

# The Futures Trading Landscape\*

Nicholas Fett<sup>†</sup>     Richard Haynes<sup>‡</sup>

March 10, 2017

## Abstract

Futures markets, originally designed for the hedging of future exposure to physical commodities, have over time expanded to a broader range of products like equities, fixed income and currencies. Along with this broadening of product classes has come a similar expansion of participant types, in part due to the increased use of market automation. Using a classification of trading accounts by firm type, this paper provides an overview of trading activity by type over the last three years in select futures contracts, as well as a more detailed activity summary of trading in the E-mini contract. We find clear differences across participant types in measures including average trade size, the level of agency vs. principal trading and liquidity provision, intra-day volumes, and the ratio of outright to spread volume. These findings confirm many generally assumed characteristics of listed derivatives trading, including the relatively high participation of end-users in physical commodity markets, of asset managers in market benchmark contracts like the S&P E-mini and U.S. Treasuries, and widespread participation of highly automated firms across almost all futures products.

## 1 Introduction

Futures and forward markets began as a way for companies and individuals to hedge against adverse price movements. An oil firm can use futures markets to ensure that the price at which oil is sold to a refiner is hedged months in advance. Conversely, an airline company can lock in fuel prices, a significant business cost, for months, or even years, into the future. Over time, futures contracts expanded from these physical goods to more financially focused products – there are now highly liquid futures contracts on Treasury bonds, on inter-bank lending rates, on currencies and on commonly tracked stock market indices. Introducing these contracts allowed market participants a way

---

\*The research presented in this paper was co-authored by Richard Haynes and Nicholas Fett, who are both CFTC employees, in their official capacities with the CFTC. The Office of the Chief Economist and CFTC economists produce original research on a broad range of topics relevant to the CFTC’s mandate to regulate commodity futures markets, commodity options markets, and the expanded mandate to regulate the swaps markets pursuant to the Dodd-Frank Wall Street Reform and Consumer Protection Act. These papers are often presented at conferences and many of these papers are later published by peer-review and other scholarly outlets. The analyses and conclusions expressed in this paper are those of the authors and do not reflect the views of other members of the Office of Chief Economist, other Commission staff, or the Commission itself.

<sup>†</sup>Research Economist, [nfett@cftc.gov](mailto:nfett@cftc.gov).

<sup>‡</sup>Supervisory Research Analyst and Corresponding Author, [rhaynes@cftc.gov](mailto:rhaynes@cftc.gov)

of gaining, or hedging, price exposure to a standardized set of physical and financial products through a centralized platform. Historically, there were two primary holders of futures contracts: end-users, who had business exposure to commodity prices, and floor brokers, who intermediated between buyers and sellers and held inventory when there was an imbalance between buying and selling interests. With the advent of automated trading in the last few decades, new market participant classes have grown in volume and importance. These include hedge funds/asset managers who often trade in futures contracts as an investment or diversification strategy, and principal trading firms (PTFs) who provide intermediation services over shorter time horizons. Each of these participant types play unique roles in day-to-day futures market trading. Some only trade infrequently and in contracts related to their line of business; others are active throughout the day, willing to buy or sell a contract depending on market demand and often ending the day flat or at least substantially hedged. Still others specialize in more complex strategies. They may trade options or swaps and hedge these exposures in futures markets, or act as market makers during the periodic futures “rolls” when traders shift a position from an expiring futures contract to a more deferred futures expiration. The mix of these strategies in a given contract is dependent on product characteristics; for example, physical commodities are more commonly traded by traditional end-users, who, as described above, have natural exposure to the commodity in day-to-day business. Futures contracts with high correlation to macroeconomic activity, like the S&P 500 E-mini contract and U.S. Treasuries, have higher than average levels of activity from investment firms like hedge funds and asset managers.

This white paper provides a brief overview of recent activity in a number of active futures contracts, broken up by participant type. It complements the recent white paper “Automated Trading in Futures Markets”<sup>1</sup>, which provides a general overview of the extent to which market participants use automation to trade in futures markets. In this paper we focus on a classification by firm type (e.g. Banks, PTFs, Asset Managers) rather than on connection/trading method. By using this classification, we find that futures contracts have significant heterogeneity in participation levels. The following sections provide further details supporting this claim but, in summary:

- Physical commodities have a relatively high level of participation by corporations and individuals, often the set of investors that have the most direct need for financial products to hedge business risk.
- Activity for individual firms across futures products is highly dependent on both the business goals of the firm and the demands of those who invest with the firm (e.g. asset managers concentrate in futures products which may be used as proxies for general market conditions). Daily volume, trading size, and price sensitivity similarly vary across the different firm types, relative to investment interests.
- Activity within a single futures points to distinctions between the trading activity of different firm types. PTFs, and to a lesser extent banks, are usually active throughout the trading day, often trading in smaller sizes and with shorter holding periods. Others, like asset managers, trade only a handful of times on an

---

<sup>1</sup>Haynes R. and Roberts J., 2015, Automated Trading in Futures Markets, CFTC.

average trading day, with activity often concentrated near the settlement period. These traders are usually more tilted to spread trading, where they roll large positions out of an expiring contract, usually using a relatively small number of large volume trades.

