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Informed Trading: Special Issue

REITs: Global Market Microstructure

Global REITs do not behave like common stocks when trading; they exhibit differences in spread and liquidity characteristics, which should be factored into trading strategies and instructions.

Global REITs exhibit unique characteristics and their price action is often uncorrelated to the financial sector and broader market, due to the niche nature of this sector. This is reflected by the market microstructure of this universe of stocks. There are significant differences between REITs globally that should inform execution strategy. In this commentary, we look into spread, volume and market impact profiles, highlighting key trends you need to be aware of when trading these names.

Highlights from this analysis include:

- **US: More liquid, but not cheaper to trade**
 - Although volume and spreads have improved, higher volatility leads to a more expensive trading environment
 - The REIT sector has the largest close auction volume of all sectors (10%) in US
- **Europe: Volume at Close is significant for REITs**
 - Across European markets, closing prints accounted for a significant portion of volume: as high as 30% for the UK, 15% on average
- **Asia ex-JP: Widest spreads, hardest region to trade**
 - Asia ex-JP REITs have the widest spreads at 21.6 bps vs. the global average of 8.7 bps. These securities also tend to have the lower traded volume with an ADV of 6.2% vs. a global average of 4%



REITs: Global Market Microstructure

Global REITs Universe

Our analysis is based on developed markets within the global FTSE EPRA NAREIT universe. We have excluded countries representing fewer than five stocks, as the trends would not be meaningful. We also excluded names where the ADV was greater than 400% of the 20-day average, as their inclusion would skew liquidity and impact cost data.

The table below highlights data for our focus countries, providing headline statistics of key metrics as a “quick guide” for outlier countries by trend category.

This data may be helpful for adjusting trading instructions to better reflect the market microstructure trends. For example, “VWAP for a Singaporean REIT” may be too loose of a trading instruction. Instead a more prescriptive instruction more reflective of the trading environment could be: *“Spread over the day, looking to maximize spread capture. Can be more of the volume if not impacting, reduce exposure to first 20 minutes”*.

REIT Liquidity Summary

Region	20 day %ADV	Spread (bps)	Exec Cost (bps)	Open Vol as % of Daily Volume	Close Vol as % of Daily Volume
Americas	3.1%	6.5	7.4	1.1%	8.3%
Asia ex-JP	6.2%	21.6	13.5	2.1%	15.5%
Europe	7.5%	11.3	11.0	1.0%	19.2%

Region	Country Name	20 day %ADV	Spread (bps)	Exec Cost (bps)	Open Vol as % of Daily Volume	Close Vol as % of Daily Volume
Americas	Canada	12.3%	8.9	13.7	0.9%	5.1%
	United States	2.8%	6.4	7.2	1.1%	9.4%
Asia ex-JP	Australia	5.0%	23.5	13.1	2.1%	19.5%
	Hong Kong	5.1%	14.8	10.4		
	Singapore	11.9%	33.5	22.2	2.2%	11.5%
Europe	Belgium	32.2%	17.0	26.5	2.1%	19.3%
	France	5.0%	8.0	9.0	1.5%	24.0%
	Germany	5.5%	10.3	9.8	0.6%	16.4%
	Netherlands	2.2%	5.0	4.7	0.6%	15.7%
	Sweden	16.0%	20.8	21.2	0.6%	14.5%
	United Kingdom	9.9%	14.8	13.5	0.3%	27.8%

Region	Country Name	20 day %ADV	Spread (bps)	Exec Cost (bps)	AM Open as % Daily Volume	PM Open as % Daily Volume	PM Close as % Daily Volume
Japan	Japan	5.5%	10.1	14.6	2.6%	1.4%	8.3%

The tables above show an ADV-weighted average of the percentage of 20 day ADV of a USD 1m position, bid/ask spread, 1-day VWAP execution cost and an average of the auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

