Do derivatives improve managed fund performance?

Our study highlights the importance of cash equitising fund flows using derivative instruments. It indicates funds that do not cash equitise experience diminishing returns as fund flow increases, while cash equitising funds experience no deterioration in performance due to increased fund flow. Given the size of the Australian funds management industry, these results potentially translate into significant economic savings.[1]

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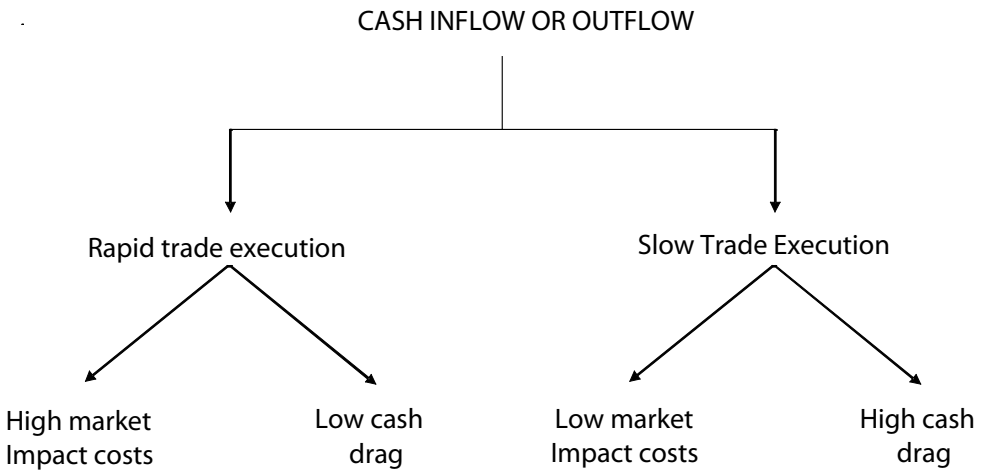
THIS PAPER EXAMINES the relationship between derivative use, investor fund flows and managed fund performance. It attempts to quantify the costs associated with investor flows and the extent to which 'cash equitisation' eliminates these costs. Cash equitisation involves using SPI200™ index futures to achieve rapid exposure to index returns at low cost. This process therefore alleviates the two primary costs attributable to fund flow: cash drag and transaction costs. In order to determine the relative benefit of cash equitisation, this study compares the monthly returns of equity funds that cash equitise against those that do not.[2] Three years of returns data are analysed — 31 August 2003 to 31 August and 2006.

All other things constant, the presence of large cash flows is likely to diminish the performance of managed funds.[3] If the manager transacts rapidly in the equity market, significant trading costs (market impact costs and the bid-ask spread) will be incurred. Alternatively, if the manager transacts at a slower rate and holds cash for longer, the fund's performance may suffer as a result of 'cash drag'. Cash drag diminishes performance because, on average, the return on cash is lower than the return on stock.[4] Therefore, when presented with large fund flows, a fund manager faces a trade-off between market impact and cash drag costs (see Figure 1).

FIGURE 1: **Trade-off between market impact and cash drags**



Cash equitisation

Cash equitisation is a process which allows fund managers to adequately deal with large investor flows and simultaneously reduce cash drag and transaction costs. Upon the receipt of new funds, the process of cash equitisation simply involves taking an appropriate long position in the SPI 200™ futures and purchasing fixed income securities. If futures contracts are priced at fair value, it can be shown that the net return on the fixed income securities plus the return on the futures is equal to the return on the accumulation index.[5] Effectively, the problem of cash drag is alleviated by cash equitisation.

A concurrent benefit of cash equitisation is the ability for funds to lower their trading costs. Two costs that are likely to be incurred when a fund manager rapidly transacts to meet the demands of investor flows are spread costs and market impact costs. Table 1 compares the bid-ask spread of SFE SPI 200™ futures against the bid-ask spread of the ASX/S&P200 market portfolio and the Street Track 200 exchange traded fund.[6]

TABLE 1: **Average daily closing bid-ask spread of SFE SPI 200™ futures, ASX/S&P200 Index portfolio and the Street Track 200 exchange traded fund: year ended 31 August 2006 (in basis points).**

The bid-ask spread of the S&P/ASX200 Index portfolio is the average market capitalisation-weighted bid-ask spread of the securities in the index.

