

# **Trends in OTC Equity Derivatives: Where do we go from here?**

October 2006

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**ABOUT THE STUDY**

The goal of this paper is to shed light on the OTC equity derivative (OTCED) market with an eye towards understanding the operational risk that exists for market participants. To gain this understanding, the paper reviews the global nature of OTCED, the varied products that trade and the type of standards and documents that exist to facilitate trading and implement automated processing of these products.

**ABOUT THE AITE GROUP**

Aite Group, a leading independent research and advisory firm focused on business, technology and regulatory issues and their impact on the financial services industry, has produced the following white paper. It has been sponsored by the Depository Trust & Clearing Corporation (DTCC) to encourage broader understanding of the issues and obstacles facing the over-the-counter equity derivatives market. This white paper does not endorse any particular vendor, technology, or process and is the expression of Aite Group's independent analysis and opinions. All non-sourced percentages and numbers in this paper are Aite Group's estimates.

## IMPACT POINTS

- Over-the-counter equity derivative (OTCED) growth has been steadily increasing. The equity derivatives market grew by a year-over-year rate of 32% as of June 2006, according to the International Swaps and Derivatives Association (ISDA®). With increased usage and adoption of these instruments by more market participants, comes greater difficulty in managing trades and an increased number of backlogs of unconfirmed trades due to the inability of the existing operational infrastructure to support the rapid growth.
- An industry focus on operational risk has been heightened by the attention of the Federal Reserve Bank of New York during a September 27, 2006 meeting with 16 key industry firms in which it highlighted concerns about the slow pace of confirmations in equity derivatives.
- OTCEDs are truly a global phenomenon; they are actively traded in Europe, the Americas and Asia. Many of the issues that arise when analyzing OTCEDs stem from the global nature of trading, the very wide-ranging nature of participants, and the myriad of products that exist.
- Rapid growth in OTCEDs, however is constrained by the ability of operations to keep up with trading innovations. Some of these difficulties include: reaching documentation consensus among dealers and the buy-side community, actions that affect the underlying equity, the long turn-around times for confirmations to be finalized, the lack of standards in processing protocols, the high error rates in processing trades, and the training and retention of qualified operations staff.
- Documentation is highly fragmented and is subject to differences on a geographical, product and client basis. Solving some of the complexities in documentation and developing some standards is key to moving this market to a more automated environment.
- The current manually based, paper-intensive environment is fraught with excess operational risk for market participants. According to the ISDA, about one trade in five is subject to some type of processing or trade capture error. In a statement following its meeting with the 16 leading dealers in the derivatives market, the Federal Reserve Bank of New York said, "Finally, we look forward to seeing the industry improve the automation and standardization of over-the-counter equity derivatives trading and reduce the current levels of unconfirmed trades."

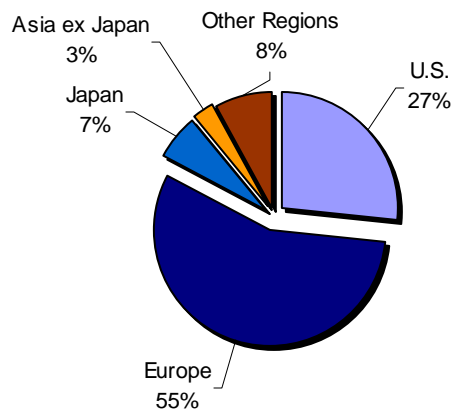
## MARKET OVERVIEW

Over-the-counter equity derivatives (OTCEDs) profoundly impact a wide array of investors -- from small retail investors in Europe who are looking for yield, to the largest corporations, investment banks, asset managers, and hedge funds that are looking for diversification of portfolios, protection from volatility, and specific strategies to gain exposure to equity markets. OTCED is a highly client-driven market segment. By and large, most of the trading occurs between dealing banks and investment managers, corporations, hedge funds, and high-net worth individuals.