These findings mirror common intuitions about futures markets, such as the relative prominence of corporations/end users in physical commodities – but also highlight the diversity of trading behavior across, and within, contracts.

This paper is organized as follows: Section 2 provides details about the methodology of classifying firms and the basics of each firm type, Sections 3 and 4 provide a general overview of trading by participant type and by contract type. Finally, Section 5 is a more detailed analysis of trading in the S&P E-mini contract, a futures contract which tracks the price of the Standard and Poors 500 equity index.

## 2 Data and Classification Methodology

The trading statistics summarized below are based on transaction and reference data received daily by the CFTC; this data is a record of all futures trades on the Chicago Mercantile Exchange’s (CME’s) electronic trading platform. The data set includes information about the firms, and accounts, that are the counterparties to each trade, including whether the trade was done for a house or customer account and whether the executed order was passive or aggressive. Included within the data is an indicator for whether the trade was against a single futures expiration or multiple expirations, such as a spread trade or pack/bundle trades for Eurodollars. In this paper, the first set of trades is grouped under the class of “outright” trades and the second under “spread” trades. The trading time frame we use spans the years of 2010 through the second quarter of 2016. By associating this trading history with the firms generating this activity, we are able to trace the activity patterns of firm types across time and across a number of active futures markets.

For this paper, firms are classified into six different participant types (described in the appendix).<sup>2</sup> Expanding on the work in the Joint Report, classifications in this paper cover active accounts across all futures products traded on the CME futures platform. Using reference information for trading accounts, market participants are assigned to the parent firm associated to the account. Each parent firm was then assigned to one of the six categories using registration information and publicly available information about the firm; the classification was based on the firm’s primary activity. Firms that did not fit into the major categories, or were unknown, were placed into the ‘Other’ category. Because no individual unclassified firm had more than 0.05 percent of total futures volume over the period, we believe our classification includes all major market participants. Around 88 percent of total futures volume has been classified into one of the non-“Other” categories. A full list of the market participant types, with volume statistics and category descriptions, can be found in the Appendix (Tables 2 and 3). On a total market volume

---

<sup>2</sup>The classification was based on a similar, but less extensive, trader classification initially done for the Joint Report on the events of October 15, 2014. The list of types is: Bank/Dealers, Asset Managers, Principal Trading Firms (PTFs), Individuals, Corporations, and Non-Bank FCMs (i.e. non-bank intermediaries). The Asset Manager category is perhaps the broadest, including traditional asset managers, hedge funds, pension funds, sovereign wealth funds and similar buy-side institutions. The Corporations category includes “real economy” institutions like airline and oil companies, along with insurance companies.

basis, PTFs accounted for 51 percent of all volume through the analyzed period, followed by Bank/Dealers (16 percent) and Asset Managers (8 percent). The Non-Bank FCM category had the largest number of accounts, with 217,639 active during some period of the time window, though each individual account tended to be significantly smaller in activity than average. During this time period, the largest 27 firms account for 50 percent of all futures volume. Table 3 in the Appendix provides summary statistics for each participant type for a recent trading month.

### 3 Activity by Participant Type in Selected Contracts

To help quantify the differences in trading activity across firm categories, this section summarizes market participation by firm type across a few of the most active futures contracts. We begin these comparisons with two fixed income contracts: the U.S. Ten Year Treasury future and the Eurodollar contract. The 10 Year U.S. Treasury future trades on the Chicago Board of Trade (CBOT) and settles against the cheapest-to-deliver U.S. bond with maturity between 6.5 and 10 years. Figures 1a and 1b present total trade activity for the six identified firm types (plus “Other”) during the months of May and June 2016. Trade activity is dominated by PTFs for both months, followed by Bank/Dealers and Asset Managers. Because Treasury trading is usually concentrated in the most active contract month (traditionally the one closest to expiration), the level of spread trading is low and often makes up a small portion of trades for all major participant groups. The spread trading that does occur is usually due to rolling a position from one contract to the next, which for Treasury contracts occurs on a quarterly basis. This roll occurs during the months of February, May, August and November; activity due to this quarterly roll distinguishes the higher level of spread trading seen in May of 2016 from that in June, and is a fairly negligible portion of activity for all participant categories in the non-roll month.

This spread versus outright breakdown (equivalent to single- versus multi-leg trades) changes significantly when we compare Treasuries with another interest rate product, CME’s 3-month Eurodollar contract (Figure 1c). The Eurodollar contract tracks short-term, rather than long-term, interest rates and settles against the U.S. Dollar Libor rate. Because the tenor of the contract is short, trading is often done in “packs” or “bundles” where multiple expirations will be traded together, creating long duration exposures which still reference short-term rates. This type of activity increases the level of spread/cross-expiration trading relative to outright trading, enough so that spread trading makes up around half of all Eurodollar activity. In aggregate, Eurodollar volumes, as measured in contracts, are twice that of the Ten Year futures contract (though this does not take duration into account). Perhaps because both are reference interest rates, the distribution of volume across participant classes is similar for Eurodollars and U.S. Treasury futures, with the primary distinction being in the outright to spread ratios. Both products experience high PTF and bank participation rates, with other investment companies, like asset managers, taking a prominent, though less active, role. Because participants like PTFs often end the day relatively flat, the high level of spread trading associated to them does not necessarily represent heavy roll activity – instead it is often the general intra-day cross curve activity common among short rate contracts. However, because the Eurodollar