	SPI 200™ Futures	ASX/S&P200 Index Portfolio	STREET TRACK S&P/ASX 200 FUND
Mean	6.52	18.95	51.56
Median	6.05	14.80	21.91

Cash equitisation is a process which allows fund managers to adequately deal with large investor flows and simultaneously reduce cash drag and transaction costs. Upon the receipt of new funds, the process of cash equitisation simply involves taking an appropriate long position in the SPI 200™ futures and purchasing fixed income securities.

Table 1 demonstrates that the SFE SPI 200™ Futures contract is the cheapest mechanism by which to rapidly obtain exposure to the underlying equities market. The average bid-ask spread of the ASX/S&P200 Index portfolio is 18.95 basis points. In contrast, the average bid-ask spread of SFE SPI 200™ Futures is much smaller — only 6.52 basis points. Therefore, obtaining rapid exposure to the underlying index portfolio using stock index futures is approximately three times cheaper than trading the underlying stocks outright in terms of spread costs.[7]

The second type of cost likely to be incurred by fund managers is market impact or slippage. Since futures markets are considerably more liquid than the underlying stock market, market impact costs are likely to be lower when trading the futures contract.[8] Prior research indicates that the slippage incurred in executing transactions in SFE SPI 200™ futures is generally less than 1 index point for trades up to 50 contracts in size.[9] Even the very largest futures transactions (greater than 50 contracts) incur

slippage of approximately 2 index points, which equates to approximately 0.05% (5 basis points) of the value of the underlying portfolio. In contrast, research concerning equity markets shows that the slippage incurred by funds in executing transactions averages between 20 and 27 basis points.[10]

One element associated with trading index futures is the establishment and maintenance of margin requirements. When considered in isolation, this represents a distinct (opportunity) cost because extra cash is required to establish and maintain the margin. However, in the context of cash equitisation, the futures contract is traded *in substitution* for trading the underlying equity and only in the presence of fund flow. Therefore, the cash required to maintain the margin is readily available, thus imposing no additional costs than would otherwise be incurred. Even if there is some aspect of trading index futures that is significantly more costly than trading the underlying equity, this will be evident in the returns and net asset values of the funds that undertake this strategy. In the next section we compare the returns of those funds that trade index futures to cash equitise against funds that do not.

Data and results

This section documents the improvement in performance associated with cash equitisation. The data used in this study is sourced from Morningstar Direct. All active, long-only, open-end equity funds domiciled in Australia trading domestic stocks are considered for analysis. For proper comparison, sector-specific, imputation, small-cap and mid-cap funds are removed from the sample. For the funds in the sample, monthly returns (net of fees) are analysed. Standardised net fund flow *(SFF)* for each fund is calculated as follows:[11]

$$Standardised\ Net\ Fund\ Flow_t = \frac{Size_t - Size_{t-1}(1+return_t)}{Size_{t-1}}$$

Table 2 presents descriptive statistics of the sample. The sample consists of 147 equity funds. The average fund size as at 31 August, 2006 was $225 million, while the average age of the funds was 7.5 years. Over the period of analysis, these funds experience average monthly absolute net fund flows of $8.15 million, which represents approximately 5.7% of fund size.

