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A window into the world of futures market liquidity

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The purpose of this snapshot is to call attention to an interesting data set maintained by the Chicago Mercantile Exchange (CME) that affords a unique insight into futures trading costs. As brokers, we use this data to help understand transactions costs and to keep them as low as possible for our clients.

The CME microstructure data allows us to conclude two things. First, those traders whom we traditionally think of as liquidity takers do in fact pay for access to the pool of liquidity afforded by the exchange. Second, the net price paid for liquidity is remarkably small given the size of the bid/ask spread. In this example, which highlights trading in 10-year Treasury note futures, we find that the average price paid by “liquidity takers” is about \$3 per contract per round turn, while the value of the bid/ask spread is just over \$15.

LDB data and market participants

In addition to the traditional futures market division into hedgers vs. speculators, for business purposes futures exchanges classify their customers into four groups, identified by Customer Trade Indicator (CTI) codes. The four groups are

- CTI 1 – An individual member trading for his or her own account, a “local;”
- CTI 2 – A member firm trading for its own proprietary account,
- CTI 3 – A member firm trading for another member (very little volume), and
- CTI 4 – All other participants.

In practice, the world is more complicated than this, and over the years, the distinctions have become blurred as hedge funds and other active traders have become members of futures exchange. But generally speaking, the first three groups fall into a class of trader that is more interested in making money from the bid/ask spread (e.g. the local) or that is better able to avoid paying the bid/ask spread when trading (member firms). These are the “liquidity providers.” The fourth group is typically thought of as a class of trader whose interests in trading stem more from the possibility of broader swings in the price. We think of these traders as “liquidity demanders.”

In this age of electronic trading, the CME can now tag each buy and each sell with the CTI code of

the trader. The Liquidity Data Bank (LDB) data set reports the aggregate buy and sell volume for each CTI category, at each distinct price point, on each 15-minute interval. In Exhibit 1, for example, we show the quantities bought and sold at various prices for each of the three prominent groups for the 10-year Treasury note front-month futures contract, for the 15-minute interval from 10:00 to 10:15 AM Chicago time on Monday, November 1, 2010. (The volume for CTI 3 is so small that we have lumped it in with trading by CTI 1.)

Exhibit 1

Trading in 10-year Treasury note futures, December 2010 contract (10:00am to 10:15am, Chicago time, Monday, November 1, 2010)

Price	CTI Group					
	1 + 3		2		4	
	Buy	Sell	Buy	Sell	Buy	Sell
126-07	2	0	1	110	107	0
126-06+	1,965	1,479	1,897	2,783	1,640	1,240
126-06	1,251	2,625	5,645	5,178	3,287	2,380
126-05+	1,560	1,845	4,024	2,937	1,603	2,405
126-05	1,562	2,221	2,311	3,205	3,224	1,671
126-04+	4,628	4,958	4,873	5,320	3,824	3,047
126-04	3,064	2,459	4,155	4,157	3,444	4,047
126-03+	40	211	209	0	153	191
Total	14,072	15,798	23,115	23,690	17,282	14,981
Average price	126.155	126.157	126.161	126.162	126.158	126.155

Source: Quantitative Brokers based on CME LDB data

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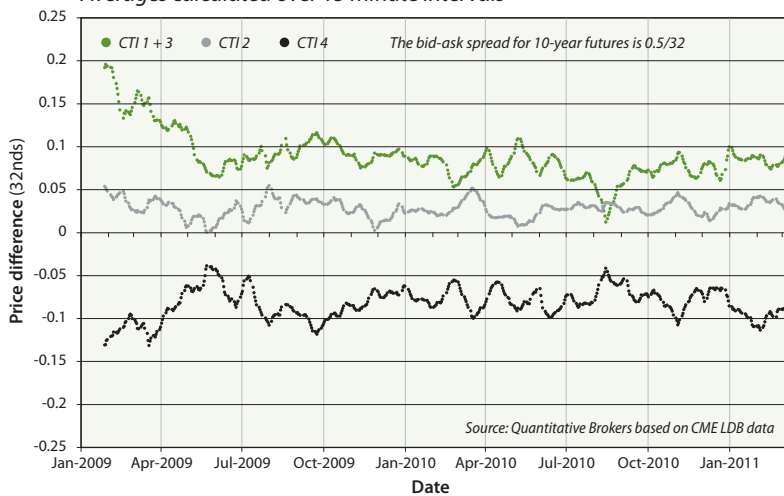
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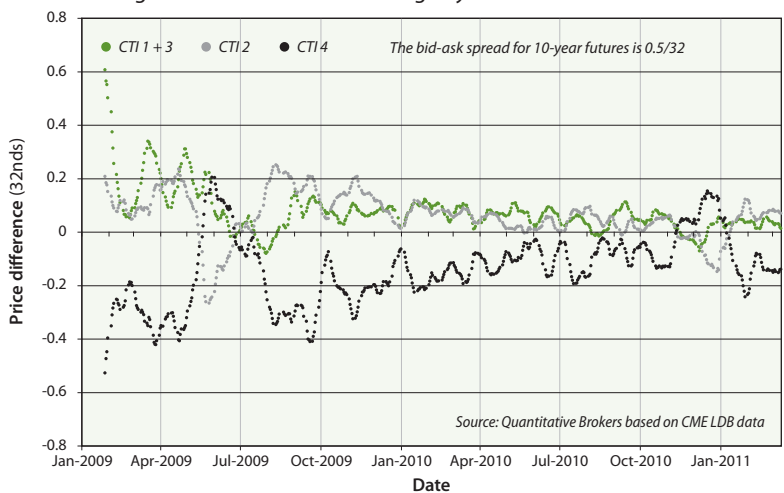
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Exhibit 2**Difference between average sell price and average buy price**
Averages calculated over 15 minute intervals

Averages calculated over full trading days



could have counted on paying the full bid/ask spread – or very close to it – for access to the market.

On the other hand, the risks inherent in providing liquidity are evident in the lower panel where we have shown the differences in sell and buy prices when we calculate these averages over entire trading days instead of the narrow 15-minute intervals used to produce the values in the upper panel. The business of making markets – or of being a liquidity provider – is one of selling options. The most you can make is the bid/ask spread and the market can get away from you. In the lower panel, we see a clear quarterly cycle in the price difference, probably associated with the futures expiration. We can also see two extended episodes, in June 2009 and December 2010, when those in the CTI 4 group – the so-called liquidity demanders – were consistently winners across the day while the liquidity providers were the losers. We do not yet have an explanation for these episodes.

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Exhibit 1 also shows the average price at which each group bought and at which each group sold during this particular 15-minute interval. As it happened, for the two insider groups – CTI 1+3 and CTI 2, the average buy price was lower than the average sell price, while for the one outsider group – CTI 4 – the average sell price was lower than the average buy price. This is consistent with our intuition that the first two groups are more interested in providing liquidity and getting paid for it, while the last group is more interested in access to liquidity and is willing to pay for it.

The longer view

It would be a bit of a stretch to suggest that the difference in average prices is a measure of market slippage for these three groups, but the evidence provided in Exhibit 2 is at least consistent with the idea that outsiders are paying for access, while those who are closer to the market are in the business of providing market liquidity.

In the upper panel, we have plotted the average values of these differences between sell and buy prices calculated for 15 minute intervals. The price differences are fairly stable and fairly small. On average, traders in the CTI 4 group pay approximately 0.1/32nd, which is about 1/5th of the tick in this market and is worth about \$3.00. This is much smaller than and a far cry from what one would have found in the open outcry days when someone in this group

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