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An Analysis of CDS Transactions: Implications for Public Reporting

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Abstract

Ongoing regulatory reform efforts aim to make the over-the-counter derivatives market more transparent by introducing public reporting of transaction-level information, including price and volume of trades. However, to date there has been a scarcity of data on the structure of trading in this market. This paper analyzes three months of global credit default swap (CDS) transactions and presents findings on the market composition, trading dynamics, and level of standardization. We find that trading activity in the CDS market is relatively low, with a majority of reference entities for single-name CDS trading less than once a day. We also find that a high proportion of CDS transactions conform to standardized contractual and trading conventions. Examining the dealer's role as market maker, we find that large trades with customers are generally not rapidly offset by further trades in the same reference entity, suggesting that hedging of large positions, if taking place, occurs over a longer time horizon. Through our analysis, we provide a framework for regulators and policymakers to consider the design of the public reporting regime and the necessary improvements to data collection to facilitate meaningful price reporting for credit derivatives.

Keywords: clearing eligible, credit derivatives, dealer hedging, large trades, price reporting, public transparency, standardization, trade repository

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I. Executive Summary

The over-the-counter (OTC) derivatives market will be evolving in the coming years to meet new regulatory and legislative demands for improvements to market design and infrastructure, including increased use of central clearing and greater transparency.

In response to a supervisory call in early 2010 for greater market transparency, market participants provided an international group of supervisors (the OTC Derivatives Supervisors Group) with access to three months of CDS data to analyze how greater transparency could improve financial stability. The Federal Reserve Bank of New York analyzed this data and reported findings to the OTC Derivatives Supervisors Group. The authors are now releasing their analysis to enhance public understanding of the CDS market, and as additional outreach to other policymakers, regulators or organizations who are considering introducing public reporting to the CDS market.

A very high proportion of CDS trades in our dataset conformed to the standardized economic terms introduced in early 2009 under the industry's Big Bang Protocol.[1] We further find that trading was concentrated in the 5 year tenor and in standard notional sizes. Uniform contractual and trading conventions enhance the ability of the public to interpret reported prices, since the economic features of the trade are comparable across a broad set of transactions.

The low trade frequency of most CDS in our dataset combined with relatively large trade sizes highlights the important liquidity-providing role of the market marker in the CDS market. Understanding how market makers hedge their positions is important for policy makers when designing a trade reporting regime. Our analysis finds little evidence that dealers hedge large trades using other transactions in the same instrument type within the same or next trading day. This fits with anecdotal evidence that dealers typically hold on to risk taken on in customer trades for some time before hedging, and implies that when crafting large trade reporting rules, policy makers will need to consider what impact they are likely to have on this approach to market making.

The treatment of large trades is an important consideration for any reporting regime, and our analysis of trading patterns offers some insight into key issues. Our analysis of the size and frequency of CDS trading indicates that if the threshold for classifying large trades in a trade reporting rule were set on the basis of notional trade size, then it might be possible to adopt a relatively streamlined approach as within each distinct segment of the market (corporate single-name, sovereign single-name, and index) trades cluster around a few typical sizes (such as $5 million or $10 million). By contrast, a threshold set in terms of traded volume over a defined time period would require a more granular set of thresholds tailored either to each specific instrument, or to narrow groupings of instruments with similar trade frequencies, due to the heterogeneity in trading activity across all segments.

The data issues we encountered in this study, including the lack of execution level information (e.g. price and time stamps) and some inconsistencies in the presentation of underlying reference data

[1] The Big Bang protocol introduced new CDS market trading conventions aimed at standardizing trading in most single-name products. For example, for Standard North American corporate products the protocol introduced four standard effective and maturity dates, two standard coupon levels and a default contract state for high yield products that does not include restructuring as a credit event (for investment grade contracts, restructuring is included). For Standard European corporate products, there are four standard effective dates and four coupon levels. For more information, see http://www.isda.org/bigbangprot/bbprot_faq.html. CDS on ABS, municipals and loans were not included in the Big Bang, although a new standard contract for LCDS was released in March 2010.

information, highlight the need for additional work by regulators and infrastructures to ensure meaningful transaction level reporting.

These findings are based on an analysis of trading dynamics in CDS markets that yielded the following results:

- **We found a broad level of participation in the CDS markets.** 50-100 unique[2] market participants traded on a daily basis in single-name CDS and an average of 135 traded daily in the index markets. More than half of all transactions were between G14 dealers. Dealers, on an aggregate basis, tended to be sellers of protection more often than they were buyers. We found a low to moderate level of concentration of trading activity within the dealer community.
- **CDS trading activity was heterogeneous.**
    - **On average, trade frequency in single-name reference entities was relatively low and varied widely by reference entity.** A majority of the single-name reference entities traded less than once a day, whereas the most active traded over 20 times per day. Few specific reference entities were consistently active during the period; the most actively traded reference entities changed markedly over our three month sample, suggesting that activity is often driven by specific credit or economic events impacting the credit quality of the underlier.
    - **Trading in the CDS indices was more frequent, on average.** The most active indices were traded more than 100 times per day. The CDX North American Investment Grade and Europe iTRAXX consistently traded at a significantly higher frequency than other indices over the sample period. Off-the-run indices traded more infrequently compared to their on-the-run counterparts.
    - **At a broad product level, modal notional trade sizes were similar for single-name CDS; there was more dispersion for indices.** For corporate and sovereign single-name contracts, the typical trade size was 5 million (dollar or euro); however, average trade sizes were considerably larger in sovereign reference entities. Typical trade sizes in index CDS were either 10 or 25 million (dollar or euro) with the exception of the two most active indices, the CDX North American Investment Grade and Europe ITRAXX, where mean trade sizes were two to three times greater. Trade sizes in off-the-run indices tended to be larger than their on-the-run counterparts.
    - **Clearing-eligible products within our sample traded on more days and had more intraday transactions than non-clearing eligible products.** They did not exhibit trade size patterns that were different from non-clearing-eligible instruments.

II. Introduction

The over-the-counter (OTC) derivatives market provides a venue for market participants to transact in flexible and customizable contracts for the purposes of both hedging credit risk and taking outright credit risk positions. The OTC Derivatives Supervisors Group[3] (ODSG), an international body of regulators of the major 14 OTC derivatives dealers[4] (the G14 dealers), was formed in 2005 to work with market participants to improve the resilience and operational efficiency of OTC derivative markets.

[2] In our dataset unique market participants are counted at the parent entity level.
[3] For more information please see http://www.newyorkfed.org/markets/otc_derivatives_supervisors_group.html.
[4] The G14 dealers included Bank of America-Merrill Lynch, Barclays Capital, BNP Paribas, Citi, Credit Suisse, Deutsche Bank AG, Goldman Sachs & Co., HSBC Group, J.P. Morgan, Morgan Stanley, The Royal Bank of Scotland Group, Société Générale, UBS AG, and Wachovia Bank, N.A.

The CDS market became a particular focus of regulatory attention in 2005 due to the market's rapid growth and the jump to default risk inherent in the structure of the instruments. In recent years supervisors have also become concerned about the implications of the decentralized nature of these markets for the ability of firms to adequately manage their derivatives exposures.[5] For this reason, across all major financial centers, lawmakers and regulators are currently in the process of drafting new laws and implementing rules governing derivatives trading that would require greater use of centralized market infrastructure for trading and counterparty risk management, greater transparency of trading information and more robust risk management practices.

One major component of the regulatory drive to reform OTC markets will be the introduction of transaction reporting requirements. Policymakers envision public trade reporting as part of a range of regulatory initiatives to increase liquidity, reduce transaction costs, provide greater transparency and help to move the OTC derivatives market toward greater standardization.[6]

A detailed understanding of the dynamics of OTC derivatives markets is crucial to enable regulators to design appropriate new regulations for these markets. Unfortunately, the lack of transactions data is a barrier to regulators understanding how these markets currently operate.

The benefits and risks of the introduction of public reporting in the corporate bond markets have been examined in detail in the literature,[7] but few studies have focused on the OTC derivatives markets.[8] This paper examines three months of detailed transaction-level data from the credit default swap market. This dataset allows us to evaluate key elements that are relevant to the formulation of public transaction reporting requirements, such as the market's size and composition, the frequency of trading activity and the level of standardization of CDS products.

As a consequence of our analysis, we hope to enhance public understanding of trading activity in the CDS market and inform the design of public reporting regimes. In particular, we examine the issues of large trade thresholds and hedging behavior of a dealer following an initial CDS trade, which are of interest to regulators and market participants involved in ongoing discussions of special reporting rules for large sized trades. Additionally, our analysis of product standardization and consistency of data standards can help to inform policymakers working on improving the market design of OTC derivatives. We also identify some issues that should be considered if trade repositories are to be used as disseminators for transaction-level information.