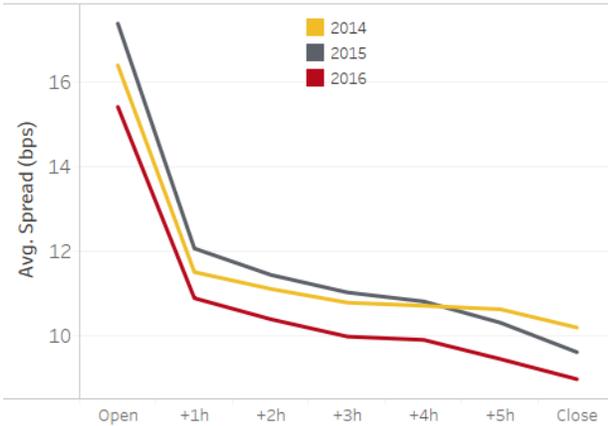
Source: Instinet



REITs: Global Market Microstructure

I. Canada

Intraday Spread Profile



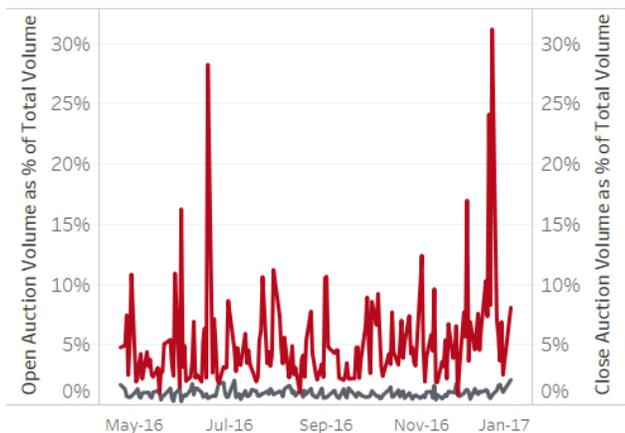
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Unlike the U.S. (page 4), Canada actually saw an improvement in both bid/ask spreads and volume. This is borne out in impact costs, which have steadily declined in 2016, especially in comparison with 2015.

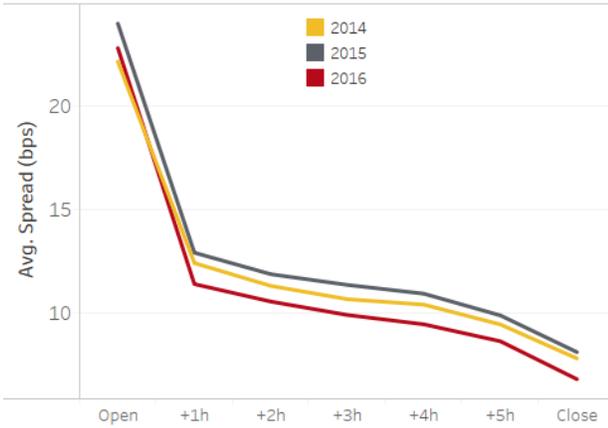
The closing auction saw 5% of daily volume on average – however, there was a large amount of variation – between 1% and 30% over 2016. Opening volumes were relatively stable at just under 1%.



REITs: Global Market Microstructure

II. United States

Intraday Spread Profile



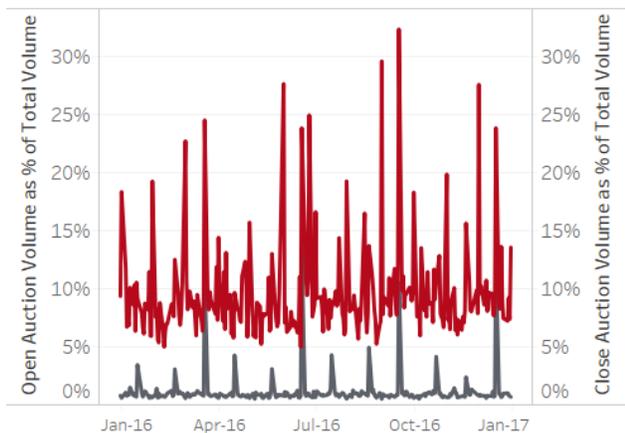
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Spreads for U.S. REITs throughout the trading session have tightened by approximately 19% at the close when compared with 2015. This difference continued through the entire trading day. Volumes have also increased. Market impact estimates showed no trend, but were volatile around an average of around 20 bps, which could be attributed to market volatility.

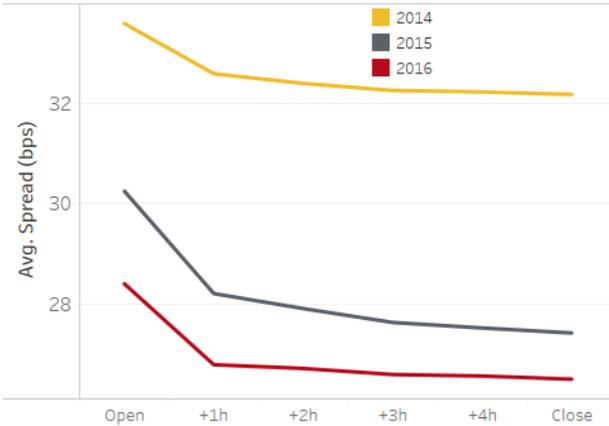
Closing auction volumes were in the 10% range. This is significant and deeper than any other U.S. sector, and thus, you can trade in the close with minimal dislocation on average. The opening auction is far less dominant at around 1% of daily volume on average.