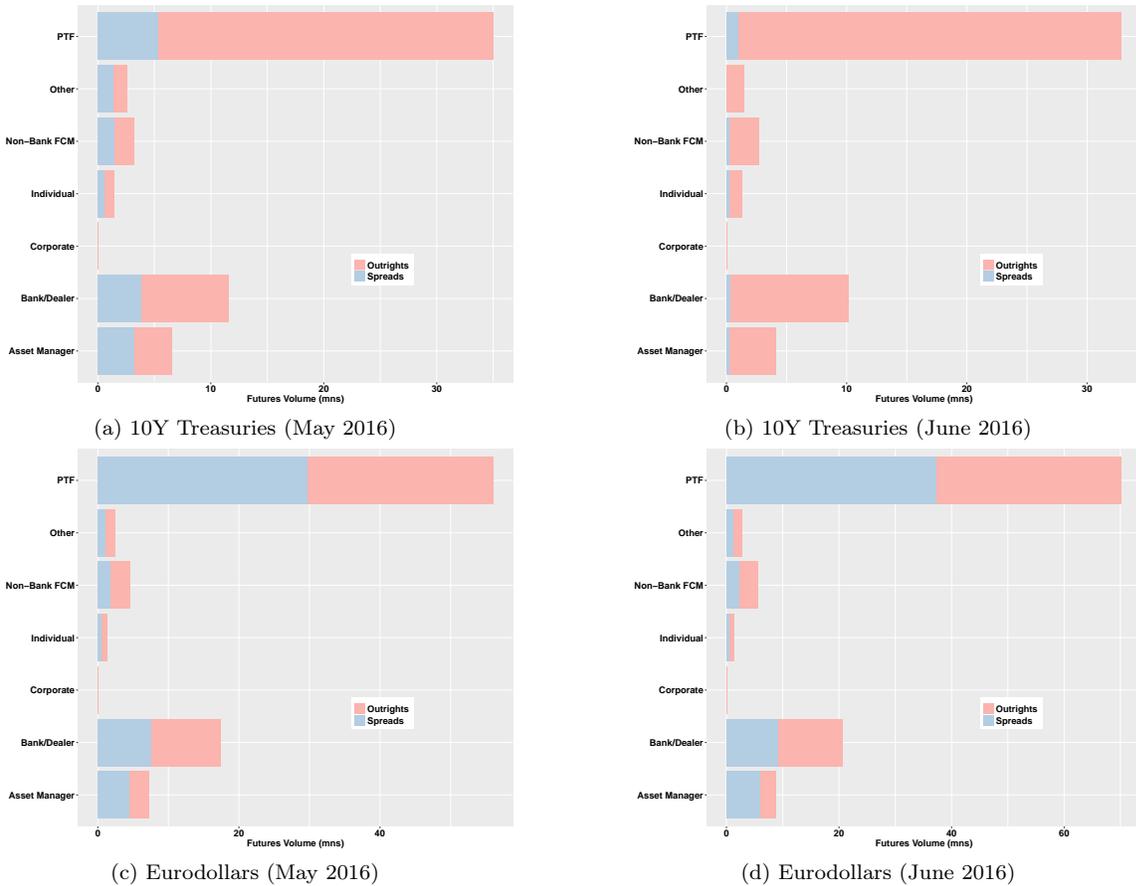


Figure 1: Futures Activity by Product - Financials

contract does roll on a monthly basis, spread activity is a mix of both multi-leg trading and contract roll.

In Figure 2 we chart participation for corn and crude oil, representing agricultural and energy commodities respectively. Similar to the Eurodollar contract, multi-leg transaction activity is often as high as, or higher than, that for single-leg transactions. Because producers and consumers are exposed to the price fluctuations of a physical commodity over extended periods of time, this can often require multi-leg hedges across multiple contracts or trading in the relative value of a long-dated versus a shorter-dated contract. In addition, crude oil futures roll on a monthly basis, further increasing spread activity. The distribution of activity across firm types, however, is quite different from that for Eurodollars and for U.S. Treasuries. Trading in physical futures contracts is more concentrated among the individuals and corporations who are part of the manufacturing process. In addition, “pit trading,” where floor brokers (individuals) stand on the floor of the exchange and act as trade intermediaries, still remains an active part of commodity options trading (and futures up until very recently). For these and other reasons, individual traders and corporations are a higher proportion of total volume than in the two rate contracts. For instance, individuals are a much larger proportion of the aggregate volume for corn, and much more active when restricting solely to spread trading. Figure 8 shows further detail for four futures contracts on participation levels by category since the beginning of 2012.