OTCEDs are truly a global phenomenon; they are actively traded in Europe, the Americas (Canada, Latin and South America, the United States) and Asia. Many of the issues that arise with OTCEDs stem from the global nature of the business, the very wide-ranging nature of participants, and the myriad of products that exist. According to the Bank for International Settlements (BIS), Europe leads the trading in equity derivatives with 55% of the global market. The United States represents 27%, Japan follows with 7%. Other parts of the Americas have approximately 5% and Asia ex Japan about 3%.

Figure 1: Global Geographical Breakdown of OTCED Trading by Notional Value

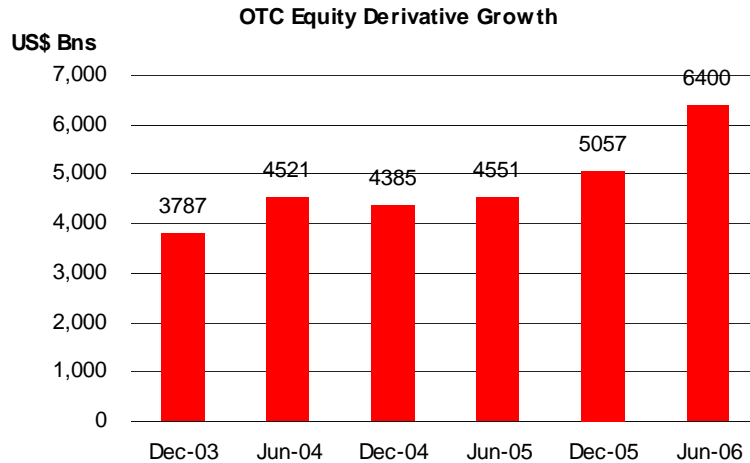
### Geographical Breakdown of OTC Equity Derivatives



Source: BIS

OTCEDs have been a substantial driver of profits for dealers and investors and a source of ongoing financial product innovation. The most recent data supplied by the ISDA indicates that OTCEDs have grown by about 32% over the last year. Figure 2 below shows the growth in the notional value outstanding in this market.

Figure 2: Global Notional Amount Traded Outstanding of OTCEDs



Source: ISDA

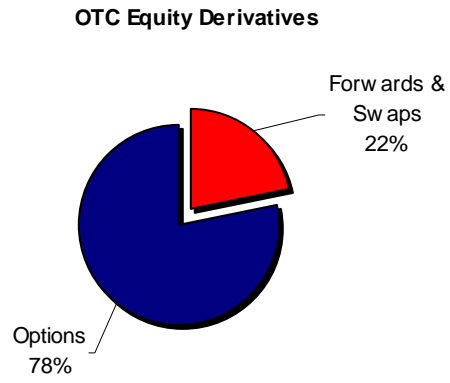
For those not directly involved in this market, its very existence is a source of confusion. Most everyone has at least a very basic understanding of stock trading on exchanges, and many have had some exposure to the concept of equity derivatives, typically through options and exchange-traded futures. However, the fact that many single-name options, equities and equity indices trade over-the-counter and also on exchanges is generally not well understood. In Europe, where the OTC option business is most pronounced, over 75% of all single-name equity options trade over-the-counter.

Despite the multitude of products that exist, the BIS divides the universe of OTCED products into two broad classes for reporting purposes: options representing 78% of the market, and forwards and swaps, with 22% (see Figure 3 on the following page). Greater granularity is provided when the universe is divided broadly into the following four areas (in descending volume order): options, equity swaps, volatility swaps and structured products. Tables 1 and 2 of Appendix A describe each of these product groups and detail the participants in this market and the specific examples of the types of OTCED products they trade.

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Figure 3: Global Breakdown of OTCEDs by Product

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Source: BIS

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## PROCESSING OVERVIEW

In September 2006 the Federal Reserve Bank of New York hosted its third meeting of the major OTC derivatives dealers. During the past year, the Fed has convened these meetings as a means of highlighting some of the operational concerns associated with the trading and processing of OTC derivatives. Specifically, the meetings focused on the area of backlogs of confirmations and the lack of technology infrastructure in the credit derivatives market. At the same time, the Fed pointed out that it is concerned with OTCEDs and its desire for the industry "to improve the automation and standardization of over-the-counter equity derivative trading".

