steps called for reforms in the OTC derivatives markets with regard to mitigating counterparty risk through central clearing and enhanced transparency.

At the following G-20 Summit in London in April 2009, leaders called on the newly expanded Financial Stability Board (formerly the Financial Stability Forum) to report on progress toward the 47 steps. The Financial Stability Board (FSB), in a November 2009 progress report, noted that global regulatory work on OTC derivatives market reforms had expanded to include a call for higher capital requirements on non-cleared OTC transactions. This report also called for private sector action to improve OTC risk management.

Finally, at the Pittsburgh Summit in September 2009, the G-20 crystalized its directive about OTC reform into what is now commonly known as the clearing mandate. “All standardized OTC derivative contracts should be ... cleared through central counterparties by the end of 2012 at the latest.” The directive also called for trading on exchanges, where appropriate, reporting of OTC trades to trade repositories, and higher capital requirements for non-cleared trades.²

In the U.S., the clearing mandate was implemented by Title VII of the Dodd–Frank Act of 2010. Rules promulgated by the Securities and Exchange Commission (SEC) and Commodity Futures Trading Commission (CFTC) will implement the clearing mandate, as well as other Title VII requirements, such as mandatory execution requirements for swaps that are eligible for clearing, mandatory reporting of all OTC swaps to a trade repository, and minimum margin collateral requirements for non-cleared swaps.³

¹See www.canadainternational.gc.ca/g20/summit-sommet/g20/declaration_111508.aspx?view=d.

²See http://europa.eu/rapid/press-release_MEMO-13-690_en.htm.

³For a summary of Title VII, see http://assets.openers.com/rpts/R41398_20121106.pdf.

Pricing and Valuation of OTC Derivatives

Because OTC derivatives are typically nonstandard contracts, the terms of which are not disclosed, market prices are not readily available as they are for bonds, equities, futures, and other traded instruments. Many OTC contracts are structured as swaps that

involve an exchange of fixed cash flows for “floating” cash flows, whose value is determined in the future by a specific reference rate (often Libor, the London interbank offered rate). (For credit default swaps, the floating cash flow will only be exchanged in the event of a default of the underlying bond. In addition, the buyer typically pays a premium to the option seller every six months.) For most swaps, the value at inception is zero because the price is set to a “par value swap rate” that equilibrates the present value of the future payments. Over time, as the reference rates fluctuate, the swap is marked-to-market (typically daily) to the new present value of future payments.⁵

“Futurization” of Swaps

A recent innovation that most industry observers believe has come about due to the Dodd–Frank OTC reforms is futures products that are intended to blend the advantages of OTC instruments with standard futures contracts—these are called swap futures. Swap futures are contracts listed on a futures exchange and are currently available for commodities and financial instruments. Swap futures are designed to mimic the cash flows or other terms of an OTC derivative with the benefits of lower costs associated with futures, including lower margin requirements.⁶

OTC Market Size

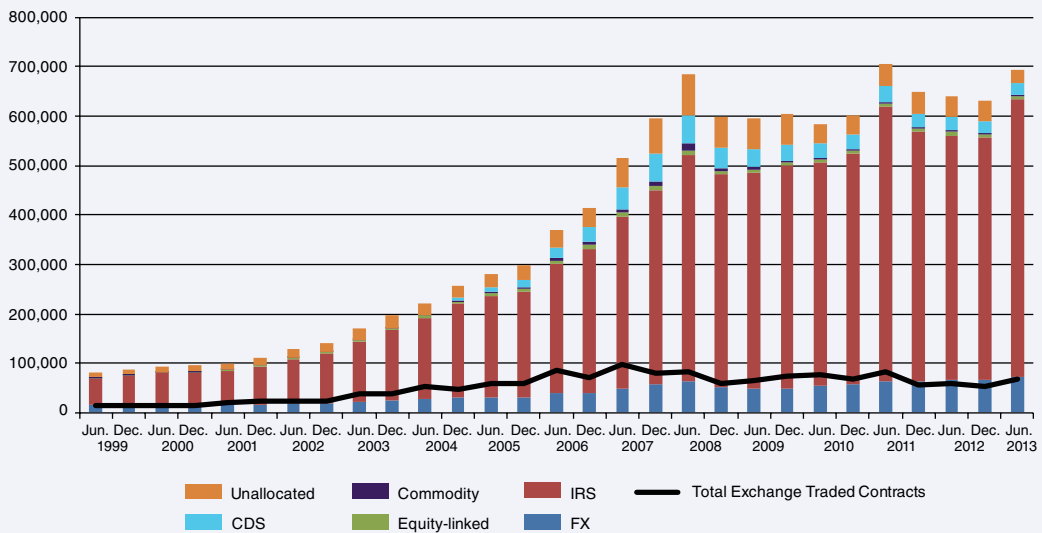
Measuring the size of OTC trades is somewhat complex because an OTC trade has two parts—the monetary amount that the trade counterparties agree to swap and the principal or notional value upon which the swap is based. OTC derivatives are sorted into “asset classes,” based on the underlying financial position on which risk transfer is based. The generally recognized asset classes are:

- Interest rate swaps (IRS)—typically the swap of fixed versus floating interest rates, with many variations that include forward rate agreements (FRA), interest rate caps, and cross currency interest rate swaps;
- Equity linked—often baskets of equities versus an index; a forward sale of shares;
- Commodities—often temporal, locational, or mixed commodity swaps; oil price swaps;

- Credit—insurance-like products such as credit default swaps; and
- Foreign exchange—includes FX options, non-deliverable forwards, and forward swaps.

The Bank for International Settlements (BIS) periodically surveys the major dealers to estimate the notional amount outstanding, as reported in figure 1.

1. OTC Derivatives Market (\$billions) – Notional Amounts Outstanding (by type)



Source: Authors' calculations based on data from Bank of International Settlements.

Notes

¹Over-the-counter markets are not unique to derivatives markets. Many financial instruments are traded over-the-counter, including bonds, equities, loans, repurchase agreements, currencies, and structured products.

²Basis risk introduces uncertainty and costs to hedging. Some traders trade basis differences as a strategy, aiming to profit from the divergence or convergence of prices in related markets. The actual result of a hedge that is subject to basis risk will be uncertain, because the changes in the value of the legs of the hedge relative to each other will not necessarily offset each other exactly. While this risk can be managed to a degree, such management adds to the cost of the hedge, thereby reducing the efficiency of the hedge. This is not to say that hedging with OTC contracts is without its costs either. Such costs are built into the price or spread charged by the OTC dealer, but unlike the exchange-traded case with basis risk, the OTC all-in costs are known in advance (i.e., the dealer bears the risk). In either case, hedging should not be perceived as being free; hedging comes at some cost whether implicit in the OTC contract or uncertain, as in the case of basis risk.

³For more information about SEFs and the regulations governing them, see www.cftc.gov/ucm/groups/public/@newsroom/documents/file/federalregister051613b.pdf and www.sullcrom.com/files/Publication/c6aced2f-aac3-4f3b-9d64-119d1be39fa4/Presentation/PublicationAttachment/bcc46272-7f6a-4c64-b14a-1390fd4eb3b/SC_Publication_Swap_Execution_Facility_Requirements.pdf.

⁴Justice Briggs, Case No: 7942 of 2008, Royal Courts of Justice, London, available at www.trusts.it/admincp/UploadedPDF/201102091349110.jEngPearson2010.pdf.

⁵For a clear and concise explanation of interest rate swap pricing, see www2.gsu.edu/~fncgdg/material/Swaps.pdf.

⁶See, for example, www.cmegroup.com/trading/interest-rates/files/understanding-dsf.pdf. The deliverable swap futures described therein are one type of swap future.

Appendix: History of Derivatives Market Regulation

It is fair to say that, over the years, regulation of OTC derivatives has been characterized by degrees of uncertainty. This uncertainty has been erased with detailed and prescriptive regulation in Title VII of the Dodd–Frank Act of 2010. Overall, the regulatory history of OTC contracts in the U.S. can best be understood within the context of the regulation of derivatives in general. Commodity derivatives trading in the U.S. began in the middle of the nineteenth century with the advent of grain futures contracts.¹ At the outset, derivatives markets were self-regulated, and certain aspects of self-regulation remain today. An important marker between exchange-traded and OTC markets came in 1922 with the Grain Futures Act and its successor, the 1936 Commodity Exchange Act (CEA), which declared off-exchange futures trading illegal. Over-the-counter trades, since they are not futures contracts as defined by the statutes, were not affected.

Over the following 40 years, derivatives exchanges introduced more standardized agricultural commodity derivative products, and in 1972 the first financial futures contracts were introduced by the International Monetary Market, a division of the Chicago Mercantile Exchange. Owing to the expansion of futures markets, in 1974 Congress amended the CEA to create a more comprehensive regulatory framework for futures trading. Among other things, the amendment created the Commodity Futures Trading Commission (CFTC), which is the market regulator for the derivatives industry.² CFTC jurisdiction did not extend to OTC markets.