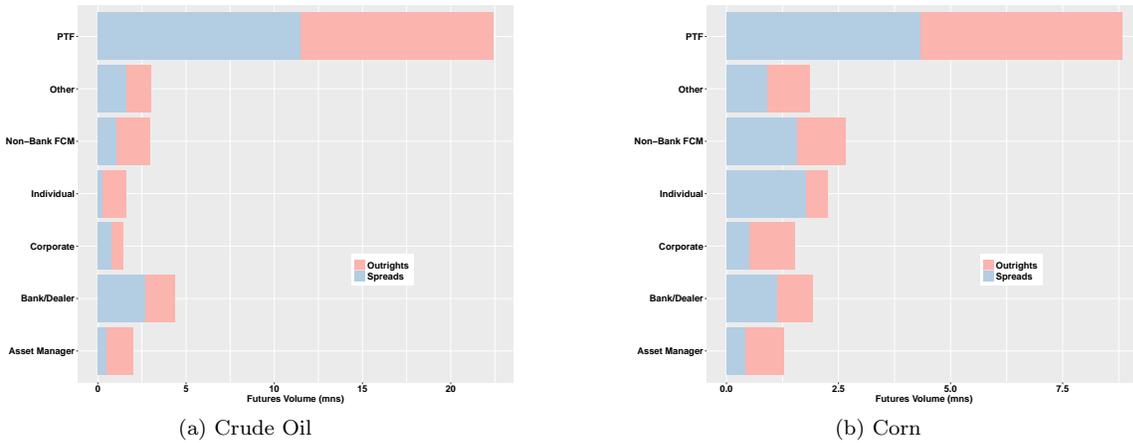


Figure 2: Futures Activity by Product - Commodities (June 2016)

## 4 Activity by Contract for Selected Participant Types

This section provides a similar, but inverse, comparison to that shown in the previous section. Instead of a breakdown by firm type of activity in selected futures contracts, here we show a breakdown of activity across futures contracts for selected firm types. In order to capture some diversity in behavior, we select two firm types that primarily take uni-directional positions in a given futures product over the short or medium term, and two that often act as trade intermediaries, buying and selling depending on market demand and often have shorter holding periods. In the first category, we highlight Corporations and Asset Managers; in the second, we highlight PTFs and Bank/Dealers.

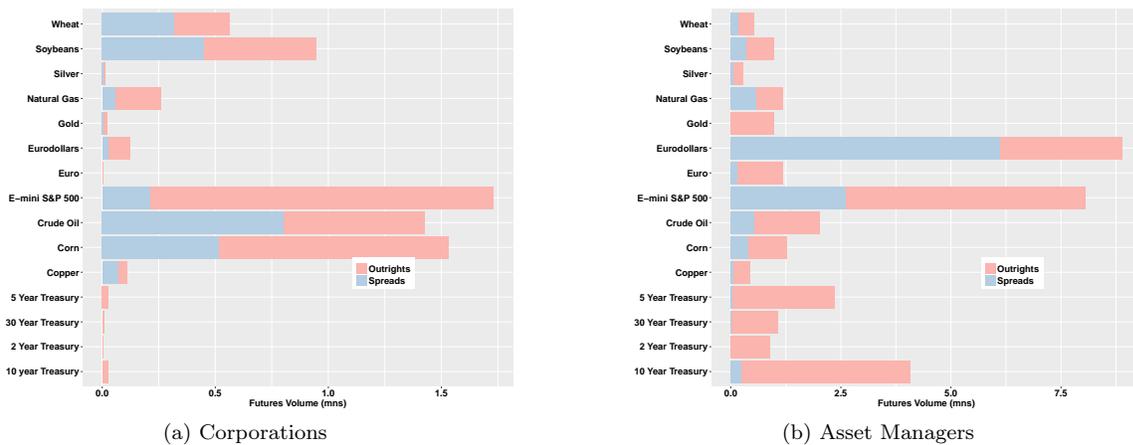


Figure 3: Futures Activity by Firm Type (June 2016)

Figure 3 summarizes activity for classes that traditionally make use of, rather than provide, intermediation services. Corporations have a high level of activity across a number of physical commodities contracts (Figure 3a), including other agricultural products, as well as energy and precious metals. For the products where they are the most active, Corporations participate, relatively equally, in both outright and spread trading. Though their activity is mostly limited to physical commodities, there is some activity in traditional financial contracts like Treasuries or the E-mini. This is almost exclusively due to trading by insurance companies, included in the corporate category,

who can use rate futures to hedge liability exposures. In contrast, Asset Managers concentrate their activity in a different set of products (Figure 3b). Where Corporations concentrate their trading in physical commodities, Asset Managers rarely trade these products. Instead, they are most active in contracts which mirror traditional equity and fixed income investment areas, the first through exposure to E-mini futures and the second through Eurodollars and Treasuries. These three, highly liquid contracts can provide a means of gaining financial exposure to stocks or bonds at relatively low cost.

