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CFDs and Liquidity Provision

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Introduction: This study examines how informative market maker quotes are in the S&P/ASX 200 CFD (CFD 200) market relative to other alternative index markets. The main contribution of this study is to provide evidence on the extent to which market makers contribute to price discovery relative to limit order traders in other closely-linked markets.1 O'Hara (2003) highlights that price discovery is a key role of capital markets. Hendershott and Jones (2005) also note that efficient (or informative) prices are a public good. Hence, this study provides insights on the role of market makers in producing a particular type of public goods – informative prices. Although market makers' role in price discovery is examined in the literature, this study differs from prior research in that the CFD 200 market makers. Blume and Goldstein (1997) investigate the competitiveness of the quotes from the NYSE participants compared to those from regional exchanges and find that most quote revisions are initiated by the NYSE participants. However, they are not able to identify different types of quote providers.2 Huang (2002) examines the quality of NASDAQ market maker quotes in comparison to limit order prices from the ECNs for the NASDQ-listed stocks and shows that ECN quotes are more informative and posted between the best bid and ask quotes more often.3 In contrast, the CFD 200 market makers: (1) face little competition from public limit orders and (2) obtain minimal information from order flow due to low trading activities in the CFD 200 market.

1. Data and Results

The Reuters intra-day data used are provided by the Securities Industry Research Centre of Asia Pacific (SIRCA). For each of the three markets analysed, both trade- and quote-level data are used. The trade-level database contains the time to the nearest millisecond, the price, and volume for each transaction. The quote-level database consists of the time to the nearest millisecond, the best bid-price, best ask-price, best bid-depth, and best ask-depth for each quote revision. For the SPI data, each trading day, the most actively traded contract is selected. The sample period is from January 1, 2009 to December 31, 2009. For the price discovery analysis, quote-level data are reconstructed so that the quotes across the three markets are synchronised with the uniform frequency. When a quote is not available for an interval, the quote in the preceding interval is used.

Results show that upper and lower bounds for the information shares are presented along with the midpoints of the two bounds. The bid quote data are reconstructed such that bid quotes from different markets are evenly spaced using time intervals ranging from 0.1 to 5 seconds. The reconstruction of data is repeated each day separately. Reported are the statistics of information shares estimated each trading day. The statistics include time-series medians, means, and standard deviations.

Results are qualitatively homogeneous across all time intervals. Table I shows that the largest contribution to price discovery comes from the SPI 200 market. For example, the median 0.1-second interval information share of the SPI 200 is 89%. This provides further evidence that index futures markets dominate price discovery, consistent with prior research concerned with equity index markets. The remaining

[1] As in Huang (2002), "price discovery" refers to the process by which information is incorporated into an observable variable such as trade prices or quotes.
[2] On the NYSE, liquidity is provided by specialists, public limit orders, and floor brokers (Sofianos and Werner (2000)).
[3] The results are further supported by Barclay, Hendershott, and McCormick (2003) and Goldstein, Shkilko, Van Ness, and Van Ness (2008).

contributions to price discovery are shared between the CFD 200 and SPDR markets. The median 0.1-second interval information share of the CFD 200 (SPDR) is 5.11% and that of the SPDR is 5.79%.

[Table I]

Results show that the estimates of information shares using intervals greater than 0.1-second are inaccurate, especially for the CFD 200 and SPI 200. For example, using 0.5-second intervals, the median difference between upper and lower bounds for the CFD 200 is 47.53%. This is attributable to large innovation correlations between the CFD 200 and SPI 200 markets. Correlations between the CFD 200 and SPI 200 are considerably larger than those reported in prior studies. For example, Hasbrouck (2003) reports that the innovation correlation between the E-mini contract and S&P 500 Fund (with 1-second resolution) is zero from March 1, 2000 to May 31, 2000. The correlation between the CFD 200 and SPI 200 is 0.6488 based on the same interval (1-second). The CFD 200 and SPI 200 markets still seem to be highly correlated even when the 0.1-second interval is used: the estimate is 0.1767.

[Table II]

The information-based models suggest that market makers infer information on the value of the asset from order flow in their own market (e.g. Glosten and Milgrom, 1985 and Kyle, 1985). This is supported by numerous empirical studies (e.g. Anand and Subrahmanyam, 2007). However, order flow in the CFD 200 market is likely to convey relatively little information to market makers due to low levels of trading activity. As shown in Table I, in the fourth quarter of 2009, the mean daily number of trades for the CFD 200 contracts is 37, which is considerably smaller than those for the other instruments. Thus, the CFD market makers need to find an alternative source of information. Despite some evidence that market makers actively acquire information (e.g. Anand and Subrahmanyam, 2007), it may not be preferred by the CFD market markers since: (1) acquired information cannot be easily capitalised in the absence of high trading activities and (2) most CFD 200 market makers specialise in developing trading facilities rather than conducting macroeconomic research.

Results that a small portion of price discovery is shared between the CFD 200 and SPDR markets. However, since the estimates of information shares for the CFD 200 market are relatively inaccurate, it is difficult to draw inferences as to the magnitude of price discovery in the CFD 200 market relative to the SPDR market. To overcome this issue, information shares are estimated including only the CFD 200 and SPDR in the vector error correction model with 0.1-second resolution. The innovation correlation between these two instruments is 0.0232, which is relatively small. Consequently, differences between upper and lower bounds for both instruments are not substantial. The median difference between upper and lower bounds for the CFD 200 (SPDR) is 2.59% (2.60%).