We provide background on the CDS market, a summary of supervisory initiatives related to post-trade reporting and an overview of our data set in Sections III to V. In Sections VI to IX, we present our analysis of the level of product standardization, patterns in trading activity and trade sizes and characteristics of clearing-eligible trades. In Sections X to XII, we discuss some policy implications and implementation

[5] See the US Treasury's roadmap for regulatory reform in the OTC derivatives market released in May 2009: http://www.treasury.gov/press-center/press-releases/Pages/tg129.aspx

[6] See speech by Treasury Secretary Timothy Geithner at the International Monetary Conference: http://www.treasury.gov/press-center/press-releases/Pages/tg1202.aspx and also Federal Reserve Bank of New York President William Dudley's Remarks at the Council of Society Business Economists Annual Dinner, London, United Kingdom: http://www.newyorkfed.org/newsevents/speeches/2010/dud100311.html.

[7] For papers on the introduction of transparency in the OTC corporate bond market, please refer to: Edwards, Amy, Lawrence Harris, and Michael Piwowar, 2007, "Corporate Bond Market Transparency and Transaction Costs", *Journal of Finance* Vol. 62, 1421-1451; Goldstein, Michael A., Edith S. Hotchkiss, and Erik R. Sirri, March 2007, "Transparency and Liquidity: A Controlled Experiment on Corporate Bonds", *Review of Financial Studies* Vol. 20, No. 2, 235-273; and Bessembinder, Hendrik, and William Maxwell, 2008, "Markets: Transparency and the Corporate Bond Market", *Journal of Economic Perspectives* Vol. 22, 217-234.

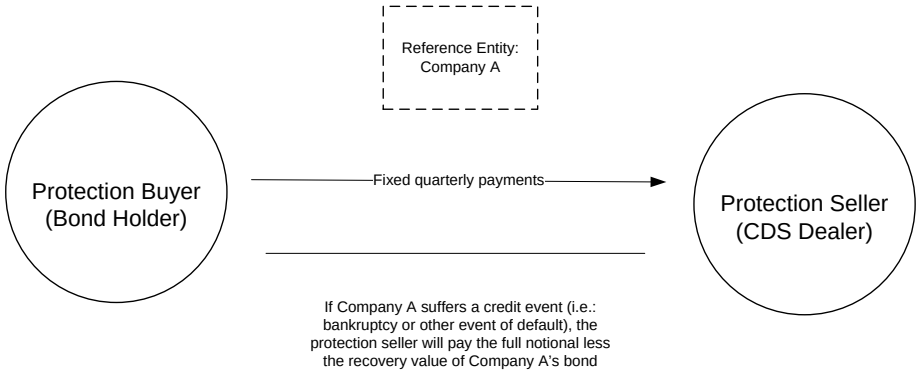
[8] On January 18, 2011, ISDA, SIFMA and market participants released a study discussing block trade reporting for the OTC derivatives market as part of a joint public comment letter to the SEC, http://www2.isda.org/functional-areas/public-policy/united-states.

challenges for the design of post-trade transparency rules. We focus on large trades and hedging behavior to show how the design of the rules might affect reporting and highlight the importance of grouping contracts for meaningful price reporting. Our discussion in Section XII of issues related to meaningful price reporting may be of particular interest to policymakers considering the use of data for regulatory reporting, the importance of consistency in data standards and the role of trade repositories. We offer our conclusions in Section XIII, and additional background on our data collection process in an Appendix.

III. The CDS Market

A derivative is an instrument whose financial value depends upon the value of another asset. Derivatives may be used either to take a position on the underlying asset, or as a tool to transfer or hedge risk. Depending on the asset class and type of instrument, derivatives can be traded through an exchange, where a central order book matching system executes trades, or they can be traded in the over-the-counter (OTC) market, where the terms of the contract can either be privately negotiated between two parties or anonymously traded through a multilateral organized trading platform. OTC trading enables market makers to customize transactions and serve the specific needs of users. Moreover, the absence of transparency requirements in the OTC markets has historically facilitated the ability of market makers to execute and hedge large sized trades in the OTC markets.

A single-name CDS provides one party with protection against the default of an issuer on its debt. To use an example, suppose that a bond holder has a $10 million, 5 year bond from a corporation (the debt issuer, also known as the "reference entity").[9] She wants to protect against the risk that the company may not make payments on its debt. She will insure against that outcome by structuring a CDS with a dealer who makes markets in CDS. For the specified term of this agreement, the dealer, selling credit protection, will receive quarterly payments from the bond holder. If the reference entity is subject to a credit event, the dealer agrees to take the bond, and make the bond holder whole on the $10 million notional.[10]



[9] In this example, one of the parties is actually a holder of the bond; however, in many instances, CDS can be traded without either of the parties owning the debt, as long as the parties agree upon which outstanding debt obligations are being used as the underlier for the CDS contract.

[10] Since there are more CDS than there are actually underlying debt instruments, settlement of credit events now utilizes an auction process to calculate what is owed by the protection seller to the buyer rather than a physical delivery of bonds. This effectively makes parties indifferent to either cash or physical settlement and prevents the disorderliness that could occur from a sudden demand for the physical bonds to satisfy settlement, which could artificially inflate the value of the bond right before the physical delivery date.

In addition to single-name CDS, trading can occur in index CDS products, which refer to a basket of CDS reference entities that have a shared characteristic (e.g. all companies that have issued North American high yield corporate bonds). Every six months, a new series of an index will be introduced to the market, updating the set of constituents within the index. The most up to date series is known as the "on-the run" index; all older series of the index are considered "off-the-run." Between updates of index series, in instances where constituents have suffered a credit event, they will be removed from the on-the-run index, in which case, a new version of the index is issued within an existing series.

CDS have historically been traded OTC, and trade execution has typically taken place over the phone, between the traders of two firms. Those traders will then pass the details of the trade onto their middle or back offices for processing and risk management. Both sides typically use an electronic matching platform to confirm the transaction (e.g., Depository Trust & Clearing Corporation's DS Match). The matched transaction is then recorded into the DTCC's Warehouse Trust. Warehouse Trust also provides services relating to certain trade events such as calculating the quarterly payments and credit event payments in advance of settlement.

IV. Supervisory and Industry Initiatives for Post-trade Public Transparency

In early 2010, in response to weaknesses in the OTC derivatives market highlighted by the recent financial crisis, the ODSG called for greater post-trade transparency. Lack of pricing information was cited as a major deficiency of the markets, and was seen as a contributor to uncertainty during the recent financial crisis. Post-trade public transparency was identified as one of several reforms to strengthen the functioning and infrastructure of the OTC derivatives market.

Dealers made a commitment to the ODSG to provide studies on the level of post-trade transparency in three specific OTC derivatives markets, credit, equity and interest rates;[11] and also to provide their supervisors with access to transaction-level data to allow an assessment of the market's structure, trading patterns, level of product standardization and conduciveness to transaction-level reporting.

Each G14 dealer committed to providing the data to its primary supervisor. The supervisors, in turn, provided the Federal Reserve Bank of NY (FRBNY), as the chair of the ODSG, with permission to receive their institutions' data. For CDS, the global trade repository, DTCC Warehouse Trust (WT), facilitated the collection, anonymization, and transfer of the dataset to the FRBNY.

The dataset is comprised of all CDS transactions having "gold" status[12] occurring globally between May 1 and July 31, 2010[13] where at least one G14 dealer was counterparty to the trade.[14] Products include single-name CDS (corporate, sovereign, muni, ABS and loan CDS) and index CDS. Data elements include a

[11] Trade Transparency in OTC Equity Derivatives markets, Marco Avellaneda and Rama Cont, January 2011, http://www.finance-concepts.com/images/fc/EquitiesTransparency-Study.pdf; Transparency in OTC Interest Rate Derivatives Markets, Marco Avellaneda and Rama Cont, August 2010, http://www.finance-concepts.com/images/fc/IRMarketTransparency.pdf; Transparency in Credit Default Swap Markets, Marco Avellaneda and Rama Cont, July 2010, http://www.finance-concepts.com/images/fc/CDSMarketTransparency.pdf.

[12] "Gold" status products are electronically confirmed and matched records of CDS transactions held in Warehouse Trust that serve as the centralized record of the transaction. Gold status contracts are estimated to make up roughly 95% of the total population of credit derivatives. While some options on CDS are now gold products, they did not have that status at the time that we received the dataset.

[13] A review of the public gross notional trading activity from DTCC indicated that the months within our sample were low trading activity months. In 2010, the period between May and September showed lower CDS trading activity compared to the mean level of activity throughout the year.

[14] According to DTCC, 95-98% of all trades in the Warehouse have a G14 dealer on at least one side of the transaction.

product description, the buyers and sellers of credit protection,[15] the maturity of the contract, trade size and the upfront payment on the transaction that facilitates the standard coupon.