As more and more types of futures and OTC contracts were created, definitional issues with regard to the regulatory jurisdiction of the CFTC arose (Tormey, 1997). The 1974 CEA amendment included a provision inserted at the request of the Treasury

Department. The Treasury was concerned that the new CFTC's jurisdiction could be construed so broadly as to include OTC foreign-currency option trading among banks, which the Treasury saw as being appropriately regulated by banking agencies and, thus, under its regulatory domain (Johnson and Hazen, 2004). The Treasury provision states:

*Nothing in this Act shall be deemed to govern or in any way be applicable to transactions in foreign currency, security warrants, security rights, resales of installment loan contracts, repurchase options, government securities, or mortgages and mortgage purchase commitments, unless such transactions involve the sale thereof for future delivery conducted on a board of trade.*³

While this amendment to the act essentially meant that OTC foreign currency contracts, such as forward and future agreements, were outside CFTC jurisdiction, there was still uncertainty about foreign currency options, as well as financial derivatives (Markham, 1987). The uncertainty led to litigation and a general uncertainty in the industry as to the scope of the CFTC's authority (Tormey, 1997).

In the early 1980s, the first swap contracts were devised. A prominent example, the IBM/World Bank 1981 swap, illustrates that the development of a global economy created a demand for innovative and highly customized derivative products. Through its corporate finance activities, IBM had large amounts of Swiss franc (CHF) and German mark (DEM) debt outstanding. Therefore, it had predictable debt-servicing payments to make payable in Swiss francs and German marks. Meanwhile, the World Bank faced a limit on the amount of Swiss denominated debt it could issue, but it had access to the U.S. debt market. The two sides privately negotiated a swap contract, the terms of which involved the World Bank issuing debt (i.e., borrowing dollars) in the U.S. market and swapping the U.S. dollar payment obligation to IBM in exchange for receiving IBM's CHF and DEM obligations. The swap allowed each party to maintain its debt positions (i.e., no debt was exchanged, nor was debt retired and reissued), and no foreign exchange transactions were necessary, because IBM had the CHF and DEM on hand and the World Bank had U.S. dollars available to satisfy its swap obligations.⁴

Soon thereafter, many other financial institutions started offering swaps. The overall market for swaps developed quickly due to the demand for hedging of interest rate, currency, and commodity price risks. Around this time, the ISDA was founded (in

1985), serving the role of a trade organization for participants in the market for over-the-counter derivatives. As noted earlier, the ISDA Master Agreement facilitated the growth of the OTC market.

In 1989, the CFTC issued the “Policy Statement Concerning Swap Transactions,” in which the agency took the position that most swap transactions “were not appropriately regulated” as futures contracts under the CEA. Since swaps contained features of an OTC futures contract, the question arose whether swaps would be subject to the mandatory exchange-trading requirement of the CEA and regulatory oversight by the CFTC (Johnson and Hazen, 2004). This uncertainty, as well as uncertainty from the Treasury Amendment, likely played a role in encouraging the OTC swap markets to shift overseas, namely to London, where financial markets were being deregulated.

Congress subsequently addressed the issue of regulating swaps in the Futures Trading Practices Act of 1992 (FTPA), which afforded the CFTC broad exemptive authority over swap agreements and certain hybrid bank products in order to address the legal status of swaps and the possible exemption of swaps from the CEA. This authority was utilized starting in January 1993, when the CFTC concurrently published separate final rules that generally exempted swap agreements and hybrid instruments from provisions of the CEA. In particular, the January 1993 “Exemption for Certain Swaps Agreements” was relied upon by the market to exempt swap transactions from CFTC regulation, as long as they were between eligible swap participants, were not standardized, had credit as a material term, and were individually negotiated (Gensler, 2010).

The Commodity Futures Modernization Act of 2000 (CFMA) ensured the deregulation of OTC derivatives in the U.S. It stated that transactions between “sophisticated parties” would not be regulated as “futures” under the CEA or as “securities” under the federal securities laws. Instead, the major dealers of those products (banks and securities firms) would continue to have their dealings in OTC derivatives supervised by their federal regulators under general “safety and soundness” standards.⁵

The Dodd–Frank Act of 2010 essentially undid the CFMA. Title VII of the act grants, among other things, direct regulatory authority over swaps to the CFTC and authority over security-based swaps to the SEC. In summary, Title VII requires that certain swaps must be executed on an exchange or “swap execution facility”

(SEF), and it imposes margin and capital requirements on certain swap deals and swap participants.⁶

¹For a nice history of the grain futures markets in Chicago, see Cronon (1991).

²The mission of the CFTC is to protect market users and the public from fraud, manipulation, and abusive practices related to the sale of commodity and financial futures and options and to foster open, competitive, and financially sound futures and option markets. See cftc.gov.

³7 U.S.C. § 2(a)(1)(A)(ii) (amended 2000), available at www.law.cornell.edu/uscode/text/7/2.

⁴See <http://hguywilliams.net/images/documents/fnce/6%20-%20FNCE5205/FNCE5206%20Lecture%209.pdf>.

⁵Congressional Research Service, 2011, “Derivatives regulation in the 111th Congress,” report, March 3, available at http://assets.opencrs.com/rpts/R40646_20110303.pdf.

⁶For an in-depth summary of new swap regulations, see www.fas.org/sgp/crs/misc/R41398.pdf.

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