MARKET INSIGHTS

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By Jagjeev Dosanjh, Daniel Joseph and Vito Mollica

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EXECUTIVE SUMMARY

This paper examines the execution costs for the most active exchanged traded funds in Australia. In addition, price impacts of block trades in the State Street S&P/ASX200 exchange traded fund (hereafter ETF) are compared to those of a replicating trade in the underlying securities.

The costs faced by market participants can be categorised into two groups (i) explicit and (ii) implicit. Minimisation of explicit costs is difficult if not impossible as these are usually levied at predetermined rates. Implicit costs on the other hand can be minimised. Market impact costs are one type of implicit trading costs faced by traders. Schwartz and Shapiro (1992) argue that institutional investors, who normally transact in large quantities, are more concerned with market impact and opportunity costs as they are more detrimental to returns than paying a higher quoted bid-ask spread.

The results in this paper show that the market impact costs of trading in the ETF market are lower than they are for our 'paper portfolio' of underlying stocks, without accounting for explicit transaction costs (such as brokerage fees). For block purchases, the market impact of a $200,000 cost of trading in an ETF is 1.7 basis points (bps) compared to 3.3bps cost for the replicating strategy. Similarly, for block sells, the cost of trading in an ETF is -0.37bps compared to -3.5bps for the replicating portfolio.

Background

The ETF industry has grown strongly since the first fund was launched in 1989 on the Toronto stock exchange. Globally, ETFs have around US$1.5 trillion in assets under management, three-quarters of which is invested in funds that track equity indices. ETFs were first listed in Australia in 2001 and have been rapidly growing in popularity. More than AU$4.5 billion is held in ETF investments in Australia.

The benefits of ETF investment include:

- The ability for investors to mitigate concentration risk by diversifying across an asset class whilst holding a single security.
- The liquidity benefits of ASX listed securities and the ability to trade intra-day.
- Ensuring transparency; ETFs announce their holdings on a regular basis allowing investors to see the exact nature of the underlying exposure.

Methodology and Data Selection

The Australian ETF market continues to grow with the launch of seven new funds since March 2012. As of 30 April 2012, there are 57 ETFs listed on the Australian Securities Exchange.

Our analysis is restricted to the most liquid and established funds. For each fund, we computed the number of daily trades and the average daily volume for the period 1 May 2009 to 30 April 2012. The results suggested four major established ETFs.

– State Street S&P/ASX 200 (STW.AX)
– State Street S&P/ASX 200 Listed Property Fund (SLF.AX)
– Physical Gold (GOLD.AX)
– iShares MSCI Emerging Markets Index (IEM.AX)

These funds account for over 60% of ETF trades over the sample period.

For each of these ETFs, several important liquidity metrics were identified in the extant literature (Hendershott, Jones and Menkveld (2011), Glosten and Harris (1988)) were examined:

Effective Spread[1]: The effective spread is a measure of the proximity of the executed price of a security to the mid-point of the bid and asks quotes. A small effective spread indicates that there is liquidity in the market as executed prices are close to the midpoint.

Realised Spread[2]: The realised spread is a measure of the difference between the midpoint of the bid and ask quotes twenty trades subsequent of the transaction and the actual transaction price. It can therefore be regarded as a measure of the extent to which a market centre provides liquidity in a fast moving market and also a measure of the extent of informed order flow.

Adverse Selection Spread[3]: The adverse selection spread is the difference between the midpoint of the bid and ask quotes at the transaction and the midpoint of the bid and ask quotes twenty trades subsequent of the transaction. The adverse selection spread is regarded as a measure of informed trading as it measures the market makers quoting behaviour after a trade.

1 $E = q \times \left(\frac{(p-m)}{m} \right)$

2 $R = q \times \left(\frac{(p-m_{20})}{m} \right)$

3 $ADV = q \times \left(\frac{(m_{20}-m)}{m} \right)$: When someone submits an order to buy (sell) a security, the uninformed market maker, perceiving that the order might be information motivated, revises his expectation of the future security value upward (downward).

Table 1 reports the aforementioned spreads, mean daily trade value, daily trades and the order to trade ratio for each ETF.

With effective, realised and adverse selection spreads of 1.41, 0.31, and 1.09 respectively, the State Street (STW.AX) fund has the narrowest spreads relative to the other funds in our sample. Nonetheless, spreads are narrow across the board, indicating a liquid market.

We find evidence that informed trading (as measured by the adverse selection spread) is higher for less liquid securities. Focusing on the Emerging Markets fund (IEM.AX), we document an adverse selection spread of 11.66 compared to 1.09 for the State Street (STW.AX) fund. This may be attributable to traders more readily being able to exploit information in markets where the degree of analyst coverage, information flows and market efficiency are lower.