V. Dataset of CDS Transactions

Table 1. Credit Derivatives Data Overview (May 1- July 31, 2010)				
	Number of Transactions	% Total Transactions	Notional (USD billion equivalents)	% of Total Notional
Single Name	**196,569**	**67%**	**1,677**	**26%**
Corporate	*166,948*	*57%*	*1,180*	*18%*
Sovereign	*29,146*	*10%*	*493*	*8%*
Other (ABS, Loan, Muni)	*475*	*0%*	*4*	*0%*
Index	**95,834**	**33%**	**4,800**	**74%**
On the Run	*75,497*	*26%*	*3,450*	*53%*
Off the Run	*20,337*	*7%*	*1,340*	*21%*
Type of Transaction Event				
New Trade	**254,568**	**87%**	**5,840**	**90%**
Termination	**19,536**	**7%**	**462**	**7%**
Assignment	**18,299**	**6%**	**179**	**3%**
Currency denomination				**0%**
US Dollar	**182,921**	**63%**	**3,670**	**57%**
Euro	**102,010**	**35%**	**2,740**	**42%**
Other	**7,472**	**3%**	**68**	**1%**
Counterparties to Transaction				
Between G14 Dealers	**183,451**	**63%**	**4,070**	**63%**
Between G14 Dealer and Other	**108,952**	**37%**	**2,410**	**37%**
Total Transactions	**292,403**	**100%**	**6,480**	**100%**

Once the dataset was processed to aggregate allocated trades (discussed further in the appendix), it comprised 292,403 CDS trades, of which 87% were new trades, 7% were terminations and 6% were assignments of existing transactions. The terminations and assignments are included in our analysis as they provide insight into current market pricing and activity in the same way that new trades do, and hence are equally relevant from a price reporting perspective.[16]

Table 1 shows two-thirds of all trades were in single-name CDS, with single-name corporate CDS comprising 57% of all observations. The dataset contained observations on 1,554 corporate reference entities and 74 sovereign reference entities. Of the one-third of the dataset made up of trades in index products, the majority were in on-the-run indices. There were 57 distinct credit indices[17] in our population (39 on-the-run and 267 off-the-run indices counting all series and versions); the Europe iTRAXX and CDX North American Investment Grade were the most frequently traded contracts, making up 22% and 18% respectively, of index trades.

The majority (63%) of all transactions were denominated in US dollars, while 35% were denominated in euros.[18] Over 60% of all transactions were trades between G14 dealers. The share of G14 interdealer trades was similar in notional terms, indicating that the mean notional size of interdealer trades was the same as the mean size of dealer-customer trades. This pattern is in contrast to trading patterns typically

[15] All buyers/sellers of protection were assigned an anonymous identifier code so as to prevent revealing the identities of the market participants.

[16] DTCC did scrub out activity that constituted administrative or non-economic post-trade activity, including any backloads, amendments and any assignments/terminations/replacement trades stemming from portfolio compression or central clearing.

[17] This count disregards different series and versions of the same index.

[18] The currency translation to US dollar equivalence was performed on all transactions using July 31, 2010 foreign exchange rates. Other currencies in our dataset were British pound, Japanese yen, Hong Kong dollar, and Singapore dollar.

observed in securities markets, where interdealer trades tend to be for larger amounts than dealer-customer trades.

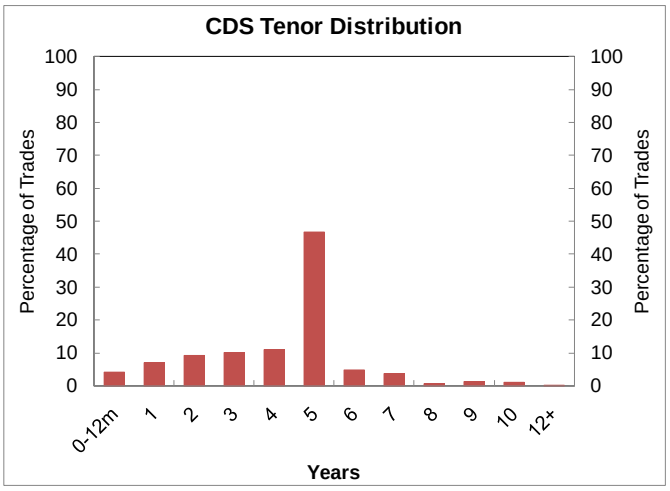
Analysis of the notional sizes of the transactions in our dataset shows that CDS transactions tended to occur in standard sizes. In aggregate, for corporate single-name trades, the mode was 5 million in US dollars and in euros ($/€), making up 24% of all corporate single-name trades. For all index trades, the modes were $10, $/€25 and €50 million.[19]

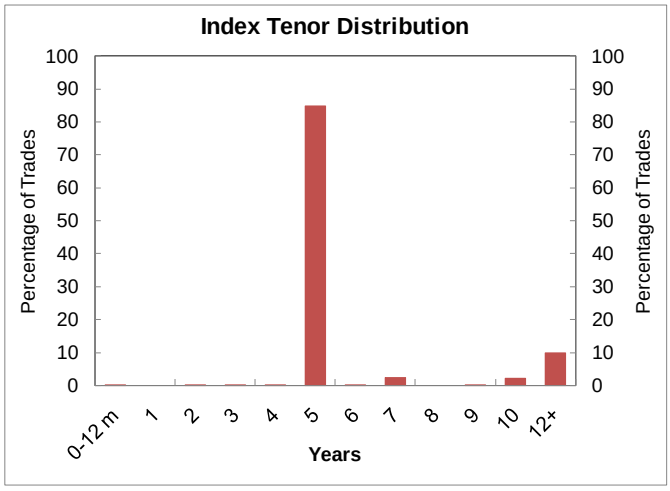
Table 2. Notional Distributions by Product Type (in millions)

	Corporate		Sovereign		On-the-run Indices		Off-the-run Indices	
	USD	EUR	USD	EUR	USD	EUR	USD	EUR
Total number of trades*	101,446	58,475	29,915	579	34,778	39,174	16,307	3,782
Mean	6.68	5.93	16.74	12.53	46.60	35.44	53.36	94.37
Median	5.00	5.00	10.00	5.00	25.00	25.00	25.00	52.50
Mode	5.00	5.00	5.00	10.00	25.00	25.00	10.00	50.00
95th Percentile	20.00	15.99	50.00	50.00	200.00	100.00	200.00	315.00
99th Percentile	40.00	28.00	100.71	100.00	300.00	250.00	500.00	625.00

*Total number of trades is not in units of millions

Both single-name and index contracts were most frequently traded in 5 year maturities. 47% of all single-name transactions and 84% of indices were traded in the 5 year tenor, demonstrating the CDS market's propensity to trading at a standard maturity.[20]





[19] In this discussion, notional values are not converted to US dollars. The clustering in sizes of 5, 10 and 25 million occurred not only in US dollar-denominated contracts but also in euro-denominated contracts.

[20] Transactions with non-round tenors were rounded down to be included into a round bucket tenor. For example, a 5 ½ year tenor would be included in the 5 year bucket. Non-round tenors made up a very small portion of the distribution.

VI. Market Composition and Dealer Concentration[21]

G14 dealers were on at least one side of all trades in our dataset, but were more likely to be sellers of credit protection, making up 78% of the population of CDS protection buyers and 85% of protection sellers.

Table 3. Trade Frequency by Market Participant Type				
Type of Market Participant	**Buyer**	**% Total**	**Seller**	**% Total**
G14 Dealers	227,131	77.68%	248,723	85.06%
Other Dealers	21,680	7.41%	18,388	6.29%
Hedge Funds	20,008	6.84%	9,338	3.19%
Asset Managers	11,489	3.93%	7,220	2.47%
Banks	9,831	3.36%	7,708	2.64%
Financials	1,094	0.37%	590	0.20%
Insurance Companies	457	0.16%	187	0.06%
Other	382	0.13%	105	0.04%
Pension Funds	259	0.09%	136	0.05%
Nonfinancial Users	70	0.02%	1	0.00%
Custodians	2	0.00%	7	0.00%
Total	**292,403**	**100%**	**292,403**	**100%**

Since dealers often take on the role of liquidity providers, we looked at the degree of concentration among the G14 dealers to assess the extent to which they were equally participating in the CDS market. Concentration may be related to competition, so customers may be more likely to receive competitive pricing for their trades and perhaps better pre-trade information in less concentrated dealer markets. Conversely, in a more concentrated dealer market, dealers may be in a stronger bargaining position relative to their customers and consequently have less of an incentive to provide competitive pricing and relevant pre-trade information.

Using two common measures of the concentration of players in a specific market (the Herfindahl-Hirschman index, or HHI, and the 4-firm concentration ratio), we found that there was a low to moderate level of concentration among G14 dealers. The four most active G14 participants were involved in 45% of the buying and 45% of the selling of all CDS trades in our dataset. Using the ratio to examine the notional activity, the four most active participants made up 50% of the buys and 50% of the sells for all trades in terms of notional amount traded. The Herfindahl Hirschman index calculations for G14 dealers as well as for all market participants, by both trading frequency and notional amounts, were at levels between 885 and 965, which according to the benchmarks outlined by the Department of Justice is a low degree of concentration (markets in which the HHI is between 1000 and 1800 points are considered to be moderately concentrated, and those in which the HHI is in excess of 1800 points are considered to be concentrated).[22] A recent ISDA study on concentration in the OTC derivatives market,[23] which measured concentration of the notional market share held by G14 dealers using a different data set, found similar results.