TABLE 2: Descriptive statistics

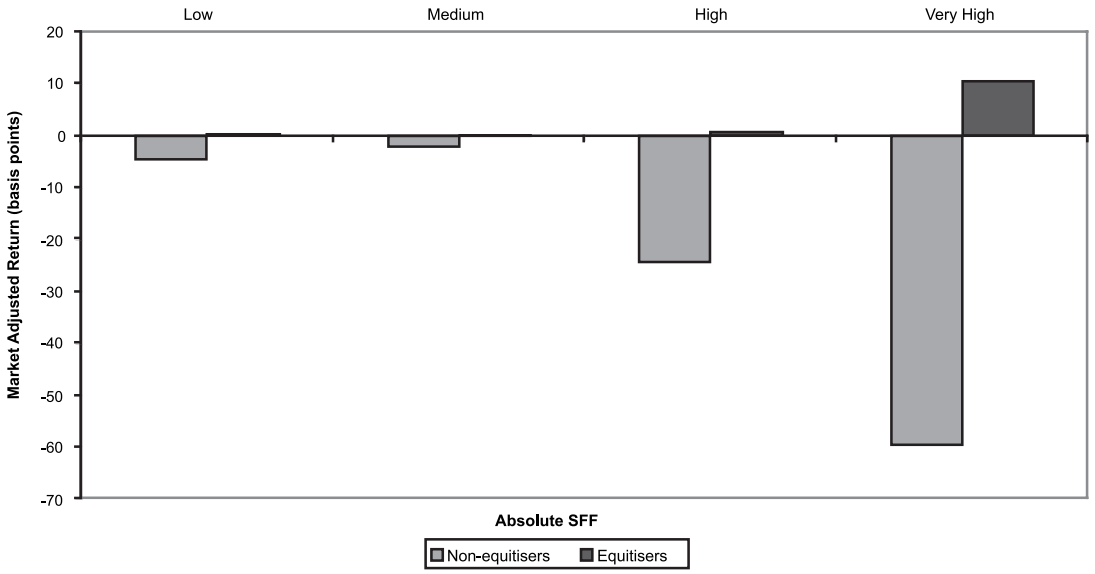
	Mean	Median
Number of Funds	147	
Fund Size ($ million)	224.7	28.0
Age (years)	7.5	5.2
Abs. Net Fund Flows ($ '000)	8150	457
Abs. *SFF* (%)	5.7	2.2

Transaction costs

To ascertain the extent to which fund performance is diminished by fund flow related transaction costs, monthly fund returns are divided into groups based on the concurrent level of fund flow in that month. Since transaction costs are incurred regardless of whether the fund flow is net positive or negative, the absolute value of *SFF* is considered for this analysis. The groupings are defined as: Low fund flow — *Absolute SFF* less than 2.5%; Medium fund flow — *Absolute SFF* between 2.5% and 5%; High fund flow — *Absolute SFF* between 5% and 10%; Very High fund flow — *Absolute SFF* above 10%.

Figure 2 compares the average monthly market adjusted returns of cash equitisers and non-equitisers for the different fund flow groupings. The results indicate that as fund flow increases, the returns to non-users decrease. For example, when fund flows are 'High' (5% to 10%), the decline in performance averages 25 basis points, while for Very High fund flows (above 10%), the deterioration in performance is, on average, 60 basis points.

FIGURE 2: Average fund return by Absolute SFF



In contrast, the returns to cash equitisers are relatively stable across all levels of fund flow and closely mimic the returns of the ASX 200 Accumulation Index. It is clear that funds that cash equitise are able to significantly reduce fund flow related transaction costs and tracking error. This finding is consistent with the idea that cash equitisation reduces performance variation associated with fund flows by exposing new cash to market risk at low cost. A corollary result is that cash equitisers have returns that are superior to non-equitisers across the board. The magnitude of the superiority is on average 25 basis points in High fund flow months and 70 basis points in Very High fund flow months.

Cash Drag

To ascertain the extent to which fund performance is diminished by fund flow related cash drag, monthly fund returns are divided into groups based on the concurrent level of cash drag in that month. We calculate cash drag as follows:

$$Cash\,Drag = SFF \times (r_m - r_f)$$

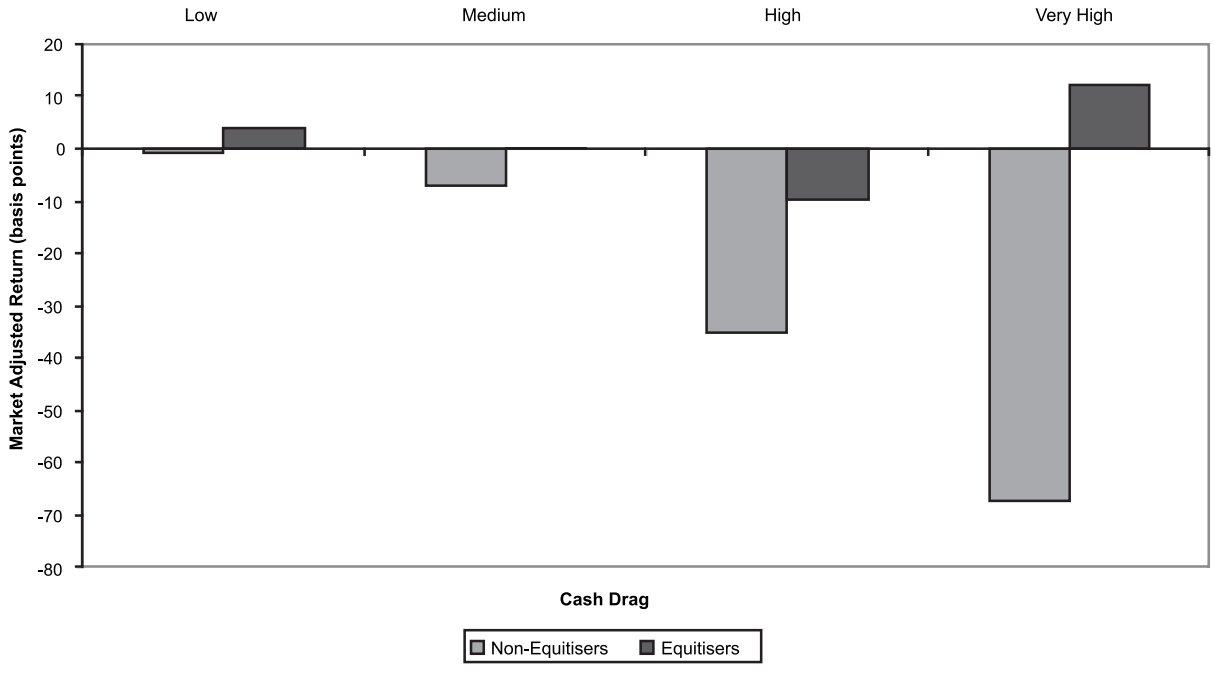
Where r_m and r_f are the monthly returns on the ASX 200 Accumulation Index and the interbank cash rate respectively. As previously, monthly returns are placed into four non-overlapping groups based on the level of cash drag for that month: Low — Less than 0; Medium — 0 to 5; High — 5 to 20; Very High — Greater than 20. For example, if the *SFF* for a given fund is 10% and the return on the index in excess of the risk free rate is 1.5%, the cash drag for that fund during that month is 15, which places it in the 'High' cash drag group. The results are presented in Figure 3.

It is clear that funds that cash equitise are able to significantly reduce fund flow related transaction costs and tracking error. This finding is consistent with the idea that cash equitisation reduces performance variation associated with fund flows by exposing new cash to market risk at low cost.

The results presented in Figure 3 are quantitatively similar to Figure 2. Non-equitisers experience significant cash drag effects in High and Very High months of 35 and 67 basis points, respectively. As expected, equitising funds are able to reduce the effects of cash drag by rapidly exposing new funds to market returns and therefore producing returns that are superior to non-equitising funds, especially during periods of High or Very High cash drag.

Overall the results of this paper highlight the importance of cash equitising fund flow using derivative instruments. Given the size of the Australian funds management industry, the results documented in this study would translate into significant economic savings.

FIGURE 3: **Average fund return by cash drag**



Regression Analysis

It is possible that the results are driven by some other characteristic of cash equitising funds and not necessarily derivative use. For example, larger funds may have superior resources. As a result, they may be more likely to employ those with the skill set to trade derivatives. At the same time, larger funds may also be able to attract more experienced and successful managers compared to smaller funds. Therefore, a positive correlation would exist between derivative use and fund performance, although the result is simply a by-product of fund size. To account for this, a regression is estimated that controls for several fund characteristics, including investment style, fund size, age of the fund, as well as general market conditions. To control for these factors, the following regression is estimated, with observations taken monthly for each fund:

$$Excess\ Return = a_0 + a_1 Market\ Return + a_2 Abs.\ SFF + a_3(Abs.\ SFF)*CE + a_4 Cash\ Drag + a_5(Cash\ Drag)*CE + a_6 Growth + a_7 Value + a_8 log\ (Size) + a_9 Age$$

Market Return is defined as the return on the Accumulation Index in excess of the Interbank Cash Rate. *CE* is a dummy variable which takes the value of 1 if the fund cash equitises and 0 otherwise; *SFF* and *Cash Drag* are as defined previously. The terms *(Abs. SFF)* CE* and *(Cash Drag * CE)* are interaction terms which attempt to capture the relationship between fund flow or cash drag and derivative use. *Growth* and *Value* are dummy variables for investment style. *log(Size)* is the natural logarithm of the fund's assets under management ($millions). *Age* is the age of the fund in years.