Table 1 – Execution Costs (bps)

	Effective Spread	Realised Spread	Adverse Selection Spread	Daily Trade Value	Number of Daily Trades	Order to Trade Ratio
STW.AX	1.41	0.31	1.09	$37,301	315	14
SLF.AX	14.43	9.98	4.56	$11,070	77	10
GOLD.AX	2.19	2.47	-0.36	$24,647	95	188
IEM.AX	18.66	10.50	11.66	$14,623	36	27

Liquidity for Large Orders

As documented in Table 1, the State Street S&P/ASX 200 ETF is the most traded ETF in our sample (and therefore, the most traded ETF in Australia). It is also possible to replicate the composition of this fund in the Australian underlying market, thereby allowing us to accomplish a primary purpose of this paper. Therefore, for this and the succeeding section of the analysis, empirical investigation is limited to the State Street S&P/ASX 200 ETF.

The extant literature on block trades (Chan and Lakonishok, (1995), Holthausen, Leftwich and Mayers (1987)) has used several definitions to identify block trades, for example 10,000 units, a multiple of median monthly volume and trades from institutions. We classify block trades in an ETF according to a liquidity based measure.

For the State Street ETF (STW.AX), trade volume distribution is heavily right skewed with a mean volume of 1129 per trade and a median of 200. We classify a block trade as a trade of 5000 units or greater, which equates to a trade value of approximately $200,000AUD. Our sample of block trades constituted approximately the top 5% of trades by volume and produced an average of 14 block trades per day.

The behaviour of the price impacts associated with block trades are of significant importance to regulators and investors alike. To the former, examining price behaviour is important to ensure sufficient market liquidity. To the latter, importance is derived from ensuring minimal implementation costs are incurred.

We compute total[4], temporary[5] and permanent[6] price impacts using the following metrics[7]:

$$PI_{Total} = \frac{Pb}{Pp} - 1$$

$$PI_{Temp} = \frac{Pe}{Pb} - 1$$

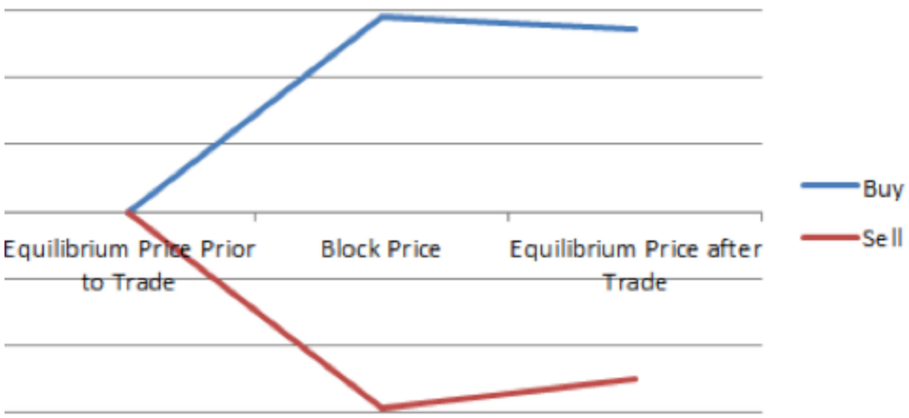
$$PI_{perm} = \frac{Pe}{Pp} - 1$$

Using Thomson Reuters data, we identify buyer and seller initiated block trades. This allows us to individually analyse the impacts of buyer and seller initiated trades. The distinction is important because we expect buyers to have permanent positive price impacts whilst sellers should have negative permanent price impacts if they are associated with information. Figure 1 provides a visual presentation of the mean market impact results. Average price impact costs for buyer initiated and seller initiated trades, are reported in Table 2 and Table 3, respectively. The total impact is small at roughly 3 bps for both buyer and seller initiated trades, indicating a liquid market.

Consistent with extant literature examining the equities market, prices after a block sell rise after the trade, resulting in a positive temporary price effect.

Figure 1 – Price Impacts: State Street S&P/ASX 200 Fund

Figure 1 presents the mean market impact results using the lead/lag approach for buyer and seller initiated State Street ETF trades during the period 1 May 2009 to 30 April 2012.



4 Temporary effects are short term price concessions.

5 Permanent effects are the information costs associated with block trades.

6 Total effects are the short run liquidity costs that arise because of the difficulty of finding immediately willing buyers or sellers.

7 P_p = The midpoint of the bid and ask quotes, 20 trades previous to the trade. P_e = The midpoint of the bid and ask quotes, 20 trades subsequent to the trade. P_b = The price of the associated ETF trade.

Table 2

Buyer Initiated Price Impacts: State Street S&P/ASX 200

	Total	Permanent	Temporary
Mean	2.91	2.74	-0.20
t	9.52	6.58	0.70

(Results are presented in basis points)

Table 3

Seller Initiated Price Impacts: State Street S&P/ASX 200

	Total	Permanent	Temporary
Mean	-2.93	-2.45	0.45
t	-10.69	-6.66	-1.74

(Results are presented in basis points)

Replicated ETF Trades

To compare the execution costs of a trade in an ETF to those of a replicating trade in the underlying stocks of the market portfolio, a common impact measure must be employed.