[21] The classifications for type of market participants presented in this section are based on DTCC's classification of its participants.

[22] The concentration ratios calculated here are done across all activity in the market and not on a specific reference entity or index level.

[23] The methodology used by the ISDA study (http://www.isda.org/researchnotes/pdf/ConcentrationRN_4-10.pdf) calculates market concentration using data on outstanding notional amounts derived from the ISDA Market Survey for Mid-Year 2010. The BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity provides concentration ratios for derivatives markets other than CDS based on notional amounts outstanding (http://www.bis.org/statistics/derstats.htm).

The number of active market participants that trade in a product is also an indication of how much liquidity is available and the level of interest in a particular product. Our analysis indicates that there is a broad level of participation in the CDS market. In total, there were 933 unique market participants in our dataset. In corporate CDS, on average approximately 110 market participants traded at least once a day, 330 participated at least once a week and 500 participants traded at least once a month. For sovereign reference entities, on average approximately 50 market participants traded at least once a day, nearly 200 participants traded at least once a week and 340 traded at least once a month. For indices, a greater number of market participants were active on a daily basis. Approximately 135 market participants traded in the indices at least once a day, 390 participants traded at least once a week and over 560 traded at least once a month.

VII. Trading Activity

The distribution of the trading frequency at the reference entity level in the dataset shows that for both single-name corporate and sovereign CDS, trading activity was relatively low, with market activity dropping off quickly after the top set of traded names and a long tail of reference entities trading less than once a day. While the dataset included contracts on a large number of reference entities, only a much smaller subset were actively traded in any maturity over the period. Moreover, while trading activity was concentrated in a limited number of reference entities, the specific reference entities garnering the most trading activity were not constant over the sample period. In terms of overall market activity for indices, trading activity was more active and more consistently centered on two on-the-run indices.

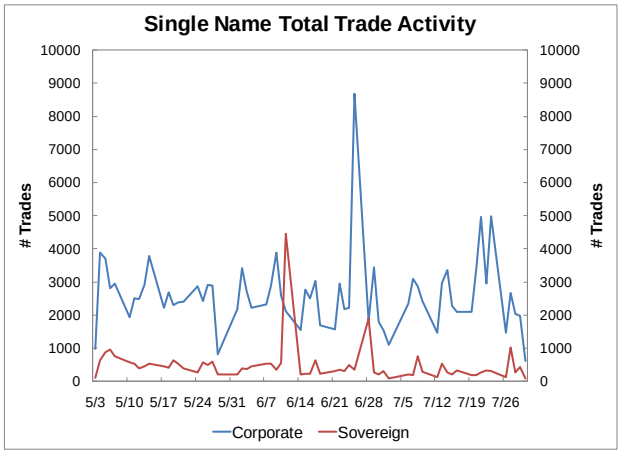
The most frequently traded notional size for corporate single-name CDS was 5 million, and for on-the-run index transactions, the notional sizes traded were typically 10 or 25 million, with the exception of the CDX North American Investment Grade and iTRAXX Europe, which traded in larger notional sizes.

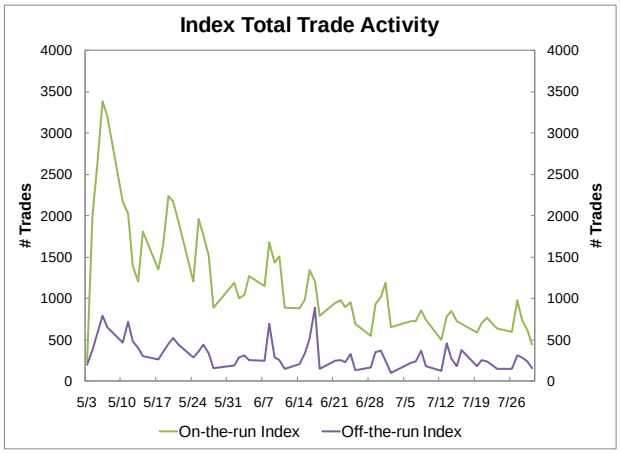
For many products, the combination of low and variable trading frequency with large and homogenous notional trade sizes seems to present mixed messages about the liquidity of the CDS market. These features seem to highlight the importance of market makers, who are willing to take on a position in a rarely traded asset and hold the risk for some time. Hence any public reporting rules should take into account the impact of enhanced trade reporting on the current activity of market makers.

a) Trading Activity Over Time

The following graphs display aggregate trading activity of single-name and index CDS over the three month sample period. The time series patterns for aggregate notional amount traded look similar. On a daily basis, an average of 3,000 single-name trades were made for $25 billion of notional value, comprising 2,550 corporate trades for value $18 billion and 450 sovereign trades for value $7 billion. In index products 1,450 trades were observed per day for value $74 billion, comprising 1,150 trades with a total value of $53 billion in on-the-run indices and 300 trades for value $21 billion in off-the-run indices.[24]

[24] These figures are calculated in USD equivalents and exclude trading in ABS, muni and loan CDS.



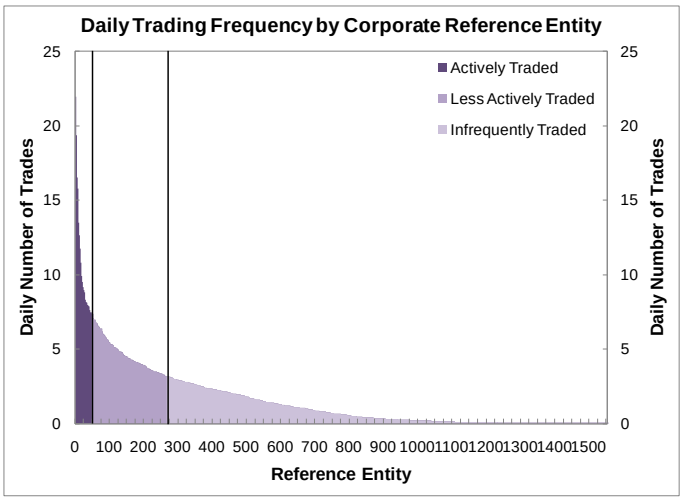


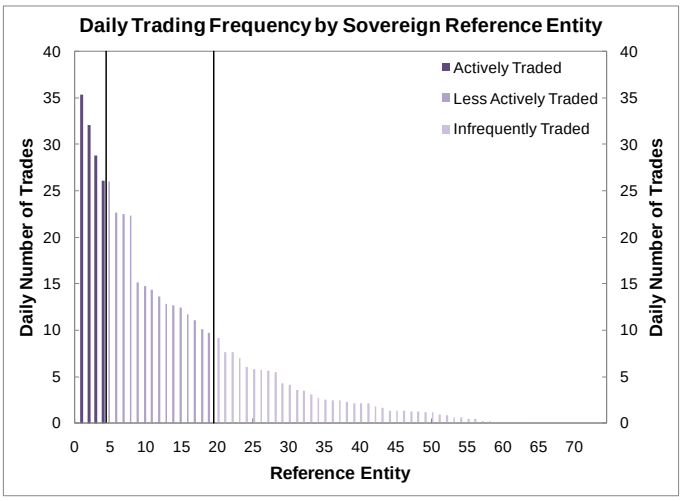
There was a marked variation in the entities that were the most actively traded reference entities each month over the three month sample period, likely reflecting the changing credit outlook for certain sectors or firms. Looking at the 250 most active names in our data, 64% of those in the top quintile of trading activity in May remained in the same quintile in June, but only 44% of the names in the top quintile in June remained in the same quintile in July. In May and June market activity centered upon the financial sector, while July activity shifted to consumer services firms. The indices garnering the most activity were more stable over the sample. Looking across all indices, 82% of the names in the top quintile of trading activity in May were in the same quintile in June, and 74% of the names in the top quintile in June were in the same quintile in July.

b) Trade Frequency: Single-Name CDS

To further understand the characteristics of the most frequently traded reference entities and compare them to those of less frequently traded reference entities, we categorized reference entities into buckets according to their trading frequency: "actively traded," "less actively traded," and "infrequently traded."[25] In the charts below, the vertical lines in the chart designate the three categories of trade frequency classification.

[25] In order to categorize reference entities into buckets, we ranked the reference entities in our dataset by total trading frequency across all maturities over the sample period, divided the distribution into quintiles, with each quintile accounting for one fifth of total activity, and grouped the quintiles into three separate buckets. Reference entities 1-48 (the first quintile) were classified as "actively traded", reference entities 49 to 267 (the second and third quintiles) were classified as "less actively traded", and reference entities 268 to 1,554 (the last two quintiles) as "infrequently traded." For sovereign reference entities, we divided the distribution of total trading frequency across all maturities over the sample into quartiles. There were a total of 74 reference entities, of which the top 4 (the first quartile) were classified as "actively traded," reference entities 5 through 19 (second and third quartile) were classified as "less actively traded" and reference entities 20 through 74 (last quartile) were classified as "infrequently traded."