The current manually based, paper-intensive environment is fraught with excess operational risk for market participants. The following section highlights where that operational risk stems from, and the challenges to migrate the OTCED market away from its current state, to a condition of greater standardization and increased automation in the processing of these trades.

## PROBLEMS CONSTRAINING GROWTH

Several areas of concern have been identified that are constraining growth in OTCEDs:

- Documentation complexities across geographical and product lines;
- Differences in the needs of the dealers and the buy-side community;
- The long turn-around times for confirmations to be finalized;
- The lack of standards in processing protocols;
- The high error rates in processing trades; and
- The lack of proper training and issues in retention of qualified operations staff.

## OTCED WORKFLOW

How are deals accomplished in OTCED? The current state of the market is paper-intensive, manually based, and deal-specific. Once two counterparties agree to the economic details of a trade, the machinery of the post-trade process begins operating. An indicative workflow for a generic OTCED transaction is provided below:



Documentation	Trade Execution/ Trade Data Capture.	Confirmation Generation and Dispatch.	Pricing.	Negotiation.
Master Agreement.			Corporate Actions.*	Unwinds, Assignments, Expiry.
Credit Support.	Affirmation of Economic Detail.	Confirmation Matching.	Counterparty Monitoring.	Final Payment.
		Exercise.		
		Amendments.		
		Settlement.		

Source: Aite Group

\*See Appendix C for a discussion of corporate action impacts on OTCED

## PAPER, PAPER AND MORE PAPER

The primary difficulty in increasing automation in OTCED is in the area of the legal documentation that needs to exist between counterparties. Developing a means to understand the complexities of the documentation issue from the point of view of buy-side clients and dealers would be an important first step in mitigating operational risk and increasing automation in OTCED.

Documentation in OTCEDs is fragmented, regional and complicated. Both ISDA and non-ISDA documentation coexist in places across the globe. Master confirmation agreements (MCAs), which are 10-15 page legal documents, in OTCEDs are a function of the region where the underlying equity trades and the product. Four regions have evolved their own documentation: the Americas, Asia ex Japan (AEJ), Europe and Japan. Outside of variance swap documentation for hedge funds, all of the MCAs are inter-dealer agreements, which can cause considerable distress for clients trying to use this documentation, particularly regarding the issue of calculation agent (see Appendix B for a definition). In addition, efforts are currently being made to provide documentation for dividend, dispersion, and equity default swaps. A representation of the state of MCA documentation that currently exists is available in Appendix B.

In order to fully understand some of the difficulties that exist in this market, key points such as the underlying equity, in which nation it trades, and on which exchange it trades must be known. This is important information for this discussion since the relevant counterparty documentation that will be applicable is a function of where the underlying equity trades. Thus, a dealer in the United States who is trading with a European institutional money manager in a derivative with an underlying stock listed on the Tokyo exchange would be subject to the Japanese documentation.

Currently, not even all the dealers have signed MCAs between them. When it comes to getting the proper documentation to their buy-side clients, dealers need to establish what are the exact products and regions that are important to that client and have that documentation put in place as a starting point. In many cases large packets of legal documentation, spanning multiple regions and products are sent to clients, overwhelming them with massive packages of legal documentation. When looking at the possible combinations of product and regional documentation, there is a very cumbersome array of possibilities. They quickly add up to a significant universe of documents from both a dealer's and a buy-side client's point-of-view. For instance, a typical, large buy-side firm with just five OTCED dealer relationships would be looking at about 80 possible combinations of product and regional legal documentation. This certainly is a challenge that needs to be tackled to simplify processing issues in the OTCED space. Concurrently, as MCAs are put in place between counterparties, the transaction supplements which describe the specific economic details of a trade, for a given product, can be put in place to form the basis for automating OTCED