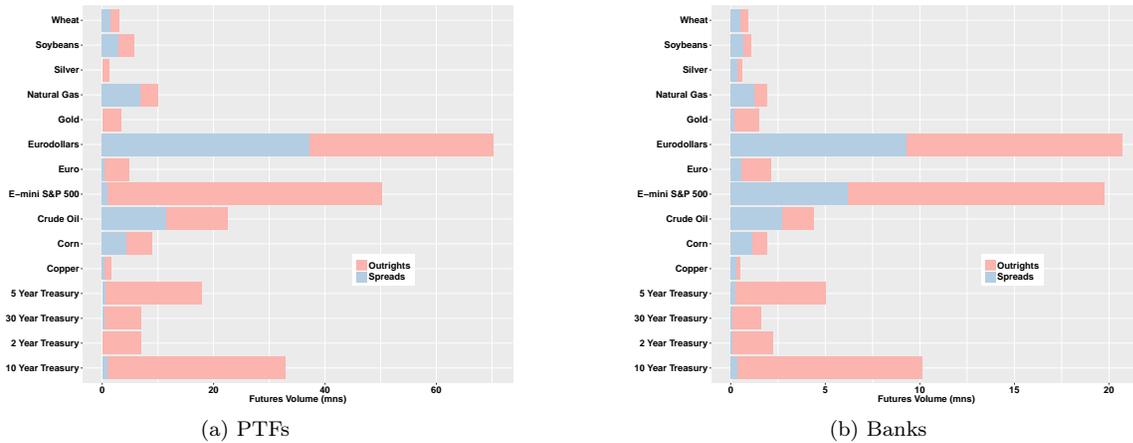


Figure 4: Futures Activity by Firm Type (June 2016) Cont

Financial intermediaries, like PTFs and Banks (Figure 4), are similarly concentrated in the fixed income and equity asset classes. For many futures products, PTF and Bank activity is very similar. One notable similarity is in the Eurodollar contract. Eurodollars, unlike most other futures instruments, trade using a “pro rata” matching algorithm, which generally prioritizes an order’s size over an order’s entry time. This adjustment in order preference may reduce the relative advantage of fast PTFs, leading to a slight skew towards bank activity relative to other contracts. Finally, the pure level of futures trading by each of the groups differs markedly. Where monthly futures activity by banks tops off at around 7 million contracts for a given product (like 10Y Treasuries and Eurodollars), in some contracts PTFs as a group can trade over 40 million contracts.

PTFs, dominant in most contracts on a volume basis, are often active across a wide variety of contracts. Other participant categories may be smaller and more idiosyncratic in activity - the individuals category, for instance, may consist of a large number of individuals, each of which trade rarely, in smaller sizes, and in only a few products. Because of this, the number of PTF accounts is often vastly outnumbered by counts in other categories, even though PTFs as a group are much larger on an aggregate basis. In addition, given market structure changes, these firm counts (as well as the volumes associated with the accounts) are likely to have changed, perhaps significantly, over time. Table 4 provides a breakdown of the number of active accounts in selected futures contracts during June 2016. The largest category, by count, switches between the Individual, Non-Bank FCM, Other and Bank/Dealer categories. All of these categories include, and in some cases are led by, customer accounts - Non-Bank FCMs, for instance, provide a clearing service for end-users and other customers who want to access futures markets. The

products with the highest number of active accounts are usually physical commodities, where a large number of individuals may have natural exposure to commodities like oil or corn. In contrast, financial futures products like currencies and US Treasuries are often more commonly used by a more specialized set of institutions; one exception to this pattern is the financial E-mini contract, which has a large retail investor presence. Figure 8 provides a time series of these account counts for four liquid products, and provides a time-series view of how these counts have adjusted with changing market conditions. Many trends have been fairly flat over the last few years, though not always. In a number of customer account heavy categories the number of active accounts has risen, while the number of PTF accounts has declined for many large products.

Finishing this section, we provide a brief set of aggregate information on non-electronic trading. Some larger trades, referred to as blocks, can be executed off of the order book; a customer interested in executing a large volume trade may call up a dealer, trade on a bilateral basis and then communicate this trade to the exchange. Table 1 shows the distribution of block trading volume across the different firm types. Because our firm classifications were based on account information for the electronic platform, the fact that the largest participant type for block trades is the “Other” category indicates that there may not be strong overlap between block accounts and electronic accounts – many accounts specialize in one or the other execution method. Bank/Dealers made up the vast majority of the classified portion of block trades; they often act as intermediaries and may be more willing to take on the inventory resulting from the block transaction. Overall, block trading is about 3 percent of total volume (block + non-block) for June 2016, with much of the activity concentrated in the Eurodollar contract.

**Table 1. Block Volume by Firm Type, June 2016**

	<b>Electronic Volume</b>	<b>Block Volume</b>	<b>Percent Block</b>
<b>Asset Manager</b>	51,458,531	703,881	1%
<b>Bank/Dealer</b>	130,222,066	7,538,461	5%
<b>Corporate</b>	14,334,621	3,202,058	18%
<b>Principal Trading Firm</b>	378,437,751	2,421,948	1%
<b>Individual</b>	25,612,206	165,555	1%
<b>Non-Bank FCM</b>	41,614,310	1,175,579	3%
<b>Other</b>	85,413,293	8,470,299	9%
<b>Total</b>	727,092,788	23,677,781	3%

## 5 Case Study: The E-mini Contract

This final section focuses on the E-mini contract and provides a slightly more granular overview of participant activity through time for a single product. We begin our comparisons by examining this outright/spread breakdown

for the two most active classes. Figure 5a shows the breakdown, by month, of spread vs. outright activity for banks over the last five years. Outright activity on a month-to-month basis is variable, with relative volume changes often related to changes in total market volume – Banks and PTFs, almost by definition, are more active when the market itself is more active. It is also clear that neither group seems to have become less active over time, a concern that has often been expressed in other markets like corporate bonds and repo. This can be seen in cases like October 15th, 2014, where market volatility and market activity both spiked. Spread activity, however, is generally more predictable from a month-to-month basis and concentrates in the month associated with the quarterly contract roll. PTFs, in contrast (Figure 5b), do not need to regularly roll large positions. In addition to being much more active than banks (peaking at almost 60mn contracts/month, compared to around 8mn), PTFs do very little spread trading through the year.