REITs: Global Market Microstructure

III. Australia

Intraday Spread Profile



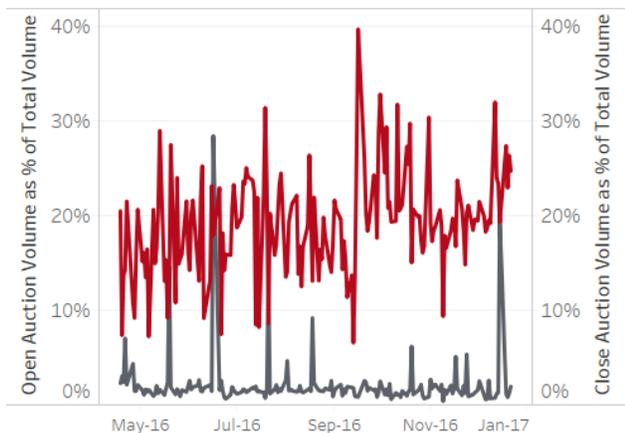
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Australian REITs have seen a dramatic improvement in liquidity parameters since 2014. This includes a 10 bps tightening of spreads and an increase in volume. Consequently, this is the only country in the region where market impact cost estimates have consistently contracted as well.

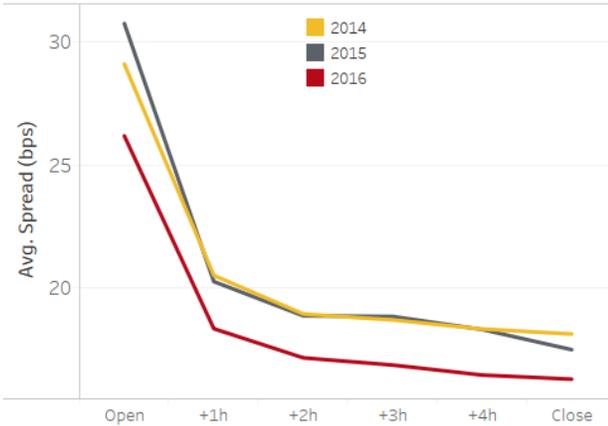
A large part of the day's volume (19%) is executed at the close, with only 2% at the open auction.



REITs: Global Market Microstructure

IV. Hong Kong

Intraday Spread Profile



Liquidity



METRIC Market Impact Cost Estimates



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position and 1 day VWAP execution cost REIT constituents of the FTSE EPRA, categorized by trading country. We omitted auction volume information for Hong Kong, due to an intra-period introduction of a closing auction. Please see Glossary for more details.

Source: Instinet, FTSE

Contrary to the trends seen in Singapore, Hong Kong actually saw tighter spreads compared with 2014. This difference is as much as 4 bps in the morning, but closer to 1.5 bps through the rest of the trading day. While there is a basic trend toward increased liquidity, volumes have been sporadic.

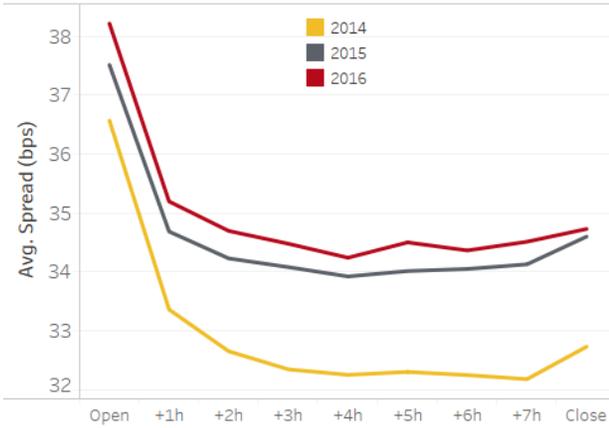
Although increasing volumes and tightening spreads should usually reduce market impact estimates, volatility in these names rose significantly. This led to an upward trend in impact costs toward the end of 2016.