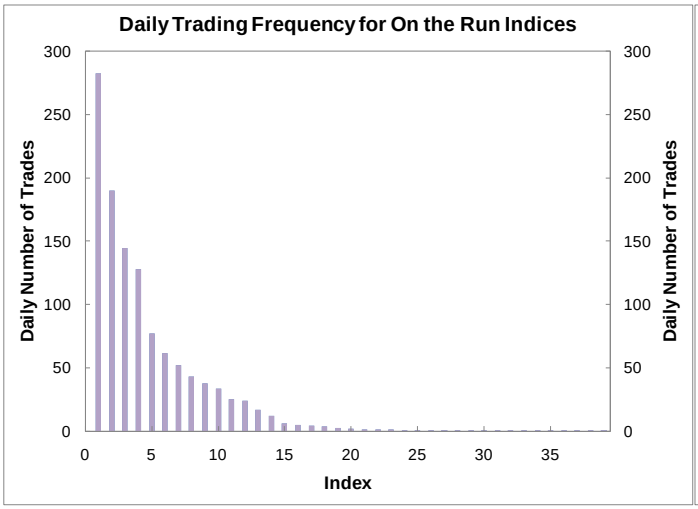
The 48 actively traded corporate reference entities traded an average of 10 times daily, with the top reference entity trading an average of 22 times per day. Less actively traded reference entities traded on average 4 times daily and infrequently traded reference entities traded on average less than once per day. The actively traded sovereign reference entities traded on average 30 times daily; less actively traded sovereigns traded on average 15 times per day and infrequently traded sovereign contracts traded an average of 2 times daily.

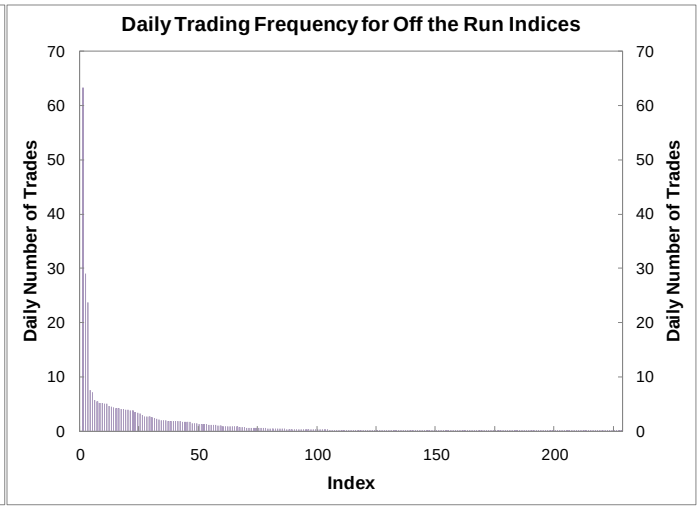
The corporate CDS data covered 11 sectors. Financial sector reference entities comprised the largest share of the actively traded bucket (46% of trades), followed by telecom companies (13%) and oil and gas companies. Less actively and infrequently traded reference entities were more evenly spread among corporate sectors, with financials, consumer services, consumer goods, and industrials making up the largest shares.

c) Trade Frequency: CDS Indices

Trading activity in credit derivative indices was more active than in single-name CDS, with the most active index trading on average 280 times a day. However, similar to the single-name CDS market, activity was concentrated among a subset of indices. Looking at the distribution of daily trading activity across all maturities in all 40 on-the-run indices, activity dropped off sharply after the first four indices, each of which traded more than 120 times daily on average. Two indices, the North American Investment Grade CDX and the iTRAXX Europe, maintained a high level of trading activity over the three months.

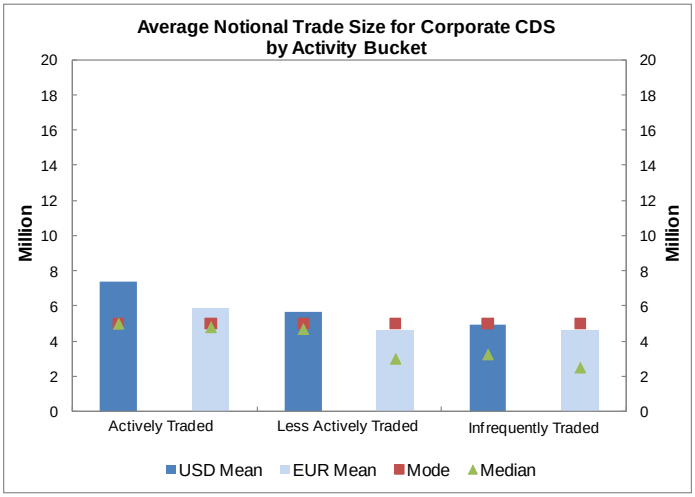
Several of the off-the-run indices were relatively active, with the most active off-the-run index trading over 60 times per day, about as frequently as the sixth most active on-the-run index. However, activity dropped off sharply after the first three off-the-run indices. With the exception of North American Investment Grade CDX Series 9, iTRAXX Europe Series 9, and iTRAXX Asia Ex-Japan IG Series 13, off-the-run indices traded less than 10 times a day.

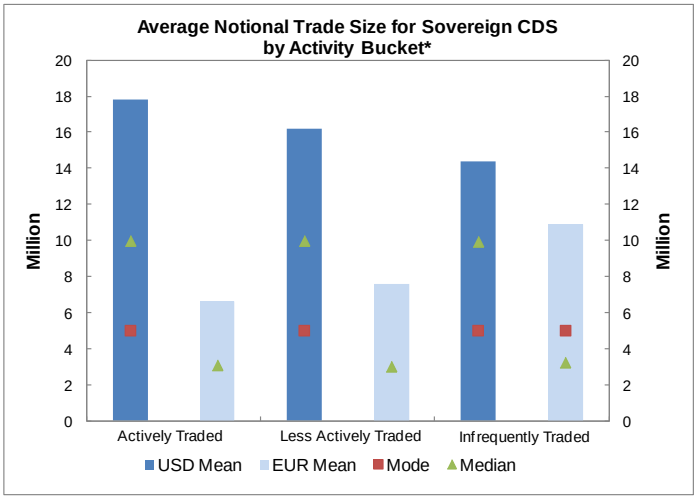




d) Trade Size: Single-Name CDS

The most frequently traded notional size (the mode) in single-name corporate and sovereign CDS regardless of activity bucket was $/€5 million. The distribution of actively traded corporate CDS trade sizes was positively skewed, with the larger trades in the distribution pushing the actively traded bucket mean trade size to $/€7 million. The balanced or negatively skewed distribution of less actively traded and infrequently traded CDS reflected relatively fewer large trades in these reference entities. For sovereign CDS, notional distributions were positively skewed for all three trading buckets, with the skew greatest for the most actively traded sovereign reference entities. For example, in the US dollar sovereign CDS actively traded bucket, the mean notional size was approximately $18 million compared to the median size of $10 million. For sovereign CDS trades denominated in euro (which only totaled 574 trades) the opposite was the case, with trade sizes of infrequently traded CDS most positively skewed.



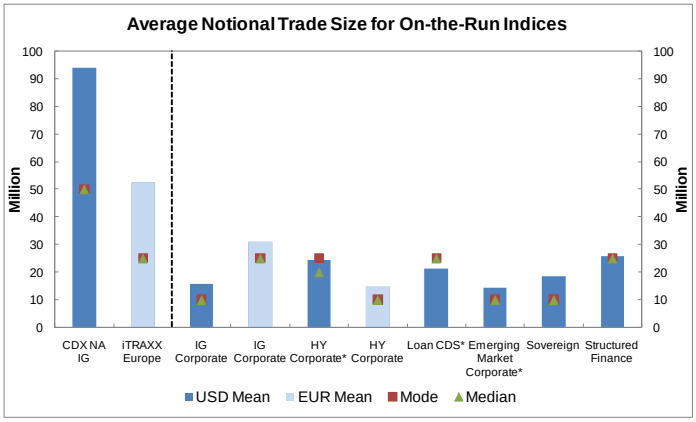


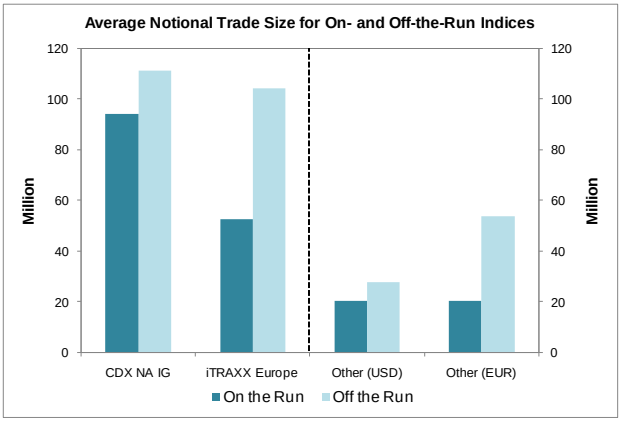
*Note: for two activity buckets in euro sovereign CDS, modes did not emerge due to the small number of observations (574 euro sovereign trades in total).

e) Trade Size: CDS Indices

The data show the heterogeneity of trade sizes across on-the-run indices and the distinctive trading patterns of the two most actively traded indices**.** The chart below left shows the average notional trade sizes of the top two on-the-run indices, the North American Investment Grade CDX and the iTRAXX Europe, on the left side of the dotted line, and the average notional sizes for all other indices grouped into eight categories on the right side of the dotted line. The CDX index tended to trade in $50 million sizes, and both CDX and iTRAXX indices had positively skewed distributions of trade sizes. For most other indices, the mode and median trade sizes tended to be $/€25 or 10 million and the distribution of trade sizes was more balanced.

