MARKET INSIGHTS

Managing exposure to the Australian equities market: The relative cost of taking positions in SFE SPI 200™ Index Futures and cash market instruments

By Professor Alex Frino and James Richard Cummings

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INTRODUCTION

In this seventeenth edition of Market Insights, Professor Alex Frino and James Cummings from the Faculty of Economics and Business at the University of Sydney examine the transaction costs of taking positions in SFE SPI 200™ Index Futures, including the cost of rolling over positions at contract expiry. These results are compared with the cost of obtaining exposure to the Australian equities market using cash market instruments.

I trust you will find the results of this research informative when considering the trading opportunities offered by SFE SPI 200™ Index Futures

Regards

R. Elstone.

Robert G. Elstone
Managing Director and Chief Executive Officer
ASX Limited

ASX
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Alex Frino and James Richard Cummings

EXECUTIVE SUMMARY

The alternatives available to fund managers for investing in the *S&P/ASX 200* accumulation index include directly investing in the underlying shares, investing in an exchange-traded fund (ETF) that seeks to closely match the returns of the index or applying a futures overlay. Equity index futures are often used to obtain synthetic exposure to the Australian equities market or hedge a position in an index portfolio. If the synthetic exposure or hedge is held across an expiration date, the position in futures contracts needs to be 'rolled over' by closing out the position in the nearest-to-expiry contract and opening up a new position in the second nearest-to-expiry contract. The objectives of this paper are (i) to illustrate the trading activity and liquidity (measured by bid-ask spreads and depth) in the alternative instruments available for obtaining exposure to the Australian equities market; and (ii) to quantify the implicit transaction costs associated with rolling over a position in *SFE SPI 200™ Index Futures* relative to the transaction costs of taking positions in an indexed ETF or investing directly in the underlying shares across various holding periods. The main findings are as follows:

- Near and deferred SFE SPI 200™ futures experienced average annual volume growth of 12 percent and 18 percent respectively over the four years to 2006. Similarly, the Australian equities market has seen steady growth in trading volume, at an average annual rate of 10 percent over the four years to 2006. In contrast, the volume traded in the *streetTRACKS® S&P/ASX 200 Fund* has been sporadic.
- The bid-ask spreads for near and deferred SFE SPI 200™ futures have narrowed considerably since contract inception and averaged 0.02 percent and 0.05 percent of contract value respectively in the first half of 2006. Although percentage bid-ask spreads in the underlying equities market have also narrowed substantially over recent years, at 0.14 percent of market value they remain far higher than for futures. Depth on both sides of the limit order book in the futures market is much greater than in the cash market alternatives, making it possible for investors to execute trading strategies employing SFE SPI 200™ futures with minimal price impact.
- Trading activity in both near and deferred SFE SPI 200™ futures gathers momentum from 8 trading days before the expiration of the near contract. The rollover of open interest from the near to the deferred contract peaks on the third last trading day (Tuesday). Trading activity in the cash market alternatives also responds to the futures expiration cycle.
- Additional liquidity is provided in the futures market to facilitate the rollover process, in the form of narrower bid-ask spreads and increased depth for the deferred contract. The minimum cost of opening, maintaining and closing out a position is lower when performed with SFE SPI 200™ futures than when performed with either the streetTRACKS® S&P/ASX 200 Fund or the underlying stocks for holding periods up to at least 12 months. Furthermore, the maximum size of a futures position that can be rolled over without incurring additional market impact costs is more than double the size of positions that can be taken in either the streetTRACKS® S&P/ASX 200 Fund or the underlying stocks at the best quotes for the respective instruments.

In summary, the cost of obtaining exposure to the Australian equities market using futures and rolling positions across expiry dates is small relative to the implicit transaction costs of taking positions in the cash market alternatives.

Introduction

Stock indices are frequently used as performance benchmarks by fund managers of varying styles. Index replication by fund managers can be implemented using direct investment in the shares underlying the index. In Australia, many funds are benchmarked to the returns of the S&P/ASX 200 Accumulation Index. However, while the use of benchmarks may be common, the methods of managing exposure to them vary by manager. The alternatives available to fund managers for investing in the index include directly investing in the underlying shares, investing in an exchange-traded fund (ETF) that seeks to closely match the returns of the index or applying a futures overlay. The first objective of this paper is to illustrate the trading activity in the alternative instruments available for obtaining exposure to the Australian equities market and the relative liquidity cost (measured by bid-ask spreads and depth) of taking positions in the alternative instruments.

Index replication strategies involving futures need to be implemented within the confines of an expiration schedule. Equity index futures are often used to obtain synthetic exposure to the Australian equities market or hedge a position in an index portfolio. If the synthetic exposure or hedge is held across an expiration date, the position in futures contracts needs to be 'rolled over' by closing out the position in the nearest-to-expiry contract (referred to as the 'near' contract) and opening up a new position in the next nearest-to-expiry contract (the 'deferred' contract). The second objective of this paper to quantify the liquidity cost associated with rolling over a position in the SFE's major equity index derivative product, *SFE SPI 200™ Index Futures*, relative to the liquidity cost of taking positions in an indexed ETF or investing directly in the underlying shares across various holding periods.