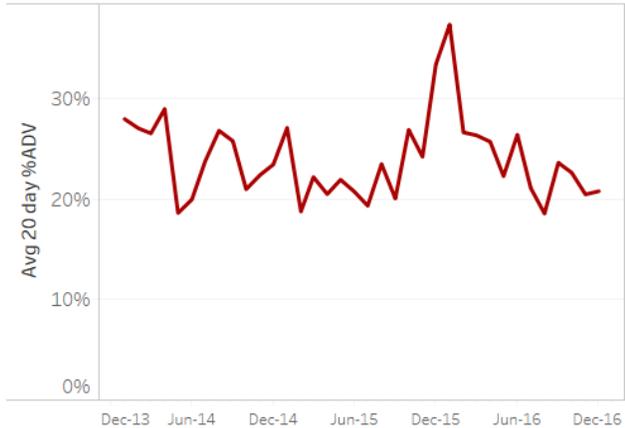
REITs: Global Market Microstructure

V. Singapore

Intraday Spread Profile



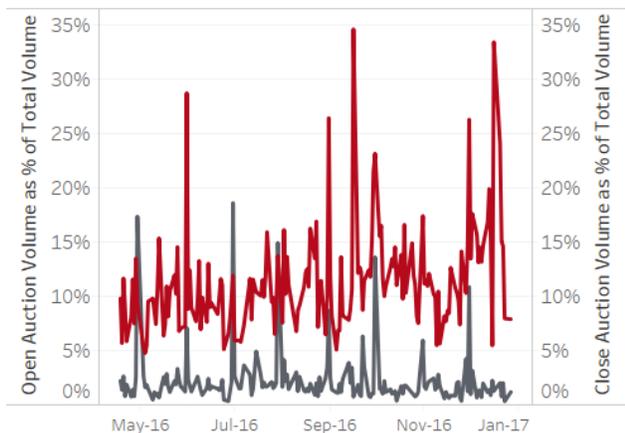
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Singapore REITs have the widest spreads and lowest liquidity in the APAC region. Since 2014, bid/ask spread increased around 2 bps across the entire trading day. However, despite an improvement in volumes compared with 2014, overall estimated impact costs remain elevated.

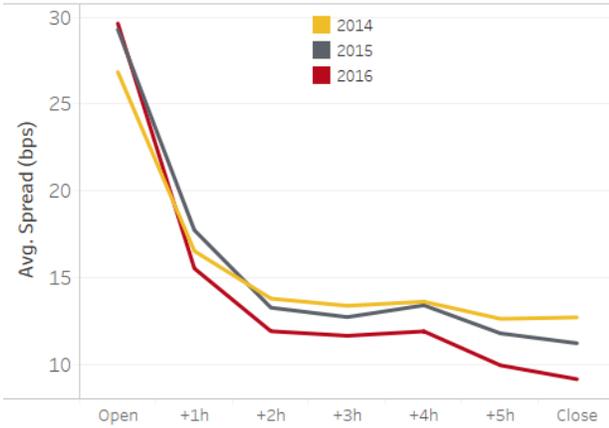
The closing auction accounts for 11.5% of daily volume, whereas the opening auction is 2% on average.



REITs: Global Market Microstructure

VI. Japan

Intraday Spread Profile



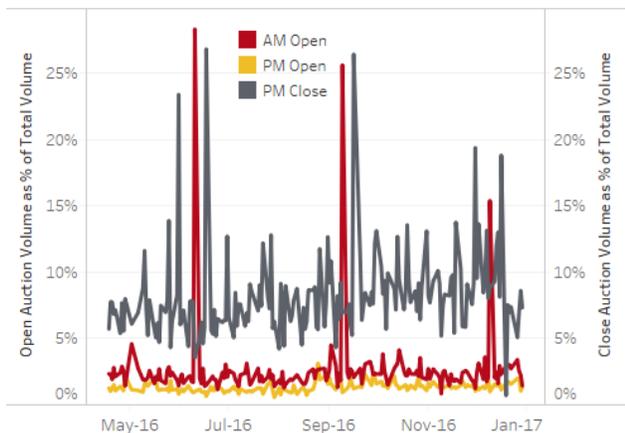
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Spreads have tightened a healthy 5 bps since 2014 in Japanese REITs. Similar to the rest of the region, spreads are highest in the morning and continue to stabilize through the remainder of the day. However, an interesting distinction is that in Japan spreads continue to decline through to the close, and are at their lowest at the end of the trading day.

Japanese REITs have become more liquid over the past three years. There is speculation that this is because of the Bank of Japan's recent interest in the ETF market.

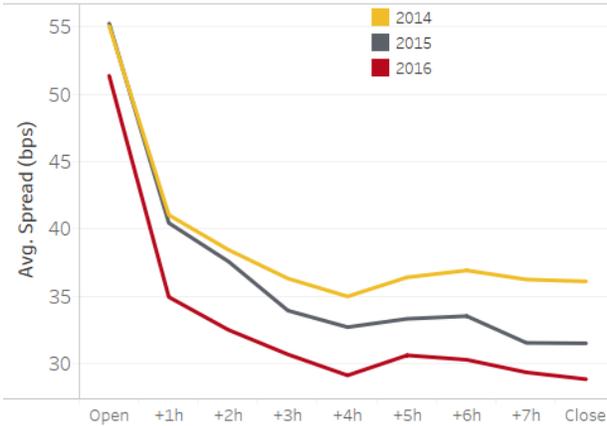
The AM open auction sees approximately 3% of the day's volume, while the PM close sees around 8%.