The chart below right illustrates that off-the-run indices, as a group, trade in larger sizes than on-the-run indices, although they trade less frequently. The larger average notional trade sizes of the off-the-run CDX NA IG and iTRAXX Europe indices were driven primarily by infrequently traded off-the-run series (on average, once or twice per day or less) executed in sizes of $/€200 to 250 million.





*Category comprised of a single index. Other categories represent averages across a group of indices with similar characteristics.

VIII. Product Standardization

Standardization of traded instruments is an important issue for OTC derivatives markets and is one factor in determining which instruments are suitable for central clearing and execution on organized trading platforms.[26] In addition, standardization has implications for transparency: since the price of a given transaction in large part reflects the economics of its terms, a sequence of time-stamped transaction prices is most meaningful if the economics are comparable from transaction to transaction, i.e. instruments have identical terms and comparable values for those terms. A stream of prices for standard transactions can also potentially be used as a basis for interpolation of price quotes for more customized or bespoke transactions.

Our data and analysis indicate that there is a high degree of product and trading practice standardization in the CDS market both in terms of contract terms as well as typical values selected for these terms, such as transaction tenors and notional sizes.[27] As such, the benefits to the publication of

[26] Organized trading platforms are typically electronic platforms and could support a variety of marketplace types, including central limit order book trading, request-for-quote arrangements, and auctions.

[27] Our data set did not include complex or structured CDS products, which are estimated to be about 3-5% of the overall market in terms of trading volumes.

transaction prices for most CDS products are greater as market participants would be able to easily compare prices from transaction to transaction in a given instrument.

While CDS instruments had, for a number of years, used highly standardized economic terms, the Big Bang Protocol in April 2009 and subsequent Small Bang Protocol in Europe in June 2009 increased standardization in the values assigned to contract terms in the CDS market, making the contracts more fungible and the prices across transactions more comparable. The Big Bang fixed the coupon levels and payment dates for certain instruments and established a deterministic process for settlement of credit events.

Most single-name new trades in our dataset conformed to standard contract terms including fixed coupons and standard payment dates and documentation types. Within our data set, we found that for single-name CDS contracts, 92% had a fixed coupon and 97% had fixed quarterly payment dates.

Standardization can also come through the concentration of trading in certain "benchmark" tenors or trade sizes. Trading in the single-name CDS market tends to frequently occur at the five year maturity point. Similarly, market participants tend to trade CDS more frequently in certain notional sizes depending on the product type. For example, within our CDS data, 43% of single-names were 5 year contracts and 36% of single-name trades were traded in sizes of either 5 or 10 million.[28]

IX. Clearing-Eligible Transactions

We examined the characteristics of the clearing-eligible CDS population and compared them with the ineligible population to better understand the trading patterns for this group of reference entities and whether they have characteristics that make this group of instruments more conducive to public reporting. Eligibility for clearing can be seen as an indirect indicator of the level of standardization and liquidity of an instrument, since central counterparties choose to support a product based on the ability to price, trade and effectively model the risks of the product. The share of clearing-eligible transactions indicates the share of the market that would have been cleared if all the transactions were accepted by a clearing house. We did not look at whether these transactions were actually cleared.

At the time of our data sample, a total of 180 corporate single-name reference entities and 24 indices were clearing-eligible according to ICE Trust (for US dollar-denominated CDS) and ICE Clear Europe (for euro-denominated CDS).[29] The clearing-eligible corporate single-name transactions represented 19% of the total share of corporate single-name volume in our sample. Clearing-eligible indices represented 52% of total index volume.

We measured the daily trading frequency of single-name CDS eligible for central clearing to assess the differences in trading patterns between the clearing-eligible population and the population that remained ineligible for clearing. About 50% of US dollar and euro clearing-eligible CDS traded between 2

[28] We did not perform extensive analysis on loan, ABS or muni CDS but we did look at the level of contract standardization and certain market trading practices for these products. For loan CDS, 80% of the contracts had fixed coupons and 98% had quarterly fixed payment dates. ABS and muni CDS, on the other hand, were less standardized and the contracts did not trade with fixed coupons. About a quarter of our loan CDS trades traded at a 2.25 year maturity and in sizes of 5 million. For ABS CDS contracts, 66% of the trades were done in a 10 year tenor and 79% had sizes of either 5 or 10 million. Muni CDS had less market convergence toward a typical tenor, but 33% were traded in sizes of 5 or 10 million.

[29] Of this population, there were 15 US dollar and 16 euro-denominated products whose first eligible clearing date fell within the sample period. These indices were counted as "clearing eligible" for the days that they qualified as such, and as "non-clearing eligible" for the days prior to the first eligible clearing date.

and 4 times per day on average, while only 30% of US dollar and about 15% of euro denominated ineligible CDS traded more than once a day.

We also looked at the continuity of trading of the two groups and found that the products eligible for clearing at the time of our sample period tended to trade on a more sustained basis over the three month sample period compared to ineligible products. Over 90% of US dollar clearing-eligible CDS and 85% of euro clearing-eligible CDS traded on more than 30 days during the sample period. For ineligible CDS, about a third of US dollar-denominated transactions and almost half of euro-denominated ones traded on fewer than five days during the sample period.

There was no clear differentiation in trade sizes between the clearing-eligible and ineligible population, with mode and mean notional sizes similar for clearing-eligible and ineligible products. This suggests there may be no need to treat clearing-eligible and ineligible transactions differently when designing trade reporting rules.

X. Hedging Activity

The importance of the ability of a dealer to hedge large positions taken on via a customer trade has been cited as a major reason why reduced reporting requirements for large transactions is warranted (as discussed further in Section XI). Dealers fear that public knowledge of a large transaction creates the risk that other market participants will attempt to front-run any subsequent attempts to offset the trade and thereby increase the cost of hedging. Increased hedging costs might make dealers more reluctant to make markets for customers in CDS instruments. Our goal in this section is to investigate the prevalence of one possible type of dealer hedging activity in our sample.

We note that CDS instruments are commonly used as hedging tools for other instruments (e.g., corporate bonds). Our analysis concentrates strictly on identifying instances of a dealer hedging a position created by entering into a large CDS trade with a customer. There are many ways in which a dealer might choose to offset large CDS transactions. In this paper we only look for evidence of the most basic hedging strategy of entering into offsetting transactions in the same reference entity within a short time period surrounding a large trade. To construct an exact hedge a dealer would typically look for an offsetting transaction(s) with the same maturity; however, hedging with differing maturities is commonplace. As such, our analysis did not differentiate by maturity.

We identified in our dataset all the instances where a G14 dealer transacted a 'large' trade with a customer (i.e. ignoring large interdealer trades).[30] All trades with a notional size greater than the 95th percentile for that reference entity were classified as large. As the tables below show, where we saw a dealer transact a large customer trade, a significant portion of the time we did not see any evidence of the basic hedging strategy described above, i.e. we did not see any trades in the opposite direction in the same reference entity with any counterparty within the same day. Furthermore, when we did see any other trades (of any size) in either direction, we did not see the dealer executing many more trades in the opposite direction to the large trade than trades in the same direction. Significantly more trades in the opposite direction could also have been seen as evidence that dealers were employing the basic hedging strategy.

For example, for single-name CDS contracts, on 47% of days with a large dealer trade with a customer, the dealer did not make any additional trades in the same reference entity in the opposite direction to

[30] We find similar results if we focus on all dealer trades rather than just trades with customers.

the large trade.[31] When trades did occur, the dealer made an average of 2.7 additional trades in the opposite direction compared to 2.8 additional trades in the same direction. Reflecting the overall larger volume in index trading it was only on 4% of days that a dealer transacted a large trade with a customer and did not transact any further trades in the same reference entity in the opposite direction. On the days when additional trades in the same index did occur, on average 20.8 additional trades were seen in the opposite direction, compared to 21.5 trades in the same direction. Analysis of the total notional amount traded by a dealer on the same day it transacted a large trade with a customer showed similar patterns.