The three instruments we examine are *SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund* and a portfolio comprised of the constituent stocks in the *S&P/ASX 200* index constructed according to the float-adjusted weight of each stock in the index[1]. A brief description of each instrument is given in the appendix.

1 We are grateful to the Securities Industry Research Centre of Asia-Pacific (SIRCA) for providing Reuters intra-day quote data and programming assistance.

1. Trading activity in the alternative instruments

The size of the bid-ask spread and slippage costs incurred in taking positions in futures are negatively related to the level of trading activity in the market[2]. When transaction costs in either futures or cash markets are high, market participants search for alternative instruments with lower transaction costs, leading to a shift in trading volume from one instrument to another. We compare the trading volume and turnover (value traded) of the three instruments, in order to assess the liquidity cost of trading the alternative instruments in light of the intensity of trading activity across their respective markets. The trading activity figures reported in this section indicate the level of demand to trade each instrument, given the relative transaction costs and quality of market index exposure provided by each instrument. In the next section, we proceed to demonstrate the levels of liquidity that sustain this trading activity.

The volume traded (in lots or shares) and turnover (in AUD billion) of the three instruments are shown in figure 1 below. Near and deferred SFE SPI 200™ futures experienced average annual volume growth of 12 percent and 18 percent respectively over the four years to 2006, as shown in panels A and B. Similarly, the Australian equities market has seen steady growth in trading volume, at an average annual rate of 10 percent over the four years to 2006 as shown in panel D[3]. Increases in equities prices over the period reported in figure 1 (reflected in higher index values) mean that the turnover growth rates are higher than the volume growth rates across all four instruments: near and deferred SFE SPI 200™ futures experienced average annual growth in nominal turnover of 26 percent and 33 percent respectively over the four years to 2006, while the constituent stocks in the S&P/ASX 200 index saw average annual turnover growth of 19 percent. In contrast, the volume traded in the streetTRACKS® S&P/ASX 200 Fund has been sporadic, declining since peak levels experienced in 2003 as shown in panel C.

In summary, the average growth in trading activity of SFE SPI 200™ futures has surpassed the growth in trading activity in the underlying equities over the past four years[4]. In 2006, nominal turnover of near and deferred SFE SPI 200™ futures amounted to AUD 640.6 billion and AUD 153.6 billion representing 62 percent and 15 percent respectively of the total turnover of S&P/ASX 200 constituent stocks on the ASX (AUD 1,041.0 billion). The SFE equity index contract plays a substantial role for investors in gaining exposure and transferring risk in relation to the Australian equities market. Noticeably, the trading activity in deferred SFE SPI 200™ futures has increased at a faster rate than in the near futures contract. SFE SPI 200™ futures are far more actively traded than the indexed ETF available in the marketplace.

2 For example, Wang G.H.K., Yau, J. and Baptiste, T. (1998), 'Trading volume and transactions costs in futures markets', *Journal of Futures Markets*, 17 (7), 757-80 report that the elasticity of trading volume with respect to transaction costs for S&P 500 index futures traded on the Chicago Mercantile Exchange is -2.03. That is, their results suggest that the trading volume of S&P 500 index futures will decrease by 2.03 percent in response to a 1 percent increase in transaction costs.

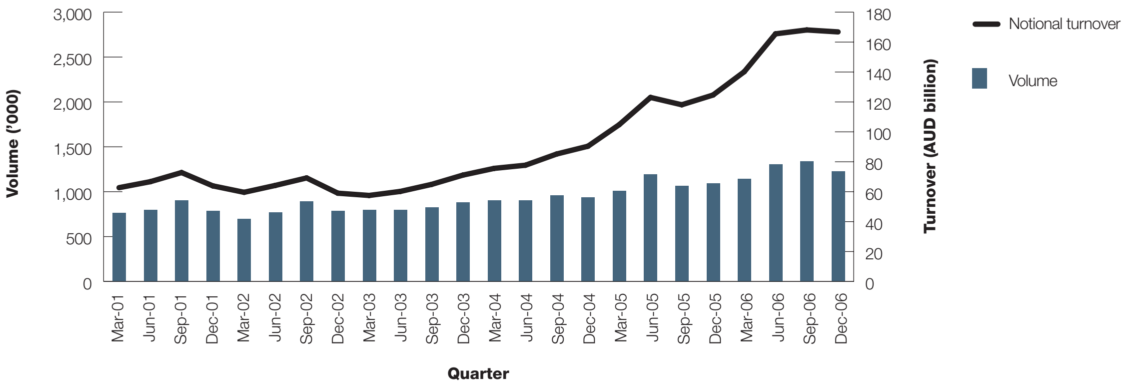
3 Panel D shows the total volume traded and turnover for all of the stocks in the S&P/ASX 200 index.

4 The comparison here is between equity index futures which are at the growth stage of their product life cycle and equities which are at the maturity stage of their product life cycle.