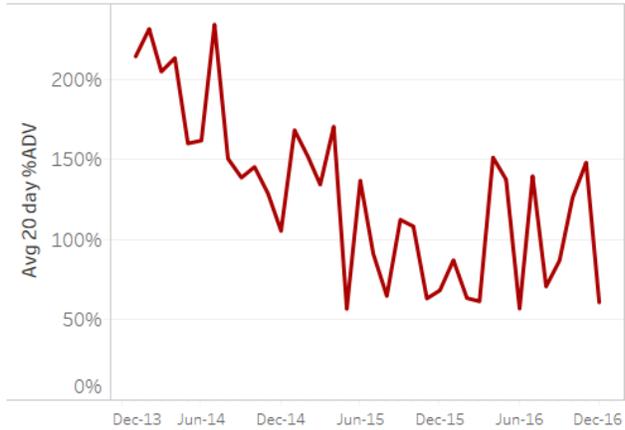
REITs: Global Market Microstructure

VII. Belgium

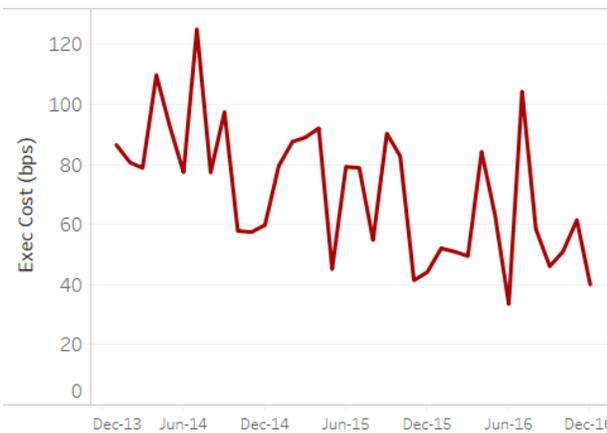
Intraday Spread Profile



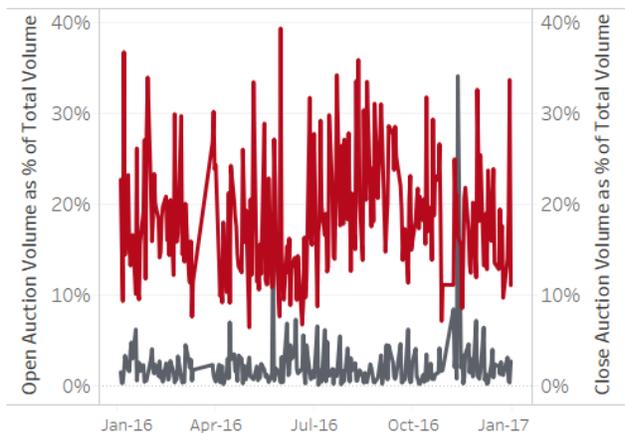
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

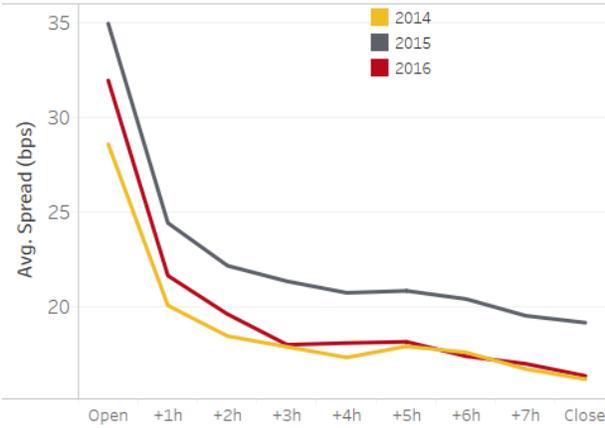
Belgian REIT liquidity followed the trends seen in the German markets – with across-the-board improvement in liquidity parameters. However, a larger amount of trading was concentrated in the closing auction, at 20% of daily volume, and open auction volumes were higher as well, at 2%.