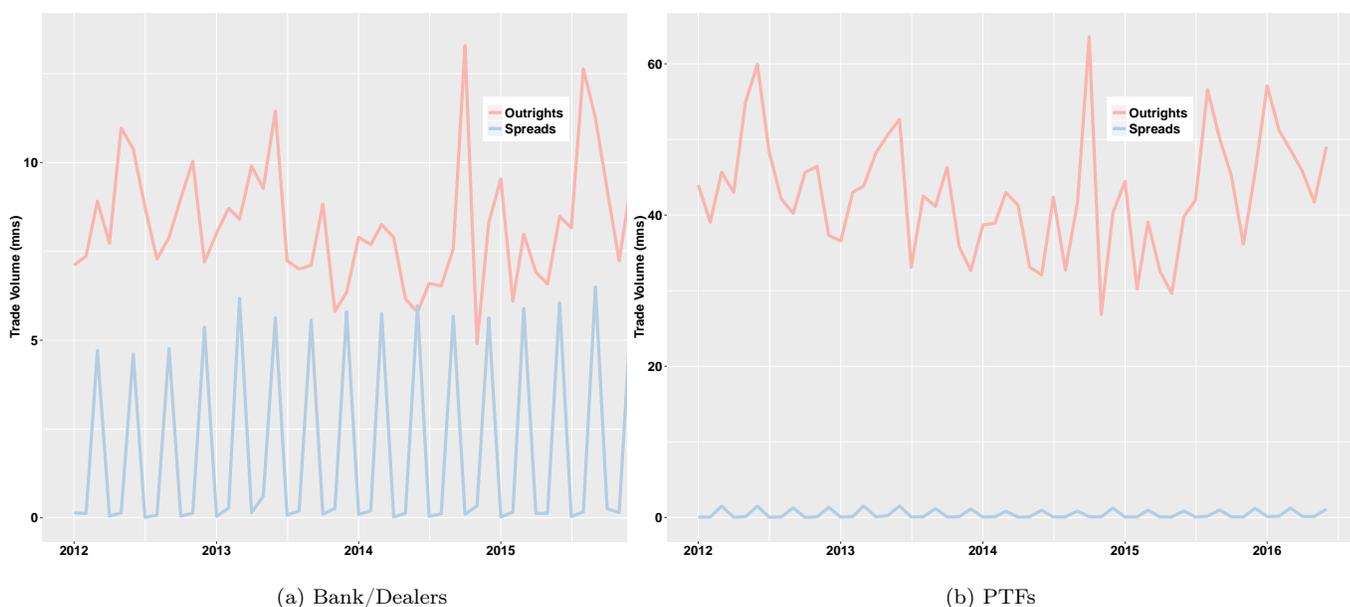
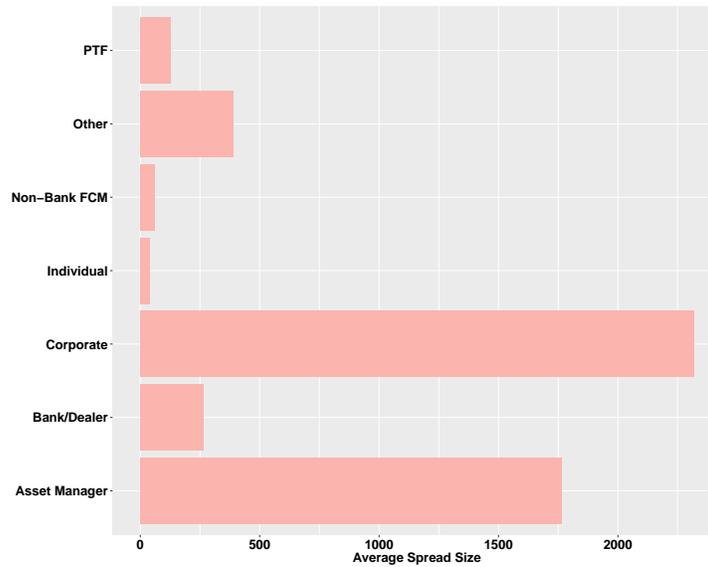


Figure 5: Historical Activity by Firm Type

Historically, outright trades are usually small, with participants on average trading only a few contracts at a time. Unlike outright, spread trading needs are more sporadic, and much larger when they come. Liquidity providers who specialize in spreads are able to meet these needs. Firms that need to transfer large amounts of risk across expirations are able to do this over short periods of time and a small number of trades.<sup>3</sup> As evidence, Figure 6a depicts the average trade sizes for spread trading across firm types; this average trade size is especially high for those that often need to roll these large inventories, such as asset managers and corporations. Where average or median outright trade sizes may be only a few contracts, average spread trade sizes for some groups are well over 100 contracts.

Next we provide two binary activity breakdowns: aggressive vs. passive trading and customer vs. house trading.