TABLE 3: Regressions

	Coefficient Estimate	t-statistic
Intercept	0.000	0.13
Market Return	0.975	169.03
Absolute SFF	-0.015	-2.60
*(Abs. SFF) * CE*	0.018	3.11
Cash Drag	-0.388	-1.97
*(Cash Drag) * CE*	0.452	2.24
Growth	-0.001	-3.01
Value	-0.002	-4.33
log(Size)	0.000	-0.76
Age	0.000	0.97
R-Square (adj.)	0.8872	

The results of the regression are presented in Table 3. The coefficient of the market return variable is significantly positive, indicating that overall fund performance is influenced by general market conditions. For a 10% increase in *Absolute SFF*, returns across *all* funds are diminished by 15 basis points. However, as indicated by the coefficient on the interaction term, those funds that cash equitise experience returns that are 18 basis points higher for every 10% increase in *Absolute SFF*. Therefore, cash equitisation more than compensates for the negative effects associated with increased fund flow. The coefficients on *Cash Drag* reveal a similar phenomenon. If a fund experiences *SFF* of 10% during a month where the Accumulation Index increases by 1.5%, the results suggest that non-equitisers suffer a reduction in performance of 6 basis points while equitisers overcome this cost by at least 2 basis points. In summary, the results of the study are not materially affected once other fund characteristics such as investment style, size and age are considered.

As expected, equitising funds are able to reduce the effects of cash drag by rapidly exposing new funds to market returns and therefore producing returns that are superior to non-equitising funds, especially during periods of High or Very High cash drag.

Conclusion

Our findings were that funds that do not cash equitise experience diminishing returns as fund flow increases. The average deterioration in returns associated with fund flows between 5% and 10% of fund size is 25 basis points. Quantitatively similar results are obtained when the analysis is repeated using varying levels of 'cash drag', rather than fund flow. Further analysis also reveals that if a fund experiences an increase in investor flows equivalent to 1% of assets under management, the reduction in fund performance attributable to transaction costs and cash drag effects is 1.5 basis points and 1.2 basis points, respectively. Cash equitising funds experience no deterioration in performance attributable to fund flow.

Notes

1 This research was funded by the Sydney Futures Exchange under Corporations Regulation 7.5.88(2), which allows excess money in fidelity funds to be used by a licenced market operator to create a 'program for the development of the financial industry' that is 'conducted primarily for the public benefit'. For further details of the funding source, please refer to http://www.sirca.org.au. The authors wish to thank participants at the Sydney Futures Exchange seminar series for their insightful comments.

2 Data on derivative use was obtained by telephone interview. We thank Effie Tsiaousis from the Australian Securities Exchange for providing this data.

3 See R.M. Edelen (1999) and J. Greene and C. Hodges (2002).

4 Cash drag is a particular problem in rising markets because the difference between cash returns *and* stock returns is very large and there is a greater propensity for funds to experience investor flows during these periods. See V.A. Warther (1995).

5 See A. Frino, G. Wearin and J. Fabre (2004).

6 The Streettrack fund is another mechanism that can be used by a fund manager to obtain exposure to equity market movements.

7 While fund managers incur a very small bid-ask spread cost in rapidly equitising their incoming cash flow using futures, they may also avoid incurring the bid-ask spread of underlying stocks altogether. Once exposure to the underlying market is obtained using futures, the fund manager can patiently switch out of futures and into equities, possibly using limit rather than market orders.

8 A. Frino and T. Oetomo (2005).

9 Ibid.

10 See D. Gallagher and A. Liou (2003) and C.N. Chiyachantana, P.K. Jain, C. Jiang, and R.A. Wood (2004).

11 It is natural to think of SFF as a value which represents the magnitude of investor flows *as a percentage of total fund size*.

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