REITs: Global Market Microstructure

VIII. France

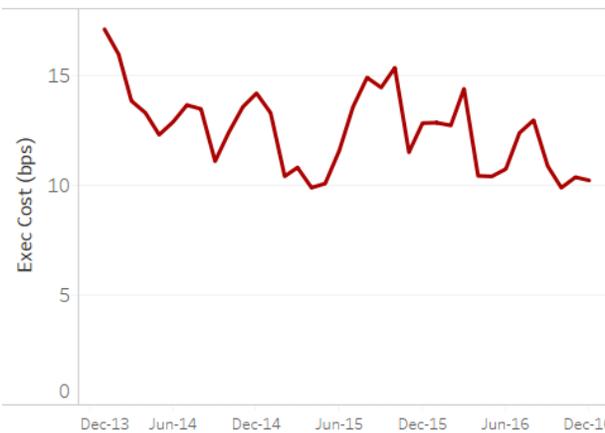
Intraday Spread Profile



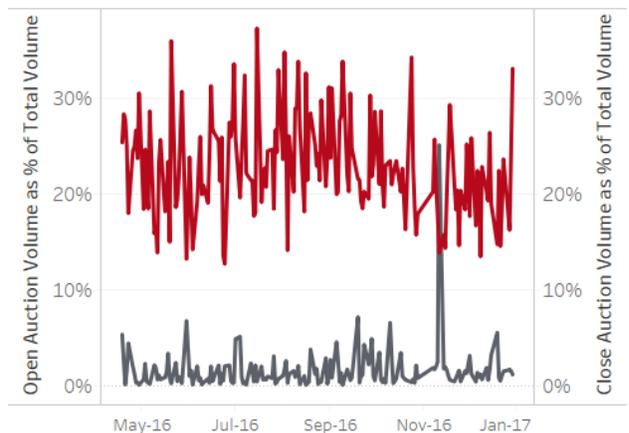
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

In France, for most of the trading session, we are seeing 2014 levels of spread, with the exception of the early morning, which continues to be challenging. Volumes have been decreasing especially in comparison with 2015 numbers. In line with spreads, impact costs have declined slightly versus last year.

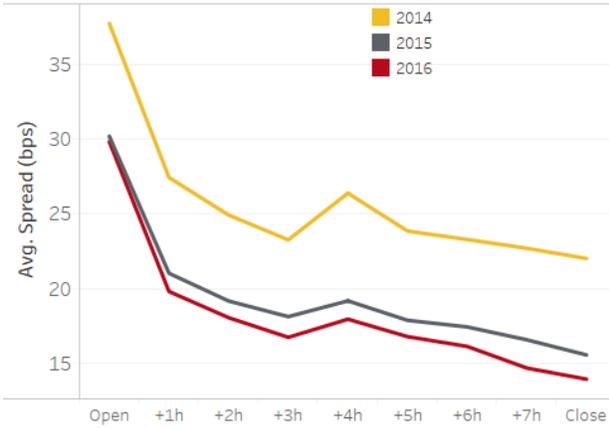
Similar to the UK, French REITs see a significant portion of the day's volume executing at the close (~24%) compared to the open (1.5%).



REITs: Global Market Microstructure

IX. Germany

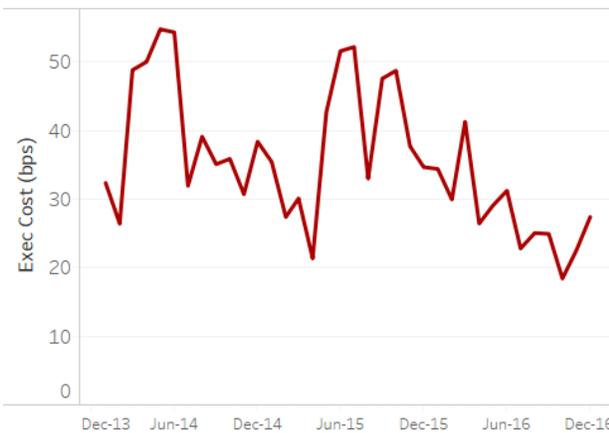
Intraday Spread Profile



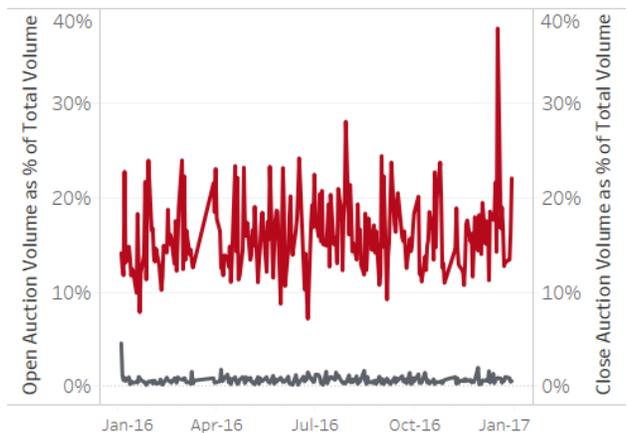
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Similar to the UK, trading conditions in German REITs are much improved compared to prior years. Volumes were higher, spreads were tighter, and consequently impact costs were sharply lower (around 10 bps vs. 2015)

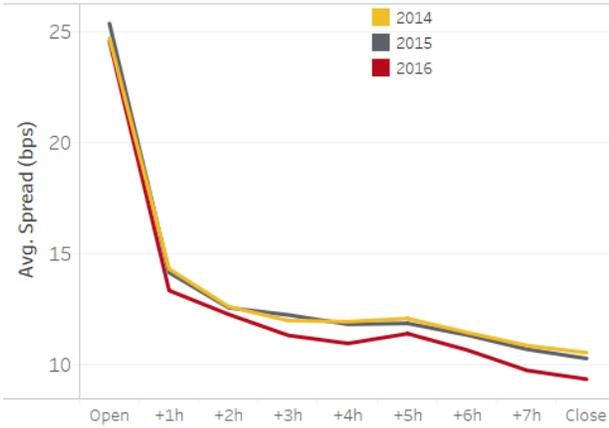
The closing auction accounted for more than 15% of daily volume, whereas open volumes were relatively anemic at 0.6%. This, coupled with liquidity increases, points to a positive continuous trading session.