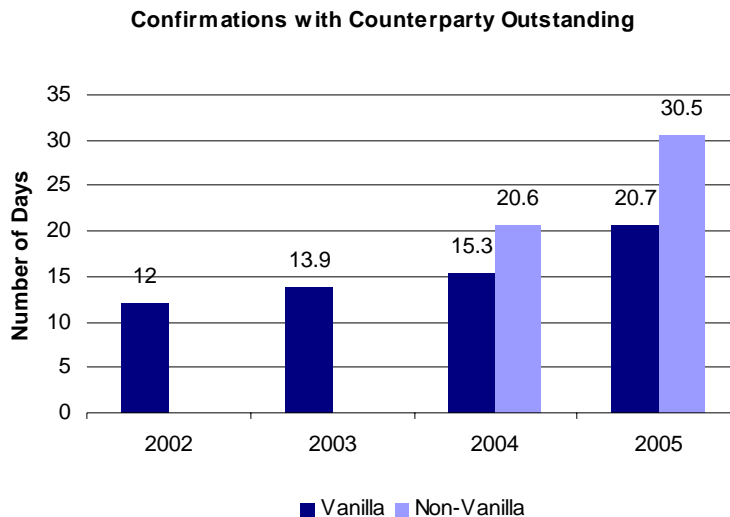
transactions. (See Appendix B for an example of the fields that make up a typical transaction supplement).

This hodge-podge of regionalized (MCAs) and non-ISDA documentation across the spectrum of products suggests that moving to more automated processes will pose considerable difficulties without substantially more standardization in documentation.

## CONFIRMATION CONUNDRUM

Many participants have expressed dismay at the length of time it takes to affirm and finally confirm all the details of an OTCED trade. The delays, stemming from complexities in documentation and over-burdened operational staff, can lead to confirmations remaining outstanding for days, weeks and even months. Often, the maturity of the OTCED is similar to the time it takes to file a completed and correct confirmation. According to BIS, 56% of all contracts have a maturity of one year or less. The chart below gives an indication of the durations of outstanding confirmations -- the time it takes for the generation of a confirm to the time it is returned from the counterparty -- for the largest dealing banks. (Vanilla refers to simple products; non-vanilla refers to more complicated or structured products.)

Figure 4: Number of Days it Takes to Get a Confirmation Back From a Counterparty



Source: ISDA

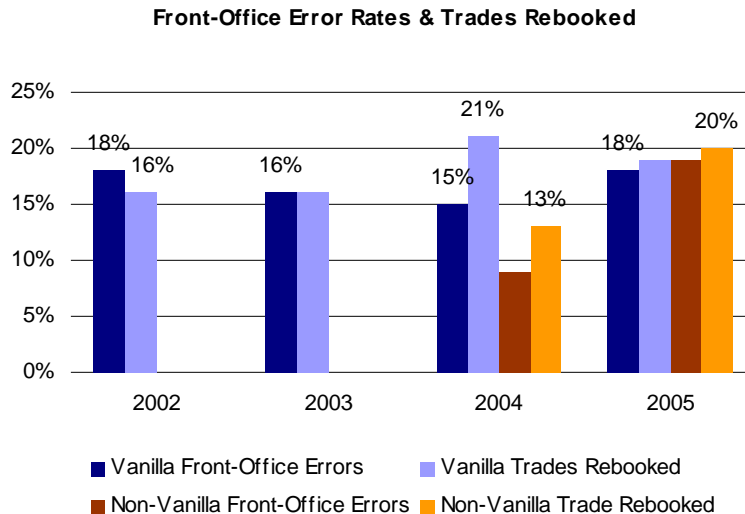
## A LACK OF STANDARDS

In a general sense, there is very little standardization in identifying OTC derivatives instruments. There are no general identifiers like CUSIP numbers. Specifically, in stock instruments, there is almost no standardization from the perspective of properly identifying underlying equities. For instance, traders in the market will often use Bloomberg codes to identify the underlying equity in an OTCED. The codes then have to be mapped, for translation purposes, onto another set of codes (like the Reuters Instrument Code (RIC)) or within the utilities.