For this purpose, we measure price impact as the percentage difference in price between trade price and the value of the closing VWAP. For ETF block trades, price impact is computed as[8]

$$PI_X = \frac{P_X}{P_{VWAPx}} - 1$$

Corresponding price impacts for our replicating trades are now discussed. A trade in the State Street ETF is equivalent to 200 individual trades in ASX 200 stocks. To replicate a trade in the ETF, we create a paper portfolio of underlying stocks that matches the ETF trade in trade value proportion of the underlying stocks.

Essentially, every block trade, X, (where $X = 1 \rightarrow N$) is decomposed into 200 individual trades that represent a trade in one of the funds stock constituents:

1. These 'individual' trades are computed by weighting the ETF trade value by the market capitalisation of the underlying stocks.[9]

$$P_X \times V_X \times W_i$$

2. Each of these individual trades is matched to a same direction trade executed on that day in the same stock. Trades are also matched on trade value (specifically, where the differential of the trade value computed in step 1 and the matched trade value is minimised).

   If UV is the value of the matched trade, it follows that[10]:

$$UV_i = P_i \times V_i \approx P_X \times V_X \times W_i$$

8 P_{VWAPx} = The closing VWAP for block trade *X*.
9 P_x = The price at which block *X* was traded.
V_x = The volume of block trade *X*.
W_i = The market capitalisation of stock *i*.
10 P_i = The price at which the match trade *i* was executed.
V_i = The volume of the matched trade *i*.

3. Using the VWAP price impact measure[11]

$$PI_i = \frac{P_i}{VWAP_i} - 1$$

we compute the price impact of the matched trade and weight the impact by the stock's market capitalisation.

4. Repeating steps 1-3 200 times produces a replicated trade for which we can compute price impact by summing the weighted impacts computed in step 3.

$$PI_u = \sum_{i=1}^{200} PI_i \times W_i$$

5. Repeat step 1 – 4 for each State Street ETF block trade during our sample period.

We can then compare the impacts of these replicated trades to those we computed for the actual block trades. Table 4 reports the results for the State Street ETF compared to the market impact had the trades been replicated in the underlying market directly. We find that State Street S&P/ASX 200 fund investors can avoid market impact costs of 1.5 to 3.2 bps for buys and sells respectively that would otherwise have been incurred had the trade been replicated in the underlying stocks directly. T_2 is the test statistic of a hypothesis test with a null hypothesis that the difference between the price impacts of ETF and replicated trades is zero. The hypothesis is rejected at the 5% and 1% significance levels, indicating a significant differential in impacts.

Table 4
Market Impacts: ETF Market vs. Replicated ETF Trades

	STW.AX	Replicated Trade	STW.AX	Replicated Trade
N	4667		5449	
Initiator	Buyer		Seller	
Mean	1.71	3.27	-0.37	-3.52
t	3.50	20.04	-0.80	-23.38
t_2	-3.02		6.4	

(Results are presented in basis points)

11 *VWAPi* = the closing VWAP for matched trade *i*

Discussion

The research documents that effective, realised and adverse selection spreads for the four ETF's in our sample are narrow, indicating a liquid market. Focusing on the State Street S&P/ASX 200 fund, it is evident that the market impact of block trades is small. Specifically, we find an approximately 3 bps total impact for both buyer and seller initiated trades. Consistent with extant literature, the behaviour of prices after a seller initiated ETF block trade rise after the trade, resulting in a positive temporary effect.

When comparing State Street S&P/ASX 200 with a replicating strategy in the underlying market, we report that State Street S&P/ASX 200 fund investors can avoid market impact costs of 1.5 to 3.2 bps for buys and sells respectively that would otherwise have been incurred had the trade been replicated directly.

Reinforcing these results, we note that we have not accounted for explicit transaction costs such as broker commissions and exchange fees, which if included, would inevitably widen the gap further.

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CONTACT DETAILS

AUSTRALIA
David Stocken
Senior Manager, Institutional Sales
+61 2 9227 0934 david.stocken@asx.com.au

ASIA
Andrew Musgrave
Regional Manager, Asia
+61 2 9227 0211 andrew.musgrave@asx.com.au

EUROPE
James Keeley
Regional Manager, Europe
+44 203 009 3375 james.keeley@asx.com.au

NORTH AMERICA
David Ritchie
Regional Manager, North America
+1 312 788 3363 david.ritchie@asx.com.au

Head office ASX Limited
Exchange Centre
20 Bridge Street
Sydney NSW 2000 Australia

Telephone +61 2 9227 0000

www.asx.com.au