2. Conclusions

Results reveal that (1) most permanent quote changes occur in the SPI 200 market first and (2) the CFD 200 and SPI 200 quotes exhibit unusually large correlations (in comparison with correlations between index instruments reported in prior studies and also in a practical sense). Hence, results may reflect market makers' mechanical quote setting strategies ("autoquoting") in the CFD 200 market. Large innovation correlations (e.g. 0.1-second correlation of 0.1767) between the quotes from the two markets may suggest that the CFD 200 market makers use computer algorithms to automatically generate quotes, which is commonly referred to as "automated market making".

3. References

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Table I

Information Shares in the S&P/ASX 200 index market

This table reports results of the information share analysis using bid quotes from the CFD 200, SPI 200, and SPDR markets. The bid quote data are reconstructed such that bid quotes from different markets are evenly-spaced with time intervals ranging from 0.1 to 5 seconds. The reconstruction of data is repeated for each day separately. In each interval, if there are multiple bid quotes reported, the last bid quote is used. If no bid quote is reported at a particular interval, the last bid quote in the previous interval is used. Statistics are computed using estimates of the parameters of the vector error correction model described in Section 5. Lower *(Upper) is the lower (upper)* bound of information share of a particular market. Midpoint is the average of lower and upper bounds.

	CFD 200			SPI 200			SPDR		
	Lower	Upper	Midpoint	Lower	Upper	Midpoint	Lower	Upper	Midpoint
Panel A: 5 Second Interval									
Median	0.0149	0.7124	0.3636	0.1152	0.8808	0.4980	0.0814	0.5917	0.3365
Mean	0.0356	0.6475	0.3416	0.1513	0.8577	0.5045	0.0942	0.5576	0.3259
Standard Deviation	0.0533	0.2365	0.1449	0.1423	0.1074	0.1248	0.0858	0.2002	0.1430
Panel B: 4 Second Interval									
Median	0.0110	0.6754	0.3432	0.1389	0.8815	0.5102	0.0743	0.5293	0.3018
Mean	0.0340	0.6399	0.3369	0.1702	0.8621	0.5161	0.0931	0.5211	0.3071
Standard Deviation	0.0539	0.2246	0.1393	0.1458	0.1036	0.1247	0.0827	0.2016	0.1421

Panel C: 3 Second Interval									
Median	0.0096	0.6850	0.3473	0.1673	0.8909	0.5291	0.0684	0.4619	0.2652
Mean	0.0323	0.6258	0.3291	0.1983	0.8722	0.5352	0.0865	0.4615	0.2740
Standard Deviation	0.0537	0.2289	0.1413	0.1586	0.0961	0.1274	0.0726	0.1875	0.1300
Panel D: 2 Second Interval									
Median	0.0112	0.6420	0.3266	0.2168	0.8952	0.5560	0.0663	0.3669	0.2166
Mean	0.0316	0.5966	0.3141	0.2448	0.8761	0.5604	0.0846	0.3768	0.2307
Standard Deviation	0.0554	0.2262	0.1408	0.1701	0.0945	0.1323	0.0691	0.1664	0.1178
Panel E: 1 Second Interval									
Median	0.0131	0.5583	0.2857	0.3162	0.9075	0.6119	0.0579	0.1958	0.1268
Mean	0.0313	0.5359	0.2836	0.3491	0.8899	0.6195	0.0744	0.2116	0.1430
Standard Deviation	0.0570	0.2183	0.1376	0.1897	0.0855	0.1376	0.0646	0.1238	0.0942
Panel F: 0.5 Second Interval									
Median	0.0144	0.4521	0.2333	0.4427	0.9180	0.6804	0.0585	0.1067	0.0826
Mean	0.0270	0.4353	0.2311	0.4711	0.8992	0.6852	0.0720	0.1216	0.0968
Standard Deviation	0.0407	0.1950	0.1178	0.1842	0.0761	0.1301	0.0639	0.0872	0.0755
Panel G: 0.1 Second Interval									
Median	0.0141	0.0881	0.0511	0.8472	0.9237	0.8855	0.0554	0.0605	0.0579
Mean	0.0251	0.0947	0.0599	0.8397	0.9133	0.8765	0.0612	0.0667	0.0639
Standard Deviation	0.0408	0.0650	0.0529	0.0749	0.0592	0.0671	0.0457	0.0484	0.0470

Table II

Innovation Correlations in the S&P/ASX 200 Market

This table reports results of the innovation correlations using bid quotes from the CFD 200, SPI 200, and SPDR markets. The bid quote data are reconstructed such that bid quotes from different markets are evenly-spaced using time intervals raging from 0.1 to 5 seconds. The reconstruction of data is repeated for each day separately. In each interval, if there are multiple bid quotes reported, the last bid quote is used. If no bid quote is reported at a particular interval, the last bid quote in the previous interval is used. Statistics are computed using estimates of the parameters of the vector error correction model described in Section 5.

Interval (seconds)	CFD 200 vs. SPI 200	CFD 200 vs. STW	SPI 200 vs. STW
5	0.7638	0.4616	0.5354
4	0.7572	0.4355	0.5016
3	0.7332	0.3889	0.4516
2	0.7073	0.3199	0.3693
1	0.6488	0.1801	0.2061
0.5	0.5691	0.0688	0.0882
0.1	0.1767	0.0072	0.0107