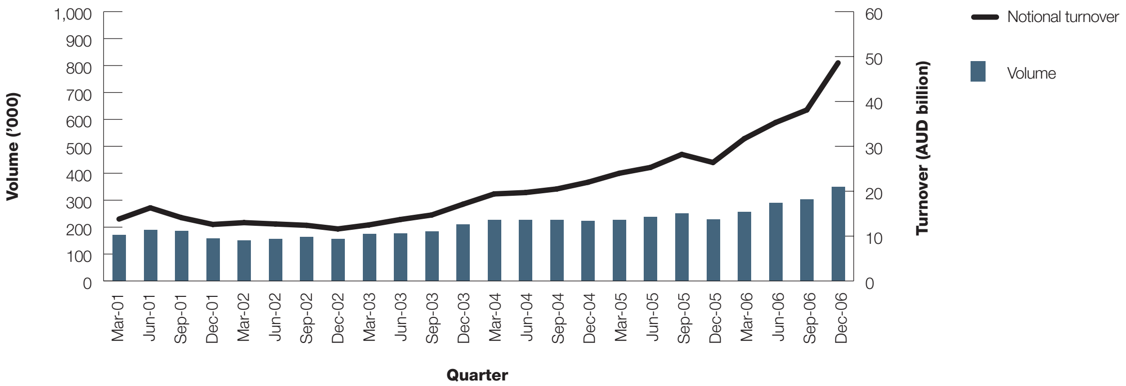
Figure 1

TRADING ACTIVITY IN SYNTHETIC AND CASH INSTRUMENTS PROVIDING EXPOSURE TO THE AUSTRALIAN EQUITIES MARKET

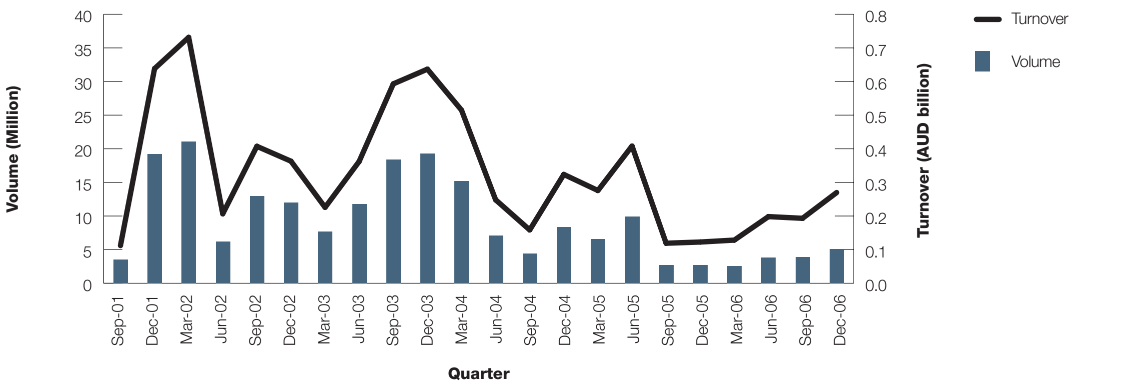
Panel A: Nearest expiry SFE SPI 200™ Index Futures



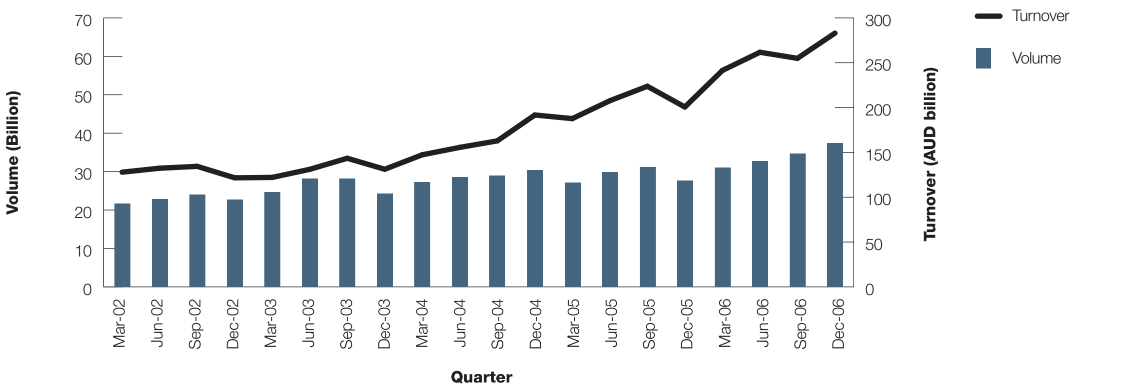
Panel B: Second nearest expiry SFE SPI 200™ Index Futures



Panel C: streetTRACKS® S&P/ASX 200 Fund



Panel D: Constituent stocks in the S&P/ASX 200 index



2. Liquidity of the alternative instruments

It is crucial for global institutions to consider transactions costs when comparing the opportunities offered by the alternative instruments for obtaining Australian equities market exposure[5]. The bid-ask spread represents the minimum cost of trading each instrument and sufficient depth at the best quotes allows investors to trade large quantities with minimal price impact. Wide spreads and low depth erode institutional profits from trading strategies[6]. To compare transactions costs across the alternative instruments, we report the bid-ask spread and depth at the best bid and ask prices.

The bid-ask spread measures the round-trip cost of a transaction. In order to assess the extent to which the alternative instruments are likely to present profitable trading opportunities to investors, we compare bid-ask spreads for SFE SPI 200™ futures, the streetTRACKS® S&P/ASX 200 Fund and the weighted average bid-ask spread for S&P/ASX 200 index constituent stocks. We report bid-ask spreads as a percentage of the dollar value exposed by opening a position in each instrument[7].