<sup>3</sup>There is also evidence from some futures markets that pre-announced spread trading periods like commodity ETF rolls attract liquidity providers and therefore lead to smaller bid-ask spreads and increased market depth. See Bessembinder et al. Predatory or Sunshine Trading?



(a) Average Spread Trade Size

Figure 6: Selected Emini Trading Metrics (June 2016)

The first breakdown is shown in Figure 7a. Aggressive trades are those that remove liquidity from the order book, and passive trades, such as those by market-makers, are those that sit in the order book waiting for opposing interest. Every outright trade has a passive and an aggressive side. Figure 7a summarizes the aggressive/passive breakdown by trader type; though there is some variation between firm types, each major trader category has non-negligible passive and aggressive volume. PTFs, the largest group by volume, is fairly balanced, with a slight tendency to be passive rather than aggressive on a trade. Large participant groups like PTFs include a variety of individual strategies, leading to an aggregate mix of passive market-making balanced with more aggressive inventory management and statistical arbitrage. Other trade categories, like bank/dealers and asset managers, are similarly balanced, but with a slight tilt towards the aggressive side of a trade. The Other category (largely unclassified) is almost evenly divided, further indicating that it is, as hoped, a semi-random sample of smaller accounts.

The house vs. customer breakdown is summarized across firm types in Figure 7b. Because firms are identified using their major line of business, there can be some divergence between the characteristics of a category and the house/customer breakdown. For instance, a small portion of PTF trading is done on behalf of customers and a similarly small portion of non-bank FCM trading done for house accounts; these trades highlight that firms, though assigned to a single category here, can play multiple roles. In addition, the customer/house breakdown confirms that institutions with multiple lines of business, like asset managers and bank/dealers, are in fact more evenly distributed across the two categories.

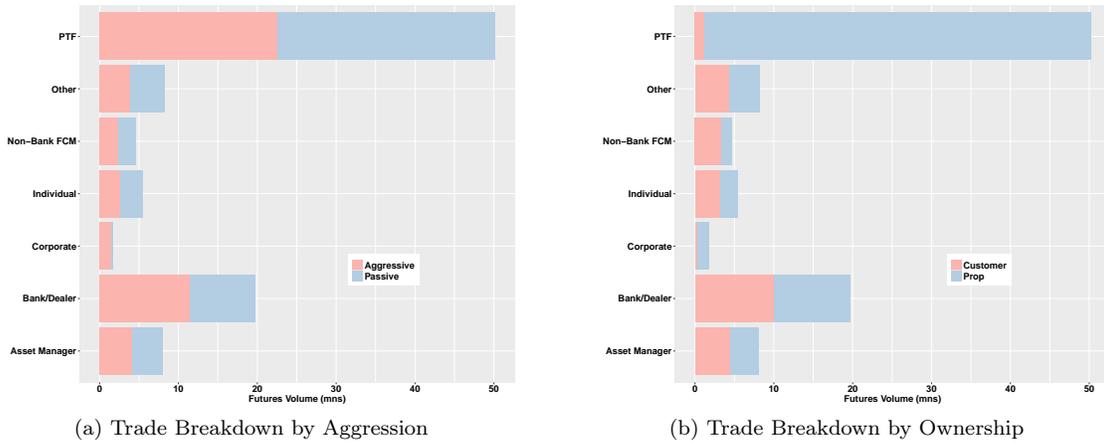


Figure 7: Selected E-mini Trading Metrics (June 2016)

## 6 Conclusion

The combination of futures transaction data reported to the Commission over recent years and a classification system created using internal reference data has allowed a fairly detailed look at how specific participant classes make use of some of the most active futures contracts. This paper provides an initial summary at the trading activity of these firm types and how this differs across product classes (fixed incomes, equities, commodities). This comparison helps us confirm many generally assumed characteristics of listed derivatives trading, including:

- Daily volume, trading size, and price sensitivity (indicated by aggressive/passive balances) vary greatly across the different firm types, but there is a persistence over time for these breakdowns within a category.
- Physical commodities experience a relatively high level of participation by corporations and individuals, investors, like extraction and manufacturing companies, that commonly hedge business risks using future products. In contrast, more traditional investment products, like equities or fixed income, see higher participation levels by Asset Managers and shorter-term intermediaries like PTFs.
- Differentiations between the frequency of trading activity and holding periods across categories, with some firm types more active throughout the trading day and others more focused on obtaining or rolling large positions.

Further research and work by the CFTC will examine more granular questions about trading activity across time and across type, as well as expansions into other derivatives products like swaps. In additional work, we hope to expand the overview here to more detailed analysis of specific events and the potential effects of participation trends on market quality.