REITs: Global Market Microstructure

X. Netherlands

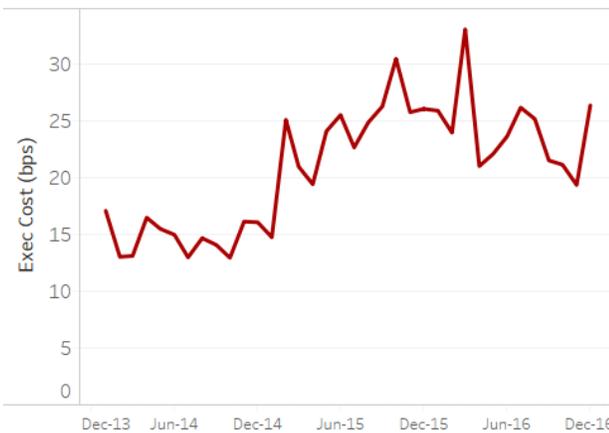
Intraday Spread Profile



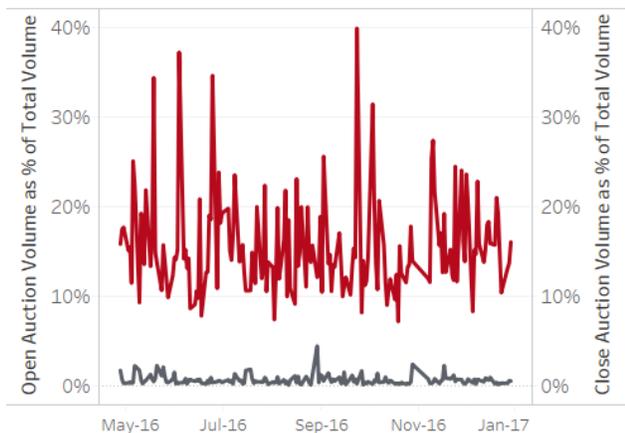
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

Of the markets analyzed in this study, The Netherlands is the only market where bid/ask spreads have been stable since 2014. Volumes, on the other hand, have steadily declined during this period. This trend is dominated by small cap names in the Dutch REIT universe.

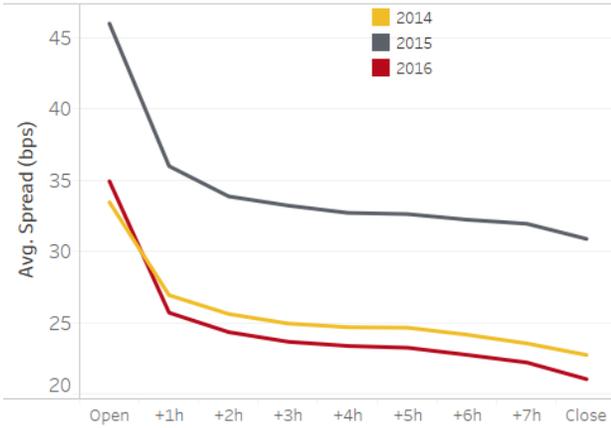
As was seen with Germany and Sweden, the closing auction sees around 15% daily volume, while the opening auction saw a meager 0.6%.



REITs: Global Market Microstructure

XI. Sweden

Intraday Spread Profile



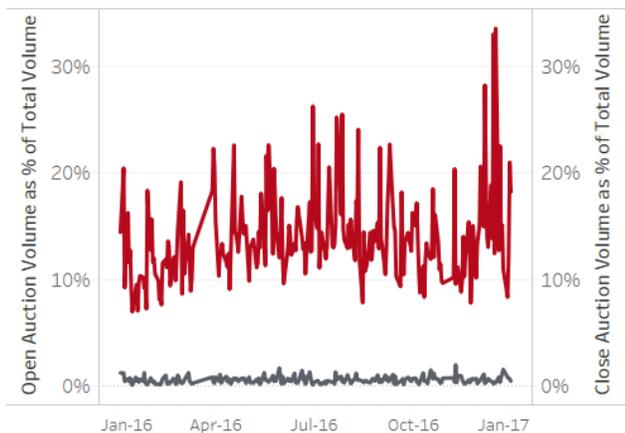
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

REITs in Sweden have seen a significant tightening of bid/ask spreads across the trading day, as well as an increase in daily volumes. Impact costs have steadily declined, as well. The year 2015 was a particularly difficult one in terms of liquidity costs.