Figure 2 panel A reports time-weighted average bid-ask spreads for all four instruments. The bid-ask spreads for near and deferred SFE SPI 200™ futures have narrowed considerably since contract inception and averaged 0.02 percent and 0.05 percent of contract value respectively in the first half of 2006. Although percentage bid-ask spreads in the underlying equities market have also narrowed substantially over recent years, at 0.14 percent of market value they remain far higher than for futures. The streetTRACKS® S&P/ASX 200 Fund is the most expensive alternative in this respect, with an average bid-ask spread of 0.25 percent in first half of 2006. Figure 2 highlights that futures produce much lower transaction costs compared to the cash instruments for obtaining Australian equities market exposure.

Depth provides an additional indicator of the trading opportunities available to investors. To assess the extent to which SFE SPI 200™ futures present profitable trading opportunities to investors, we compare time-weighted average depth at the best quotes on both sides of the limit order book across the four alternative instruments. We report depth in terms of the Australian dollar value of the aggregate quote size at the best price in order to compare across the markets[8].

Although the time-weighted average depth in near SFE SPI 200™ futures (AUD 1.4 million at both the bid and offer) decreased in the first half of 2006 relative to the same period of the previous year, the near futures contract continues to provide considerably more depth than the other instruments as shown in figure 2 panels B and C. The depth in deferred futures is also substantially higher than in the two cash market alternatives. In the first half of 2006, both the average bid depth (AUD 282,000) and the average depth at the offer (AUD 295,000) of the constituent stocks in the S&P/ASX 200 index are greater than the average bid depth (AUD 158,000) and depth at the offer (AUD 185,000) in the streetTRACKS® S&P/ASX 200 Fund.

The comparison across the alternative instruments demonstrates that depth on both sides of the limit order book in the futures market is substantially greater than in the corresponding cash markets, making it possible for investors to execute trading strategies employing SFE SPI 200™ futures with minimal price impact.

5 Frino, A. and Gallagher, D.R. (2002), 'Is index performance achievable? An analysis of Australian equity index funds', *Abacus*, 38 (2), 200-14 find that the tracking error in passive fund performance is significantly related to the fund cash flows, the cost of trading stocks in the index portfolio, the volatility of the benchmark and the investment strategy used by the fund manager.

6 Bilson, C., Brailsford, T. and Evans, T. (2005), 'The international transmission of arbitrage information across futures markets', *Journal of Business Finance and Accounting*, 32 (5/6), 973-1000 demonstrate that arbitrage profits from exploiting stock index futures mispricing across futures markets disappear when taking account of transaction costs.

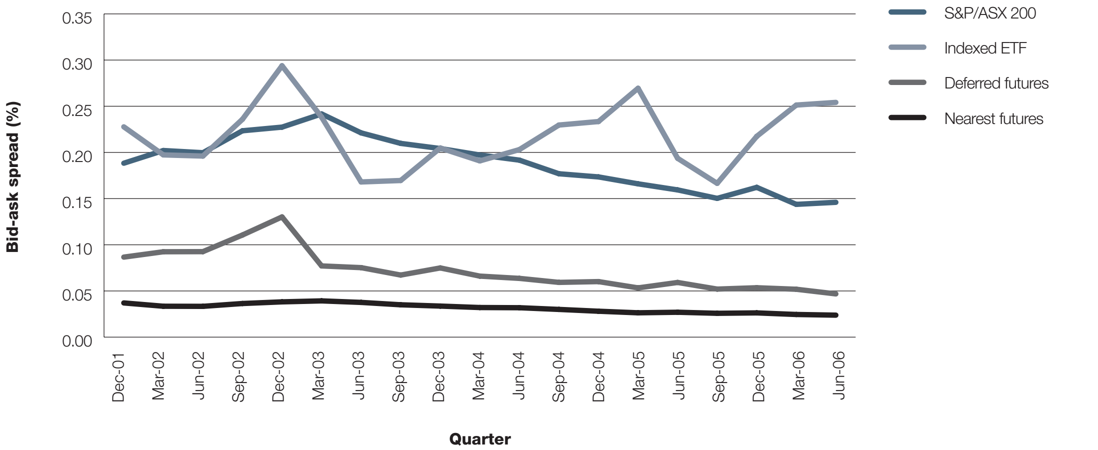
7 The percentage spread is calculated as [(lowest ask price - highest bid price) ÷ midpoint price] x 100. A time-weighted average of the percentage spread is taken across the portion of the trading day for which the markets in all three instruments are open simultaneously (that is, from 10.00 a.m. to 4.00 p.m). In the case of the constituent stocks in the index, the time-weighted average bid-ask spread for each stock is further weighted according to the float-adjusted weight of the stock in the index, such that the bid-ask spreads of stocks with the greatest weight in the index (for example, BHP, CBA, NAB and ANZ) have the greatest weight in the overall measure of index bid-ask spread. The index weights change daily and are obtained from Bloomberg to construct our index liquidity measures.