# Appendix

**Table 2. Firm Types and Characteristics**

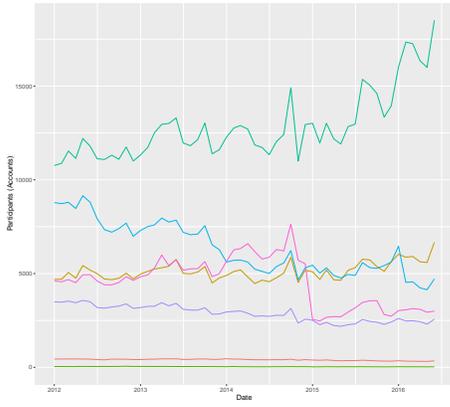
<b>Firm Type</b>	<b>Characteristics</b>
<b>Asset Manager</b>	Invests pooled funds of retail or institutional investors, generally managing and investing in a portfolio of securities.
<b>Bank/Dealer</b>	A bank that executes orders on behalf of clients and/or trades for its own account.
<b>Principal Trading Firm</b>	A manual or algorithmic based firm that trades with the firm's own capital.
<b>Individual</b>	Personal (non-corporate) futures trading accounts. This category includes floor brokers/traders.
<b>Non-Bank FCM</b>	A non-bank organization that executes orders on behalf of clients and/or trades for its own account.
<b>Corporate</b>	A corporation that does not fall within one of the categories. This category includes insurance companies.
<b>Other</b>	Any firm, individual or other market participant that does not fall into another category.

**Table 3. Volume by Firm Type, June 2016**

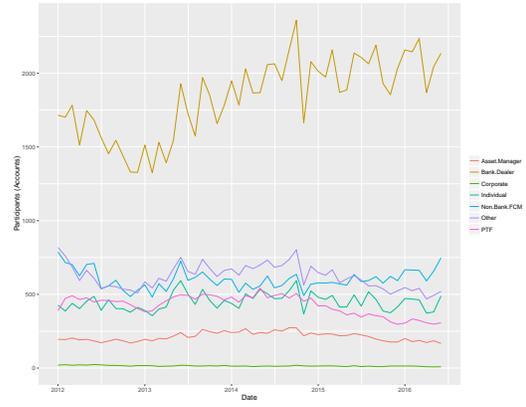
	<b>Total Volume</b>	<b>Percent</b>	<b>Top Contract by Volume</b>
<b>Asset Manager</b>	51,458,531	7%	Eurodollars
<b>Bank/Dealer</b>	130,222,066	18%	VIX
<b>Principal Trading Firm</b>	378,437,751	52%	Eurodollars
<b>Individual</b>	25,612,206	4%	E-mini S&P 500
<b>Non-Bank FCM</b>	41,614,310	6%	Eurodollars
<b>Other</b>	85,413,293	12%	N/A
<b>Corporate</b>	14,334,621	2%	VIX
<b>Total</b>	727,092,788		

**Table 4. Market Participants (Accounts) by Firm Type, June 2016**

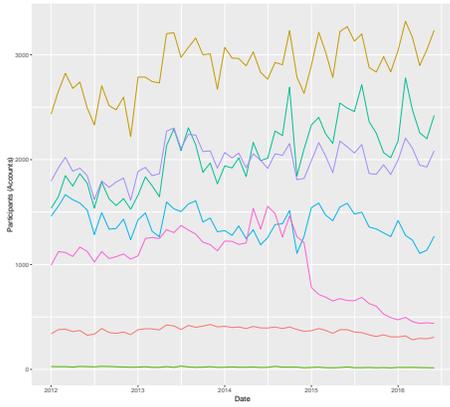
Commodity Name	Asset Manager	Bank/Dealer	Corporate	Individual	Non-Bank FCM	Other	PTF
30 Year Treasury	2187	1,329	15	2,989	1,305	1,752	324
10 Year Treasury	307	3,233	15	2,422	1,269	2,804	439
5 Year Treasury	230	1,813	(1)	770	632	1,087	333
2 Year Treasury	162	1,116	(1)	369	395	579	227
30-Day Federal Funds	45	518	(1)	185	214	198	110
British Pound	92	916	(1)	2,679	1,380	789	536
Corn	116	735	195	2,783	9,880	5,805	296
Crude Oil	129	792	62	8,427	2,697	2,763	1,849
Euro	95	1,333	(1)	2,843	1,658	838	810
Eurodollar	167	2,135	(1)	489	748	520	307
E-mini S&P 500	346	6,667	28	18,507	4,714	2,565	2,999
Gold	132	689	25	5,578	2,135	2,348	895
Natural Gas	100	396	24	2,553	1,117	1,222	374
Nasdaq	104	1,218	(1)	6,552	1,138	802	1,261
RBOB Gasoline	89	365	57	742	752	962	168
Soybeans	111	690	153	2,702	6,693	4,196	287
VIX	(1)	1,458	(1)	1,339	178	479	58
E-mini Dow	64	445	(1)	5,202	929	2,121	167



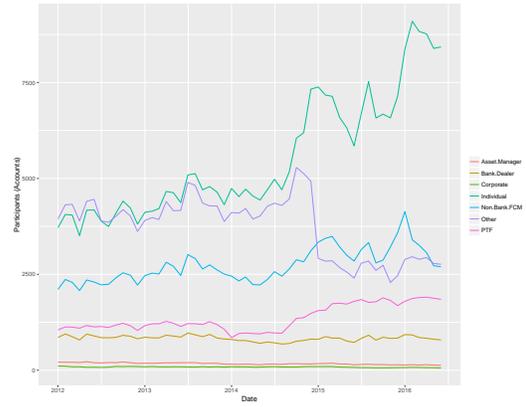
(a) E-mini S&P 500



(b) Eurodollars



(c) 10 Year Treasury



(d) Crude Oil

Figure 8: Number of Accounts by Firm Type, selected contracts