## ERRORS ABOUND

Other areas of concern are the high error rates and the large number of trades that have to be rebooked. The need to rebook stems from improperly entered trades in a bank's or client's system due to entering incorrect trade details. Rebooking is quite an issue, as it means incorrect data has been entered into trading, risk and accounting systems, and it has yielded inaccurate risk and exposure profiles. Trades in OTCEDs suffer from error rates and rebooking rates of around 20%, according to the ISDA. This means, as a conservative estimate, approximately US\$400 billion in notional trade amounts initiated between June 2005 and June 2006 had some type of error or was rebooked. The following chart reveals the nature of errors and rebooking:

Figure 5: Front-Office Error Rates and the Percentage of Trades Rebooked



Source: ISDA

## STAFFING STRAIN

Finding suitably qualified and properly trained staff is just one of the issues that firms face -- the other is keeping them. Operational expertise in OTCED is quite hard to come by and is expensive to maintain. Staff trained at the large dealing banks is particularly welcomed at large hedge funds and institutional money managers that are willing pay for talent across their product exposure. Currently, operational staff turnover is running between 30%-40% for staff with OTC derivative expertise. Smaller players have to accept the fact that they will have to rely on outside assistance or train in-house staff to develop the skill sets necessary to navigate the OTCED waters.

The situation begs a solution; many vendors and utilities are competing to evolve answers in the short- to medium-term. However, solutions that make sense in the long-term will probably evolve around a unified set of documents that can be used across a wide range of geographical regions, products and clients.

## LOOKING AHEAD

### FACING THE CHALLENGE

The environment in OTCED, from many participants' perspectives, is constrained in growth due to operational and processing difficulties. Dealers are trying to grow their business, but they are unable to properly scale given the current limited automation in the marketplace. Buy-side clients are interested in expanding in this market, but they do not have the operational expertise to handle many of the challenges. Business in OTCED has outpaced operations' ability to keep up with trading.

Currently, market participants are looking for ways to increase scale and efficiencies while decreasing errors and the time to confirm trades. Increased trading along with the increased adoption of OTCEDs by a wider audience is driving the need for solutions that will ease many of the issues discussed herein. The following are some examples of solutions that range from addressing either the market in its entirety, as much as that is possible, to solutions that solve specific product issues:

### SUPPORT SERVICES

- **Prime Broker Intermediation.** An important factor moving forward in the general OTC derivative space is intermediation services by prime brokers. Prime brokerage is also extending beyond hedge funds; many broker/dealers with prime services are actively marketing to institutional money managers that have been moving into OTC derivative trading. Prime brokerage intermediation in equity derivatives provides clients with several important advantages (from a collateral perspective) as well as the operational simplicity of having to deal solely with your prime broker (from a documentation point-of-view). Once documents are in place with this prime, they will face, as counterparty, all the other dealers with whom a client trades. However, more and more funds and investors are looking to work with multiple primes which may add significant complexities to this process.
- **Outsourcing Administrators.** A variety of firms exist to allow hedge funds (and increasingly other types of institutional managers) to outsource the difficult parts of the operations associated with trading in OTCEDs to specialized OTC derivative administrators that have specific expertise in servicing this part of the market.

## AUTOMATED SERVICES

- **Dealing Banks' Portals.** Clients with proper documentation in place with a specific dealing bank can log into the bank's OTCED portal to check confirmations. Dealing banks are attempting to publish the confirms to these sites so the clients can check trade details. This is not necessarily a real-time solution nor is it convenient for clients with high volumes of transactions or those dealing with many dealers.
- **Euronext.liffe Bclear.** The Bclear service, which was launched last fall, has gained considerable traction in the European OTC options business. It offers an exchange-like service for OTC equity and index options. This is certainly a relief to many in the European OTC options business. The model of a quasi-OTC-exchange hybrid seems to be working for this sector of the market.
- **DTCC Deriv/SERV.** Deriv/SERV has worked closely with the buy- and sell-side through weekly working groups to help define where automation is going in OTCED. A staff of product experts, technologists and client relationship managers is wholly dedicated to equity derivatives; the service supports a variety of products in OTCED including equity and index options around the globe, equity and index swaps in Europe and the Americas, and equity and index variance swaps in Europe and the Americas. A schedule is in place to offer support for new products on a quarterly basis.
- **SwapsWire.** Known primarily for its work in interest rate derivatives and their affirmation model, SwapsWire is currently offering OTCED solutions in Europe and Japan. They are building their approach around a master agreement and a transactional supplement approach. Much of their business is currently in the European options business.