Not surprisingly, a lack of any trades in the opposite direction on the day of a dealer's large customer trade was more common for the less frequently traded single-name reference entities; for actively traded single-name reference entities, no trades in the opposite direction in the same reference entity occurred 21% of the time, versus 45% of the time for less frequently traded reference entities and 56% of the time for infrequently traded reference entities (using the active, less active and infrequent buckets described in section VI of this paper). Still, when any additional trades did occur, we found that across all the buckets there was little sign of a greater tendency to trade in the opposite direction of the large trade.

There was also no firm evidence of hedging activity on the day following a large customer trade. Our results show that for 67% of days following a large single-name trade with a customer, no trades were made by the dealer in the same reference entity in the opposite direction; the similar figure for index trades was 9%. For both products, when trading was seen, there was no evidence of a bias towards offsetting trades.

Our results suggest that large customer CDS trades are not typically hedged via offsetting trades in the same instrument soon after they have been transacted, consistent with our findings on the lack of a link between trading frequency and notional sizes discussed on page 10. This is also consistent with anecdotal evidence that dealers may hold on to positions for days or weeks before hedging via offsetting transactions in the same instrument. Traders can also hedge using an index to offset the exposure from a group of single-name transactions. More rarely, offsetting trades in bond or equity securities issued by the particular reference entity might be used as hedges if finding an offset in the CDS market is not feasible.

Our analysis seems to suggest that requiring same day reporting of CDS trading activity may not significantly disrupt same day hedging activity, since little such activity occurs in the same instrument. However it will be important for policymakers to gauge what impact greater post-trade transparency would have on dealers' existing approach of holding onto risk and trading out of positions gradually, as our analysis suggests this behavior is important in facilitating trading in the CDS market currently.

[31] In some cases large customer trades observed in our dataset may actually represent a trade that enables the dealer to offset their existing position built up through previous trading activity, and hence hedging would not be required.

Table 4. Dealer trades associated with a large dealer-customer trade: % of days where a dealer makes no other trades in the same reference entity in the opposite direction			
Same Day		**Next Day**	
Index	**Single-name**	**Index**	**Single-name**
4%	47%	9%	67%

Table 5. Dealer trades associated with a large dealer-customer trade: frequency and notional value of trades in the same reference entity					
		Same Day		**Next Day**	
Metric	**Dealer's Trading Direction**	**Index**	**Single-name**	**Index**	**Single-name**
Mean number of trades	Same	21.5	2.8	16.8	1.2
	Opposite	20.8	2.7	16.3	1.1
Total notional traded as a % of the large trade notional	Same	589%	117%	378%	31%
	Opposite	507%	91%	350%	28%

XI. Large Trade Reporting Rules

Introducing a trade reporting requirement for OTC derivatives has been advocated in several jurisdictions because of the potential to foster greater price and volume transparency, support standardization and enhance firms' abilities to manage the risks associated with their holdings of OTC derivatives. However, mandating transparency has the potential to influence trading dynamics in a manner that could adversely affect market functioning. This may be particularly true for large trades.[32]

As discussed earlier, the potential for trade reporting to harm liquidity reflects concerns that if the existence of a large transaction is revealed immediately to the public, other market participants could drive up the costs of hedging for that transaction. Faced with these additional costs, dealers might respond by reducing trading liquidity, including offering less attractive pricing to customers. Thus, reduced reporting requirements for large trades might be considered appropriate. On many exchanges and in the corporate bond market, trades that are defined to be large are reported either with a time delay or with the exact notional size masked so as not to adversely affect market functioning.

When designing trade reporting rules for CDS (and other OTC derivatives), regulators will need to resolve a number of challenges around how to set the threshold for large trades to enhance price transparency without impairing market functioning. A sufficiently detailed analysis of trading data to recommend precise methods for identifying large CDS trades is beyond the scope of this paper. Ideally, one would be able to study granular data on bid-offer spreads and/or estimates of the price impact of trades to help answer these questions. Nevertheless, our analysis reveals some stylized facts about patterns in trading activity in the CDS markets that can inform the rulemaking process.

[32] In the context of this paper, we refer to "block" trades as trades that are bunched together for execution and later allocated into smaller individual trades, such as a dealer executing a transaction with an asset manager, who then divides that trade into smaller subcomponents and allocates them into different funds. Sometimes a "block" trade is used to refer to a large sized transaction that has occurred on an organized facility such as a trading platform or exchange; for our paper, we refer to these types of transactions as "large trades". The term "block" is used exclusively in our paper to refer to the former description.

Specifically, in this section we discuss the following questions regulators will need to resolve in setting a large trade threshold: a) What metric of trading activity should be used as the basis for setting the threshold? b) How should CDS products be grouped together for the purposes of threshold setting?

a) Trading Activity Metrics

In setting the large trade threshold, regulators need to consider what measure of trading activity forms the best proxy to quantify what constitutes a large trade in the CDS market. The notional trade size is the most direct measure of typical trading activity and is therefore the most obvious metric to adopt. However for some markets it might be argued that a measure of the volume of trading over time (e.g. daily or monthly traded value) might serve as a better proxy for the depth of a market and hence better identify trades that are large enough to deserve special consideration. We observe that the traded volume metric is more variable across the CDS products in our dataset than the trade size metric and therefore if a volume metric were used then it would need to be applied at a more granular level (as discussed below) to ensure appropriate treatment across reference entities.

b) Grouping CDS Contracts

Determining how CDS contracts should be grouped for the purposes of determining a large trade threshold is an important consideration. Given that our dataset reported activity for CDS contracts on over 1500 single-name reference entities and a large number of on-the-run and off-the-run index products, applying a different large trade threshold for each distinct CDS product would be complex to manage for regulators and for traders. However, to the extent that trading patterns differ across instruments, a rule that calculates a single notional size threshold for a broad range of instruments might fail to set an appropriate threshold for all products in the group.

Our analysis of trading in CDS markets gives some indications about how best to calibrate this trade-off between simplicity and precision. If it were decided that metrics based on the typical notional size of CDS trades were the most appropriate for setting the threshold, then our analysis indicates that a small number of broad groupings of CDS products might be sufficient to capture the variation in trade sizes across our sample.

In particular, we see that index CDS tend to trade in much larger sizes than single-name CDS, suggesting these two types of instruments should split for the purpose of setting thresholds. Within the index CDS market, average trade sizes for the CDX North American Investment Grade and iTRAXX Europe were significantly larger than for all other indices, and there was less consistency in trade sizes across other indices, suggesting that each index could be considered separately for the purposes of calculating thresholds.

Our data also suggests that single-name sovereign CDS should be split from corporate CDS because mean and median notional sizes of sovereign trades were approximately double those for corporate trades (although mode trade sizes were similar across the two types of products). Within these broad groupings (corporate and sovereign) we observe consistent mean and mode trading sizes. Divergences in trading frequencies do not seem to be related to trade sizes. That is, the average notional trade size varies little between actively and infrequently traded contracts. We find little evidence for a need to create separate thresholds between euro and dollar denominated contracts for either single-name or index CDS, so that thresholds could be set at the same nominal amounts for both dollars and euro despite the currency difference.

By contrast, if a traded volume metric were used as the basis for the large trade threshold, then the broad groups described above would be inadequate because we observe large differences in trading activity within a product type, e.g. trading activity in single-name CDS instruments ranged from more than 20 times per day to less than once per day. In this case a more granular set of groups would need to be devised. In addition, our finding that trading volumes for individual contracts varied markedly over the sample period would suggest that these calculations might need to be frequently revisited.

XII. Meaningful Price Reporting

In order for post-trade transparency rules to have the benefits envisioned by policymakers, reported prices should be easily interpretable and they should be comparable over time for the same product. Accordingly, there needs to be a base level of product standardization, consistency in the grouping of products and a comparable set of product characteristics. During our data analysis, we came upon several issues pertaining to data quality which should be addressed in future reporting regimes to improve comparability. In this section, we bring these data issues to the attention of policymakers as they consider implementation of a public reporting regime.

Some proposals for public reporting regimes have advocated for the use of trade repositories for either disseminating real-time transaction information, or for providing the information necessary to determine the calibration of large trade thresholds and the type of information that should be publicly reported. If there are other venues being considered to play the role of the post-trade information disseminator, uniformity in the collection, treatment and reporting of data will need to be coordinated so that there is no fragmentation of data, or confusion in interpretation of the data. We discuss issues to consider related to the collection of raw data for public reporting rules, and some ways to increase consistency of data standards to facilitate meaningful price reporting.

a) Refining Data Collection

Since DTCC Warehouse Trust is the only global trade repository for the CDS market at present, we expect that the data collected by the Warehouse will be used to inform the creation of public reporting regimes for CDS. In the US, trade repositories may also be required to collect and publicly disseminate transaction information under new legislation and therefore examination of what information is currently collected may be useful. In the process of analyzing the data, we have identified ways in which the data collected could be enhanced to support the work of regulators.