8 The depth in AUD is calculated as the quote price in AUD x quote size. As for bid-ask spreads, a time-weighted average of the depth in AUD is taken across the concurrent market open period (10.00 a.m. to 4.00 p.m.). For index constituent stocks, the individual stock depth measures are further weighted according to the daily float-adjusted weight of each stock in the index.

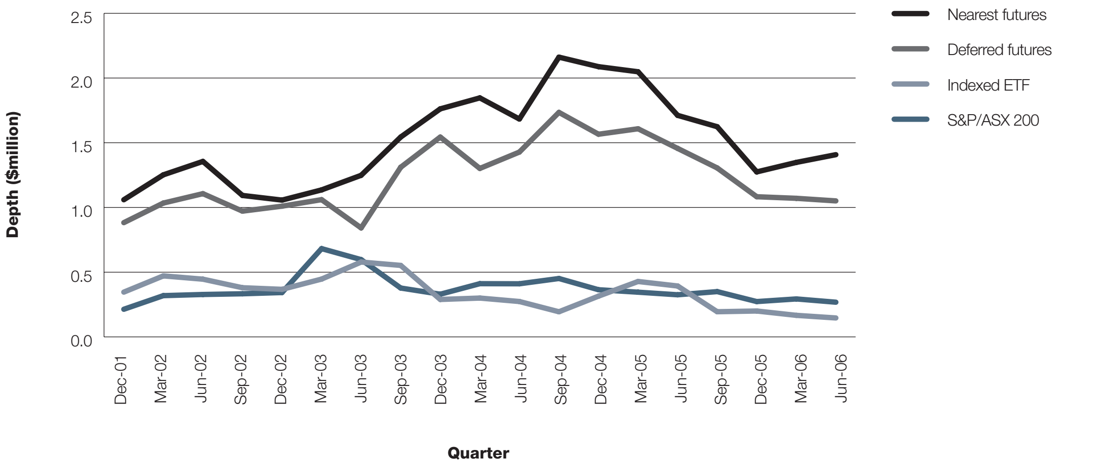
Figure 2

LIQUIDITY OF SYNTHETIC AND CASH INSTRUMENTS PROVIDING EXPOSURE TO THE AUSTRALIAN EQUITIES MARKET

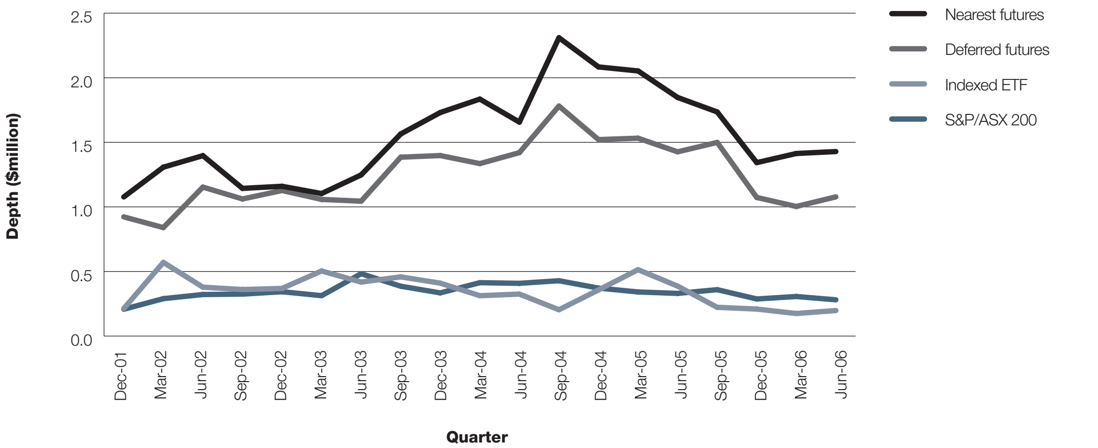
Panel A: Time-weighted average bid-ask spreads of SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund and their underlying stocks



Panel B: Time-weighted average bid depth of SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund and their underlying stocks



Panel C: Time-weighted average ask depth of SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund and their underlying stocks



3. Trading activity in the alternative instruments approaching futures expiry

Figure 3 characterises the trading activity in both the futures and cash markets associated with the rollover of open interest from near to deferred SFE SPI 200™ futures.

Figure 3 panels A and B illustrate the daily changes in volume and open interest in near and deferred SFE SPI 200™ futures leading up to the expiration of the near contract[9]. The volume traded in both the near and deferred contracts increase rapidly from 8 trading days before the expiry date and peak on the third last trading day (Tuesday) as shown in panel A. Open interest in the deferred contract builds up sooner than it dissipates in the near contract, such that there is hefty open interest in both the near and deferred contracts on Tuesday. By the second last trading day (Wednesday), a smaller amount of open interest remains in the near contract than in the deferred contract. The open interest continues to shift from the near to the deferred contract on the last trading day.

Trading activity in the cash market alternatives also responds to the futures expiration cycle. In particular, figure 3 panel D shows that the trading volume of constituent stocks in the S&P/ASX 200 index is 63 percent higher on the last trading day in the futures expiration cycle than its average volume taken over the previous 35 trading days. In turnover terms, the index constituent stocks are 68 percent more actively traded on the last futures trading day. Indeed, the Australian equities market is never more active over the course of the futures expiration cycle than on the last trading day[10]. This suggests that the implementation of strategies, including arbitrage strategies, involving both SFE SPI 200™ futures overlay and the underlying portfolio of index constituent stocks drives a large increase in equities trading on the ASX on the day that the futures expire[11].