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## APPENDIX A

### Definitions:

### Equity Options:

Single-name equity options refer to options on individual equities (i.e. a put or call on IBM, Vodafone, or Hitachi). Equity index options refer to options on stock indices (i.e. a put or call on the S&P 500, EuroStoxx 50, or Nikkei 225). Options include the plain-vanilla products that trade OTC (*look-alikes*) as compared to on an exchange. Some of the reasons why these trades do not go on an exchange include the avoidance of leaving a footprint on very large trades, mitigating exchange costs (clearly a function of counterparty risk and more pronounced in Europe), developing an expiry date that perfectly suits the clients' needs, or just the avoidance of mixing OTC and listed in one transaction. The nature of option trading varies widely across the globe. In the more fragmented and costly exchange environment of Europe and Japan, the *look-alike* business drives tremendous flows, particularly in single-name equity options. (It is estimated that about 75%-80% of these options trade OTC in Europe.) In the United States, where the domination of the many options exchanges and the "electronification" of options are occurring on a rapid basis, the *look-alike* business becomes less important. The liquidity that exists across the growing number of options exchanges and the availability of competitive pricing is driving much of the OTC single-name options trading onto exchanges in the United States. This possibly explains the nearly two-to-one trading of OTC options in Europe versus the United States.

### Equity Swaps:

Equity swaps provide a means of getting equity exposure through a counterparty without necessarily taking a position in the actual cash equity. They provide funding, tax, and collateral advantages, and in a regulatory sense, they allow investors to take a view without affecting the underlying equity. Dividend swaps, which are very popular in Europe for their tax benefits, provide a means to expose investors directly to index and equity dividends while removing other factors from the equation. Total return swaps allow direct exposure to equity or equity index returns in return for a periodic floating rate. Another product, the equity default swap, has seen periods of interest and also apathy by investors. The equity default swap is another product that sees occasional interest, as more and more strategies look across asset classes; it acts as a default swap linked to the underlying stock's price.

### Volatility Swaps:

The volatility swap is a product that is used to take a direct view on the volatility of an underlying equity or equity index. The focus of this product set is currently

the variance swap. Variance is volatility squared and is particularly useful for mapping the volatility profile that is typical in equity options. Variance swap transactions have grown dramatically and have been driven by hedge funds and large institutional traders. Variance swap growth will exceed 100% this year, and it is quickly moving from its hedge fund base to other types of institutional investors.

### Structured Products:

These products can incorporate numerous asset classes: at minimum cash equity and a derivative product. Structured equity provides a means of exposure to an equity or equity index with pre-determined upside and downside risk. These are the types of products that have been particularly interesting to retail investors in Europe. This class is broad and is only subject to the limits of financial engineers' imaginations. In the largest European markets, growth has recently been in the range of 25%-40% per year for these products. From the perspective of this report, there are two salient features: Each deal is different, and they are equity-based.

Appendix Table 1 below gives an indication of some of the products that exist by product class. The Classes are arranged in descending volume order:

Table 1: OTC Equity Products

Class	Examples*
<b>Options</b>	<p><b>Look-Alikes</b> (i.e., looks like an exchange-traded call or put): Single Stock (e.g., IBM, Vodafone, Hitachi); Index (e.g., S&amp;P, EuroStoxx, FTSE, Nikkei, etc.).</p> <p><b>Exotics:</b> Barrier, Rainbow, Quantos, Margrabe, Mountain Range (Himalayan, Everest, Atlas, Annapurna, Altiplano), Cliquets, Binary.</p> <p><b>Options on Swaps:</b> Swaptions</p> <p><b>Types of Expiries:</b> American, European, Asian, Bermuda.</p>
<b>Swaps</b>	Equity Swaps, Equity Default Swaps, Total Return Swaps, Dividend Swaps.
<b>Volatility</b>	Variance Swaps, Volatility Swaps, Dispersion Swaps, Gamma Swaps.
<b>Structured Products</b>	Products constructed from multiple products across currency and asset classes.