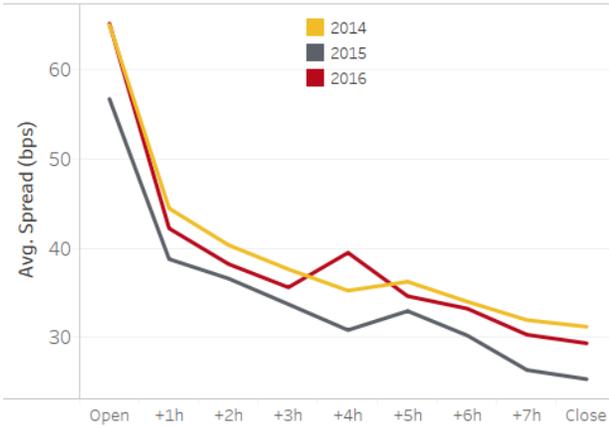
Very closely in line with Germany and the Netherlands, open and close auction participation was 0.6% and 15% respectively.



REITs: Global Market Microstructure

XII. United Kingdom

Intraday Spread Profile



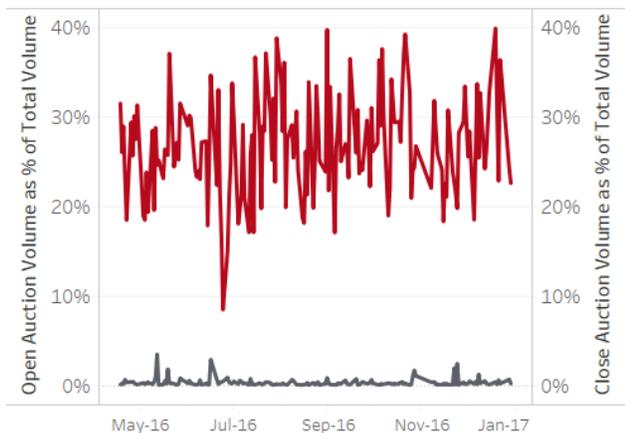
Liquidity



METRIC Market Impact Cost Estimates



Auction Volumes



The charts show the intraday bid/ask spread, percentage of 20 day ADV of a USD 1m position, 1 day VWAP execution cost and auction participation of REIT constituents of the FTSE EPRA, categorized by trading country. Please see Glossary for more details.

Source: Instinet, FTSE

The majority of the UK REITs in our universe were small caps, hence the spread numbers are skewed to the higher side. They have, however, decreased since 2014 and trend lower through the trading session. Liquidity has also improved as the sector has grabbed more attention from investors. Many stocks have been candidates for index inclusion or exclusion in the large cap space over this period.

We see a large proportion of the day's volume executed at the close - approximately 28% on average. The open, on the other hand, sees relatively insignificant volume at less than 0.5%.



REITs: Global Market Microstructure

Glossary

Liquidity

These charts show an aggregate percentage of 20 day average daily volume per country, measured from January 2014 through December 2016. Percent ADV is calculated using a \$1 million US position per security in each country's universe and aggregated using a simple average. The REIT universe is defined as the REIT constituents of the FTSE EPRA index, categorized by country. IML FP and ANF FP were excluded as outliers with over 700% ADV. A downward trend in this chart indicates an improving liquidity environment. We excluded countries with less than five REIT securities in the FTSE EPRA index as of 31 December 2016.

Intraday Bid/Ask Spread Profile

This chart shows the bid/ask spread in basis points measured at various points in the trading session. Results are aggregated using a simple average across all REIT securities in the FTSE EPRA index categorized by country, and presented as yearly averages.

METRIC Market Impact Cost Estimates

This chart shows the estimated execution cost of trading a basket with each security having a US \$1 million position, using an open-to-close VWAP trading style over 1 day, computed using Instinet's METRIC model. The names in the basket per country are the REIT securities trading in that country, belonging to the FTSE EPRA index. This cost includes the market impact and spread cost. The primary inputs into this model include available volume, bid/ask spread and volatility.

METRIC, the Model-Estimated Trade Impact Cost model, provides a quantitative approach to estimate the execution costs and associate risks given the pre-trade inputs. This model was developed from a combination of empirical studies and theoretical derivation. It is adaptive to trading strategy and is intraday and multi-day aware. It is available via Instinet's analytics tools including TradeSpex and Indigo, and in terms of batch file delivery of cost curve data and automated reports as needed.

Auction

This chart displays the auction volumes as a percentage of daily traded volume, aggregated by country, using the REIT constituents of the FTSE EPRA index, on a daily basis over 2016. Aggregation is done using a simple average. Open, Close (AM Open, PM Open, PM Close for Japan) auctions are shown separately.



REITs: Global Market Microstructure

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