Public reporting requirements are expected to apply to execution-level information, but prices and trade execution timestamps are not presently collected for CDS by Warehouse Trust. Both fields would eventually need to be collected for the purposes of real-time reporting (this information may also become more readily available with the increased use of electronic trading platforms). At present, only the upfront payment on a transaction is collected by Warehouse Trust, not an execution price. The timestamp collected does not indicate the time of the execution of the trade, but instead indicates when a transaction is submitted to DTCC for confirmation, which can differ from the time of trade execution by several minutes to several hours, depending on the product, execution method, and other idiosyncratic factors.

Also, Warehouse Trust currently only collects and stores allocated trade sizes, rather than the details of the original market transaction, or “block” size. This is problematic for those using the data as a basis for analysis and calibration of large trade thresholds, as using allocated level data would make trading appear to be more active and trade sizes smaller. From a risk management perspective, the allocated level is the most pertinent, since it reflects the ultimate counterparty pairing, but for price reporting

purposes the block level is most pertinent as it provides an accurate picture of the relationship between trade price and the notional size of the transaction. As such, if the trade repository is the entity assigned to disseminate transaction price information, it must either have a way of re-aggregating the data to its block-level size for reporting purposes, or of capturing this data at the point of execution. Since the reporting of large trades may be treated differently, the repository should also have a way of identifying large trades and isolating them for special reporting treatment.

b) Consistency in Data Interpretation and Data Reporting Standards

As the OTC derivatives market evolves toward greater homogeneity and use of centralized market infrastructure, there may be multiple sources from which trade level information will flow into the trade repository (e.g. trade execution platforms, confirmation platforms and central counterparties). In order for users to analyze data from various sources, information would need to be reported consistently across different databases. Otherwise, public reporting rules will not achieve their transparency objectives, and could even lead to reduced transparency if the information made public is misleading.

An important requirement for consistent data reporting is the inclusion of unique identifiers for reference entities and reference obligations in all databases.[33] A small number of records in the Warehouse Trust dataset did not have unique reference entity or obligation identifiers, while a small percentage only had reference entity identifiers. We believe it would be beneficial to have unique reference entity and obligation identifiers included with trade-level reporting, to minimize ambiguity around the underlying reference entity. The consistency in the formatting of reference entity identifiers would also make it easier for different systems using the identifiers to communicate information with each other as the market moves into a world with more integrated infrastructure (e.g. trading platforms, central counterparties and trade repositories will all be exchanging information). Additionally, there may be ways to group the data using a common set of characteristics that would make prices more easily comparable and also allow for more detailed and rigorous analysis across datasets from different sources. Various global policy initiatives and industry efforts are underway to study and develop consistent data standards for OTC derivatives products.[34]

Lastly, for certain trades within our data set, the classification of whether the transaction event constituted new economic activity, and was thus appropriate for public reporting, was ambiguous. For example, we found a number of trades which we believe were linked to transactions where the prices reflected a cyclical, scheduled auction process amongst dealers. These prices reflected mid-market values resulting from a multilateral auction process rather than a negotiation between two parties; comparison of the resulting prices with other market prices may not be appropriate. In advance of implementing the post-trade transparency regime, trade event types should be clearly classified according to appropriateness for public dissemination. If there are multiple reporting venues, the determination of which transactions should be publicly reported needs to be consistent across the venues so that the prices reported for transactions are comparable, and to ensure that the public is receiving a comprehensive set of meaningful information.

[33] Markit Reference Entity Database, or RED, provides widely-accepted unique identifiers for reference entities and reference obligations in the CDS market. The introduction of Markit RED codes several years ago greatly enhanced the post-trade confirmation process and gave market participants certainty on which deliverable obligations were being referenced when credit events on the reference entity occur.

[34] In April 2011, ISDA released a white paper proposing product representations for standardized derivatives: http://www2.isda.org/attachment/MzAzOQ==/Product_Representation_for_Standardized_Derivatives_20110414vfinal[1].pdf. The CPSS-IOSCO Consultative Report on Data Reporting and Aggregation Requirements (http://www.bis.org/publ/cpss96.pdf) discusses the need to develop mechanisms to allow better data aggregation for OTC derivatives, including legal entity identifiers, reference entity identifiers and product classification systems.

XIII. Conclusions

In this paper we examine data on trading frequency, trade sizes, currencies, market participants, tenors, contract terms and hedging behavior to characterize the organization, structure and trading patterns in the CDS markets.

We find that most economic and contractual features were highly standardized across the CDS trades in our dataset. A high proportion of the trades conformed to standard contract terms, and activity was concentrated in the 5 year tenor. Uniform contractual and trading conventions enhance the ability of the public to interpret reported prices, since the economic features of the trade are comparable across a broad set of transactions.

The majority of CDS trades were interdealer transactions; however we see evidence of broad participation in the CDS market, in that aggregate trading activity did not appear to be concentrated among a small number of dealers (although we did not attempt to evaluate whether particular dealers were dominant in specific individual contracts).

In general, trade volumes were very low for most single-name CDS products and, moreover, trading activity in a specific contract was typically clustered in time, presumably reflecting episodes of event-driven trading. Only a small number of single-name CDS (mostly sovereigns) traded actively and consistently while the majority of contracts traded infrequently and inconsistently. Trading in the index CDS market was substantially more active, particularly in the most popular on-the-run index contracts. However, while trade sizes differ between the single-name CDS and index CDS product types, there was substantial uniformity of trade sizes with each product type, with even infrequently traded contracts transacted in large sizes.

Our analysis found that trading was more active in clearing-eligible instruments compared to non-clearing-eligible contracts, measured both on an intraday basis as well as overall activity in the sample period. However, transactions in clearing-eligible CDS contracts were similar in notional size to trades in instruments not eligible for clearing.

We find little evidence that dealers regularly hedge large trades using offsetting transactions in the same reference entity and within the same, or next, trading day. This corroborates anecdotal evidence that dealers typically trade out of positions over a number of days or weeks.

Our analysis of the size and frequency of CDS trading has implications for rules regarding large trade reporting thresholds. In particular, our analysis indicates that if the threshold for classifying large trades in a trade reporting rule was set on the basis of the notional trade size, then it might be possible to adopt a relatively streamlined approach as within each distinct segment of the market (corporate single-name, sovereign single-name, and index) there is substantial homogeneity in the distribution of notional sizes traded. By contrast, a threshold set in terms of traded volume over a defined time period would require a more granular set of thresholds tailored either to each specific instrument, or to narrow groupings of instruments with similar trade frequencies.

Lastly, we believe that price reporting is beneficial if the prices are interpretable and meaningful, which requires coordinated and comprehensive collection of trade data and consistent standards for price reporting, especially where different disseminators share the duties of price reporting.

XIV. Appendix: Data Collection and Cleaning

Warehouse Trust made the names of all counterparties anonymous before compiling the data for presentation to regulators. All parties to the trade are anonymous in the data set, but parties are listed by their type, and each individual market player has a consistent identifier throughout the dataset (for example, the G14 dealers are listed as "G14 dealer 1, 2, 3, etc.," and hedge funds are listed as "Hedge fund 1, 2, 3 etc.").

Events in the dataset described in this memo include new trades, assignments and terminations. Since supervisors are predominately interested in price-forming trades where new market or credit risks are being introduced with the transaction, events that were strictly tied to operational or administrative processes or where the price was not negotiated in the open market were excluded from the data set. For example, any new transactions or terminations that arose from portfolio compressions[35] were eliminated. Administrative transactions related to central clearing such as novations to central counterparties were also not included.

The original dataset provided data at the allocated level. For the purposes of our analysis, the execution level information is relevant, since prices are envisioned to be reported immediately following trade execution, and the execution-level notional amount is what would be reported. Therefore, the analysis and charts in this paper are based on transactions which have been regrouped into block trade sizes.

We identified allocated trades based on certain parameters and aggregated the observations back to the original notional size that was executed in the market (see our methodology described below). This process resulted in a 9% decrease in the total number of trades in the dataset. The process did not significantly alter the mean or mode trade sizes for US dollar or euro denominated single-name CDS or indices. However, the 99th percentile trade sizes at the block level were generally larger than those at the allocated trade level.

Methodology for Linking Allocated Observations

For transactions between G14 dealers and customers, we found events that were executed on the same day, in the same direction, with the same G14 dealer and customer (but different sub accounts for that customer), with the same contract parameters (reference entity, coupon, tenor, currency) and the same ratio of the upfront payment to the notional trade size. When all the circumstances met the criteria listed above, the transactions were identified as belonging to a block and regrouped into one trade.

Using these parameters, we believe that a significant share of the allocations in our dataset were identified and re-grouped to their block level. However, it is likely that a number of allocated observations were missed in this process. For example, an allocation involving different event types would not have been identified in our process.

[35] For an example of portfolio compression, see pg. 25, Appendix E of the following paper: Duffie, Darrell, Ada Li and Theodore Lubke, Federal Reserve Bank of New York Staff Reports, *Policy Perspectives on OTC Derivatives Market Infrastructure,* Staff Report No. 424 (January 1, 2010). http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1534874