The volume traded in the streetTRACKS® S&P/ASX 200 Fund over the futures expiration cycle also suggests some interaction with futures rollover activity. Aside from a peak period corresponding to the end of the calendar month prior to futures expiry, the volume traded in the streetTRACKS® S&P/ASX 200 Fund on the second last futures trading day is more than double its average level over the previous 34 trading days as shown in figure 3 panel C. This suggests that investors' strategies involve combinations of SFE SPI 200™ futures and the streetTRACKS® S&P/ASX 200 Fund, as well as combinations involving futures and the underlying shares.

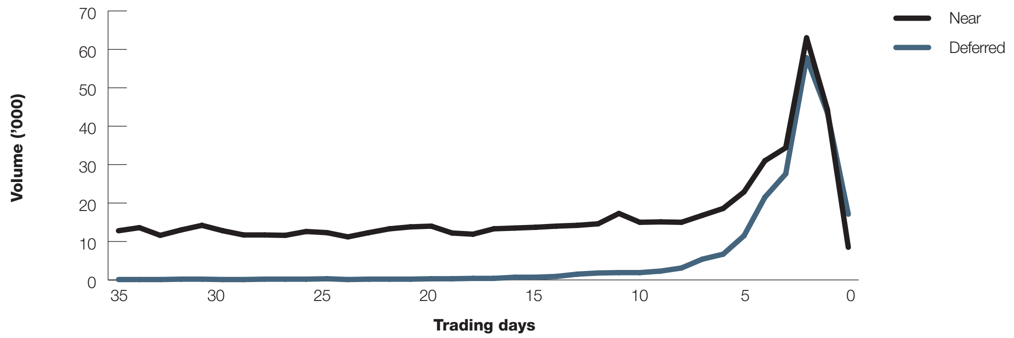
9 For December 2001 and all subsequent quarterly SFE SPI 200™ contracts, the final settlement price (Special Opening Quotation) is calculated using the first traded price of each component stock in the S&P/ASX 200 index on the last trading day being the third Thursday of the month (denoted day 0 in figure 3). Trading in expiring contracts ceases at 12.00 p.m. on day 0. An averaging mechanism was used to determine the final settlement price prior to December 2001.

10 A weekly pattern evident in panel D suggests that the Australian equities market is quietest on Mondays (day 3, 8, 13 and so forth before the third Thursday of the expiry month), possibly due to the lack of an immediate lead from the New York Stock Exchange in resolving the implication of new information for equity prices.

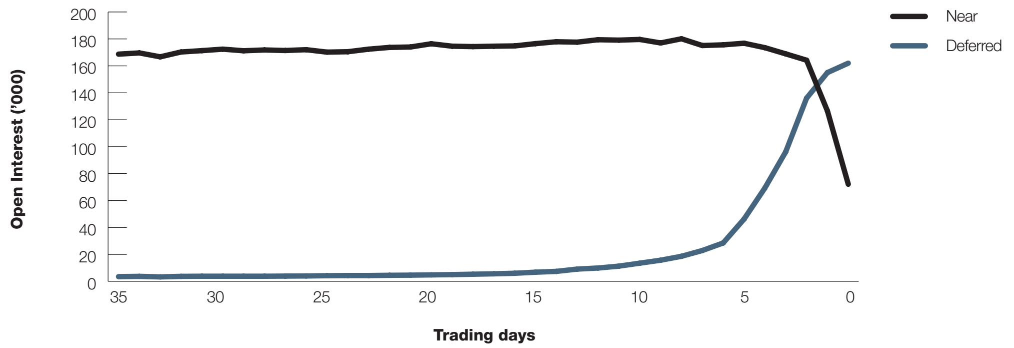
11 Part of the increase in equities trading on the last futures trading day could be associated with the implementation of strategies involving ASX index futures and index options, which have expired concurrently with SFE SPI 200™ futures on the third Thursday of the month from September 2004 onwards. We are grateful to a staff member at the ASX for alerting us to this point.

Figure 3
TIME-TO-FUTURES-EXPIRY PATTERNS IN THE DAILY TRADING ACTIVITY OF SYNTHETIC AND CASH INSTRUMENTS PROVIDING EXPOSURE TO THE AUSTRALIAN EQUITIES MARKET
1 January 2001 to 31 December 2006