Source: Aite Group

\*This list is designed to give a sense of the product offerings and is not to be considered comprehensive.

Appendix Table 2 below describes the types of market participants that trade OTCED, the products they might be using and their specific purposes for involvement:

Table 2: Major Players

<b>Player</b>	<b>Products</b>	<b>Why Involved?</b>	<b>Side</b>
<b>Hedge Funds</b>	All. They are a major client in volatility products.	Trading, hedging, investing, volatility trading, replication of cash, relative-value strategies, tax efficiency, correlation trading, and ease of implementing positions.	Buyer/ Seller
<b>Investment Banks</b>	All	Trading, investing, hedging, market-making, client-service, structuring, and correlation.	Buyer/ Seller
<b>Commercial Banks</b>	Options, equity swaps and structured.	Hedging, yield-enhancement strategies, and client-service.	Buyer
<b>Asset Managers</b>	Options, equity swaps, nascent volatility swaps, and structured.	Hedging, investing, yield-enhancement strategies, portfolio protection, and tax efficiency.	Buyer
<b>Retail Accounts</b>	Equity swaps and structured	Yield-enhancement strategies and tax efficiency.	Buyer
<b>Corporations</b>	Options, equity swaps, and structured.	Hedging, tax efficiency, and implicit diversification.	Buyer

Source: Aite Group

## APPENDIX B

Appendix Table 3, below, is a grid describing the state of documentation by product across the four geographical regions:

Product	Americas	Europe	Japan	Asia ex Japan
<b>Equity Options</b>	2004 ISDA Americas Interdealer	Non-ISDA Master Agreement	2005 ISDA Japanese Interdealer	2005 ISDA AEJ Interdealer
<b>Equity Index Options</b>	2004 ISDA Americas Interdealer	Non-ISDA Master Agreement	2005 ISDA Japanese Interdealer	2005 ISDA AEJ Interdealer
<b>Equity Swaps</b>	2004 ISDA Americas Interdealer	Non-ISDA Master Agreement	Not Currently Available	2005 ISDA AEJ Interdealer
<b>Equity Index Swaps</b>	2004 ISDA Americas Interdealer	Non-ISDA Master Agreement	Not Currently Available	2005 ISDA AEJ Interdealer
<b>Equity Variance Swaps</b>	2004 Americas Interdealer Annex ----- 2004 Americas Master Variance Swap Confirmation Agreement	ISDA Working Group Circulating Draft	ISDA Working Group Circulating Draft	Not Currently Available
<b>Index Variance Swaps</b>	2004 Americas Interdealer Annex ----- 2004 Americas Master Variance Swap Confirmation Agreement for Hedge Funds	ISDA Working Group Circulating Draft	2006 ISDA Japanese Interdealer	ISDA Working Group Circulating Draft

Source: ISDA

**Definitions:** Calculation Agent-The counterparty who determines the value of the OTCED and/or the amount owed by each counterparty based on the valuation.

Typical fields for a transaction supplement for an option trade:

1. Type of option (i.e. put or call)
2. Notional currency amount of trade (dollar, yen, Euro, etc.)
3. Date of trade
4. Tenor: expiry date and type (i.e. American, European, Asian, Bermudan)
5. Legal name of equity traded
6. Exchange-related exchanges
7. Price of equity at trade time
8. Strike Price
9. Buy/Sell
10. Counterparty 1 & Counterparty 2

Other information might be required depending on product. Additionally, other fields might appear that are derived from the ten fields in the above example: such as the premium payment.

## APPENDIX C

### THE IMPACT OF CORPORATE ACTIONS ON OTCED

Anything that affects that stock will correspondingly affect options, swaps or other derivatives related to the underlying equity. Any of the nearly 100 identified corporate actions that take place will affect the underlying equity of an OTCED. Overall corporate actions, on a global basis, are in the millions of events per year, with significant costs associated with the handling and mis-handling of these events. The ability to maintain a proper feed of relevant data for corporate actions and the affect on the underlying equity to the derivatives transaction in place is certainly one of the challenges in OTCED over the lifetime of the trade.