Panel A: Volume traded of near and deferred SFE SPI 200™ Index Futures

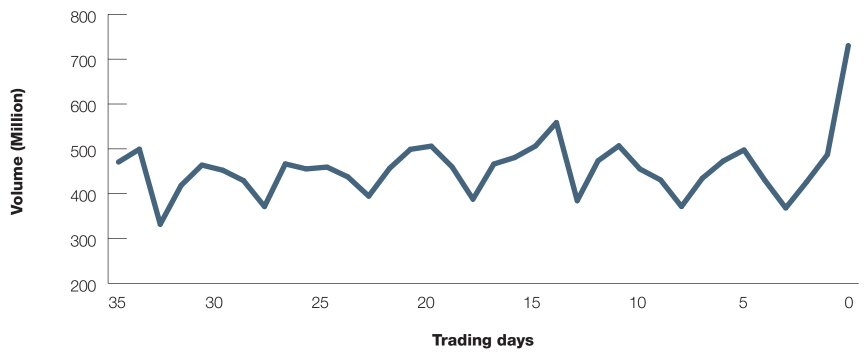


Panel B: Open interest of near and deferred SFE SPI 200™ Index Futures



Panel C: Volume traded of streetTRACKS® S&P/ASX 200 Fund

Panel D: Volume traded of constituent stocks in the S&P/ASX 200 index



4. Liquidity of the alternative instruments approaching futures expiry

In view of the finding that a substantial amount of trading activity in both the futures and cash markets is associated with the expiration cycle for SFE SPI 200™ futures, we provide an indication of the liquidity available in each of the alternative instruments to facilitate the additional trading activity leading up to the futures expiry date. In particular, we are interested in the liquidity cost of rolling over futures positions. The minimum cost of rolling over futures positions is the bid-ask spread, as traders incur part of the bid-ask spread for the near contract as they close out positions in the near contract and part of the bid-ask spread for the deferred contract as they open new positions in the deferred contract. The depth determines the maximum size of the positions that can be rolled over without incurring additional market impact costs.

Figure 4 panel A plots the pattern in bid-ask spreads leading up to futures expiry. The bid-ask spread for deferred SFE SPI 200™ futures narrows and is almost as tight as for the near contract by the second last trading day (day 1). On the day when rollover activity appears to peak (day 2), the bid-ask spreads amount to 0.03 percent of contract value for the near futures and 0.04 percent of contract value for the deferred futures. These bid-ask spreads are much narrower than on the same trading day for the streetTRACKS® S&P/ASX 200 Fund (0.17 percent) and for the constituent stocks in the S&P/ASX 200 index (0.19 percent)[12]. The differences in these bid-ask spreads imply that the minimum cost of opening, maintaining and closing out a position is lower when performed with SFE SPI 200™ futures than when performed with either the streetTRACKS® S&P/ASX 200 Fund or the underlying stocks for holding periods up to at least 12 months.

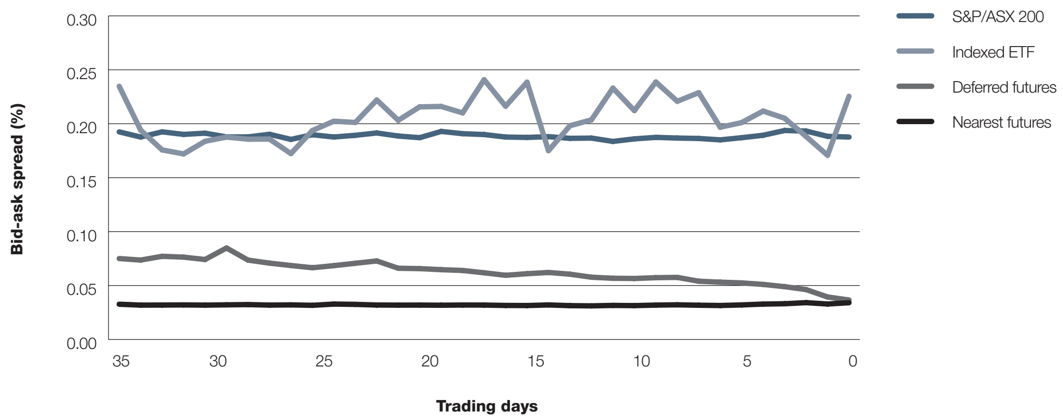
Panels B and C in figure 4 illustrate the pattern in depth at the bid and offer leading up to futures expiry. Depth available in near and deferred SFE SPI 200™ futures on both sides of the limit order book remains more than double the depth available in either the streetTRACKS® S&P/ASX 200 Fund or in the underlying stocks throughout the period that rollover activity takes place[13]. Moreover, depth in deferred SFE SPI 200™ futures has increased over the 35 trading days leading up to the expiry of the near contract. The differences in depth between the instruments approaching futures expiry implies that the maximum size of a futures position that can be rolled over without incurring additional market impact costs is more than double the size of positions that can be taken in either the streetTRACKS® S&P/ASX 200 Fund or the underlying stocks at the best quotes for the respective instruments.

12 Not shown in figure 4 panel A is that the bid-ask spread for the streetTRACKS® S&P/ASX 200 Fund increases to 0.59 percent on the last futures trading day (day 0), more than twice its average width over the previous 35 trading days.

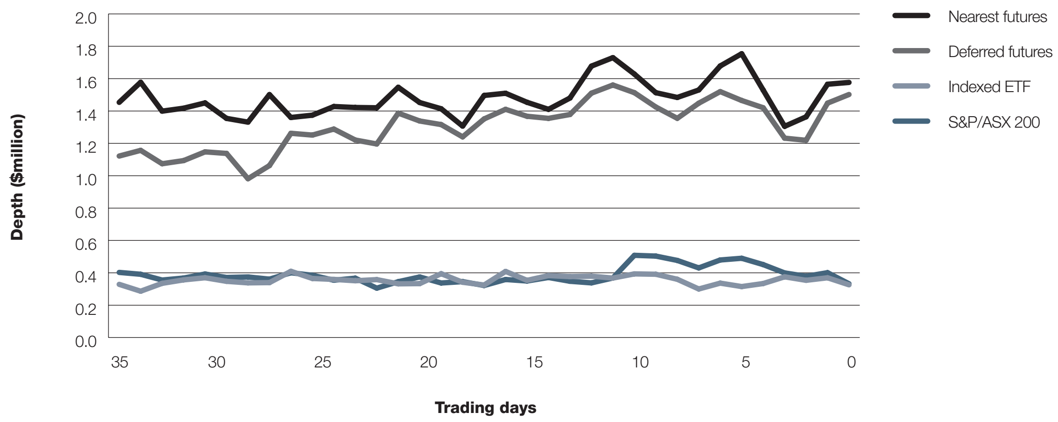
13 Not shown in figure 4 panels B and C is that the depth in near SFE SPI 200™ futures on their last trading day increases to AUD 66.7 million at the bid (45 times its average level over the previous 35 trading days) and AUD 91.9 million at the offer (60 times its average level over the previous 35 trading days). There is an absence of price risk for liquidity providers placing large limit orders in the expiring contract up to when it ceases trading at 12.00 p.m., given that the settlement price of the contract is known after the Special Opening Quotation is formed at the beginning of trading in the underlying stocks.

Figure 4
TIME-TO-FUTURES-EXPIRY PATTERNS IN THE LIQUIDITY OF SYNTHETIC AND CASH INSTRUMENTS PROVIDING EXPOSURE TO THE AUSTRALIAN EQUITIES MARKET
1 January 2001 to 15 June 2006

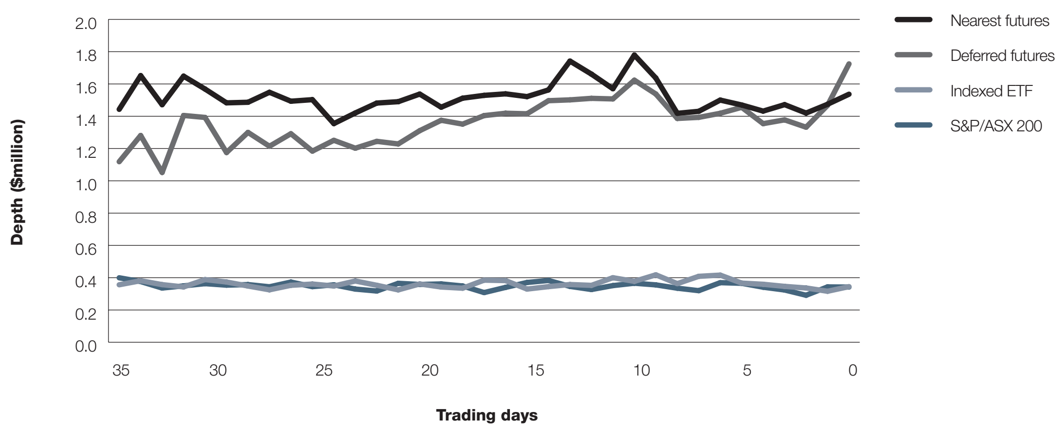
Panel A: Bid-ask spreads of SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund and their underlying stocks



Panel B: Bid depth of SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund and their underlying stocks



Panel C: Ask depth of SFE SPI 200™ Index Futures, streetTRACKS® S&P/ASX 200 Fund and their underlying stocks



Conclusion

A synthetic position using SFE SPI 200™ futures outperforms an index replication strategy using the cash market in terms of implicit transaction costs for holding periods up to at least 12 months and for positions of more than double in size. A synthetic overlay using SFE SPI 200™ futures is a viable alternative to using the underlying cash market when managing exposure to the S&P/ASX 200 accumulation index. The research presented in this paper should therefore be of particular interest to fund managers, be they passive managers tracking a benchmark or active managers seeking to generate 'alpha' returns.

APPENDIX

Synthetic and cash instruments providing exposure to the Australian equities market

SFE SPI 200™ Index Futures

SFE SPI 200™ futures were launched on 2 May 2000. They enable investors to trade movements in the S&P/ASX 200 index in a single transaction, thereby allowing exposure to Australia's top 200 companies without having to buy or sell shares in every company in the index. In this paper we examine the March, June, September and December quarterly expiry months. From the June 2003 expiry onwards, the last trading day is the third Thursday of the settlement month. Earlier contracts expired on the last business day of the settlement month[14].

streetTRACKS® S&P/ASX 200 Fund

State Street Global Advisors' streetTRACKS® S&P/ASX 200 Fund commenced trading on 27 August 2001. It is an investment that contains a pool of securities representing the S&P/ASX 200 index. The fund is listed on the ASX and units in the fund can be traded on the ASX like any other quoted security.

Constituent stocks in the S&P/ASX 200 index

Introduced in April 2000, the S&P/ASX 200 index is recognised as the investable benchmark for the Australian equities market. The index was converted from a market capitalisation weighted index to a free float based index on 1 October 2002. The weighting of constituents is determined by the free float assigned to each stock by the Standard and Poor's Australian Index Committee.

14 An exception is the December 2002 contract which expired on 19 December 2002.

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