Keywords: portfolio risk, Active Money, equity markets, alpha, active share.

ACTIVE MONEY — PROVIDING ADDITIONAL INSIGHTS INTO PORTFOLIO RISK

After testing the efficacy of Active Money (degree of activeness) as a predictor of excess returns and risk, we find that Active Money provides a valuable addition to understanding portfolio risk but it does not drive alpha. We recommend that investment professionals consider the level of Active Money in their clients' portfolios as a means to better identify, understand and manage risk.

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Active Money

The current outlook for lower asset class returns has resulted in an increased focus on the ability of fund managers to generate returns in excess of the benchmark (alpha).[1] Over the past few years, there has been a dramatic increase in the number of concentrated equity products being offered to and utilised by investors.[2] The general contention is that more concentrated portfolios have a high degree of activeness and therefore reflect higher conviction and, as a result, higher potential for excess returns. Also, following the global financial crisis, investors are seeking greater clarity regarding the actual risk levels within their portfolios, and they are investigating potential strategies to control risk in extreme market environments.

This paper explores the concept of Active Money mainly in the context of Australian equities and investigates its ability to provide greater insight into the risk and return characteristics of a portfolio.

Active Money has been used for a few decades by a handful of asset consultants and practitioners as a measure of risk. However, recently, an influential academic paper by Cremers and Petajisto (2009)[3] brought Active Money to the attention of fellow academics, the financial media and to practitioners who were not yet aware of the concept. Cremers and Petajisto (2009) are the first to study Active Money in the academic context and they have christened the measure 'active share'. Though this term is now widely used in academia, the financial media and by many asset consultants and fund managers, in this paper, we will use the term 'Active Money'.

Active Money definition

Active Money is a measure of how different the portfolio weights are from the benchmark weights. An intuitive measure would assign 0 per cent to the benchmark and 100 per cent to a portfolio which holds all stocks outside the benchmark. A definition that satisfies the above condition is defined in Equation 1, with a worked example provided in Table 1.

TABLE 1: *Active Money — worked example*

Stock Name	Portfolio Weight	Benchmark Weight	$\left\| w_i^P - w_i^B \right\|$
ABC Company	10%	25%	15%
DEF Company	40%	25%	15%
GHI Company	10%	0	10%
UVW Company	0%	25%	25%
XYZ Company	40%	25%	15%
Total	**100%**	**100%**	**40%**
Active Money	$\frac{1}{2}\sum_{i=1}^{n}\left\| w_i^P - w_i^B \right\|$		

EQUATION 1: *Active Money*

$$\text{Active Money} = \frac{1}{2}\sum_{i=1}^{n}\left| w_i^P - w_i^B \right|$$

where:

n is the number of unique stocks in the portfolio and the benchmark

w_i^P is the weight of the ith stock in the portfolio

w_i^B is the weight of the ith stock in the benchmark.

In the absence of leverage, Active Money for a portfolio is always between 0 and 1. We note that Active Money computation does not distinguish between stocks on any basis other than their absolute active weight. There is no axiomatic connection between Active Money and expected risk or return. However, this simple metric does provide an overall sense of how active, in the benchmark-relative sense, a manager is at any given point in time, and it is therefore, intuitively, related to active risk and active return. We empirically investigate these linkages in this paper.

Active Money across different market structures

In determining the Active Money in a given portfolio, there are two considerations driving the end result; the weight in the portfolio and the weight in the corresponding benchmark. Therefore, the construct of the corresponding benchmark is a significant contributor to the level of Active Money that is able to be achieved.

Analysis of market concentration

Australia has one of the most highly concentrated equity markets in the developed world and, as a result, care needs to be taken when extrapolating observations from more diversified markets such as the United States. A commonly used measure of market concentration is the Herfindahl Index.[4] For this paper, we have used a standardised version of the Herfindahl Index so that we can compare various markets.

EQUATION 2: *Herfindahl Index*

$$\text{Herfindahl Index (H)} = \sum_{i=1}^{n} w_i^2$$

where:

w_i is the market-cap weight of company i in an index

n is the number of companies in the index.

EQUATION 3: *Standardised Herfindahl Index*

$$\text{Standardised Herfindahl Index (H*)} = \frac{(H - 1/N)}{1 - 1/N}$$

where:

N is the number of companies in the index

H is the Herfindahl Index, as described above.

To highlight the level of concentration within the Australian market relative to other equity markets around the world, in Figure 1, we show the standardised Herfindahl Index for United States, Europe, EAFE (Europe, Australasia, Far East), Global, United Kingdom, Japan and Australia. As mentioned previously, the higher the Herfindahl Index the more concentrated the market.

FIGURE 1: *Developed market standardised Herfindahl Index comparison*

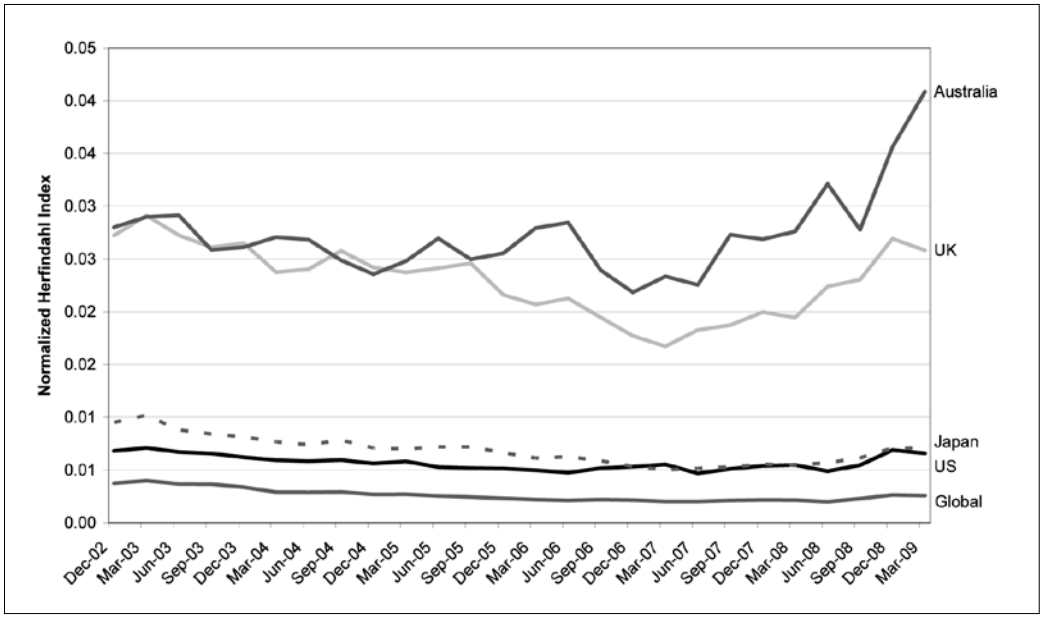
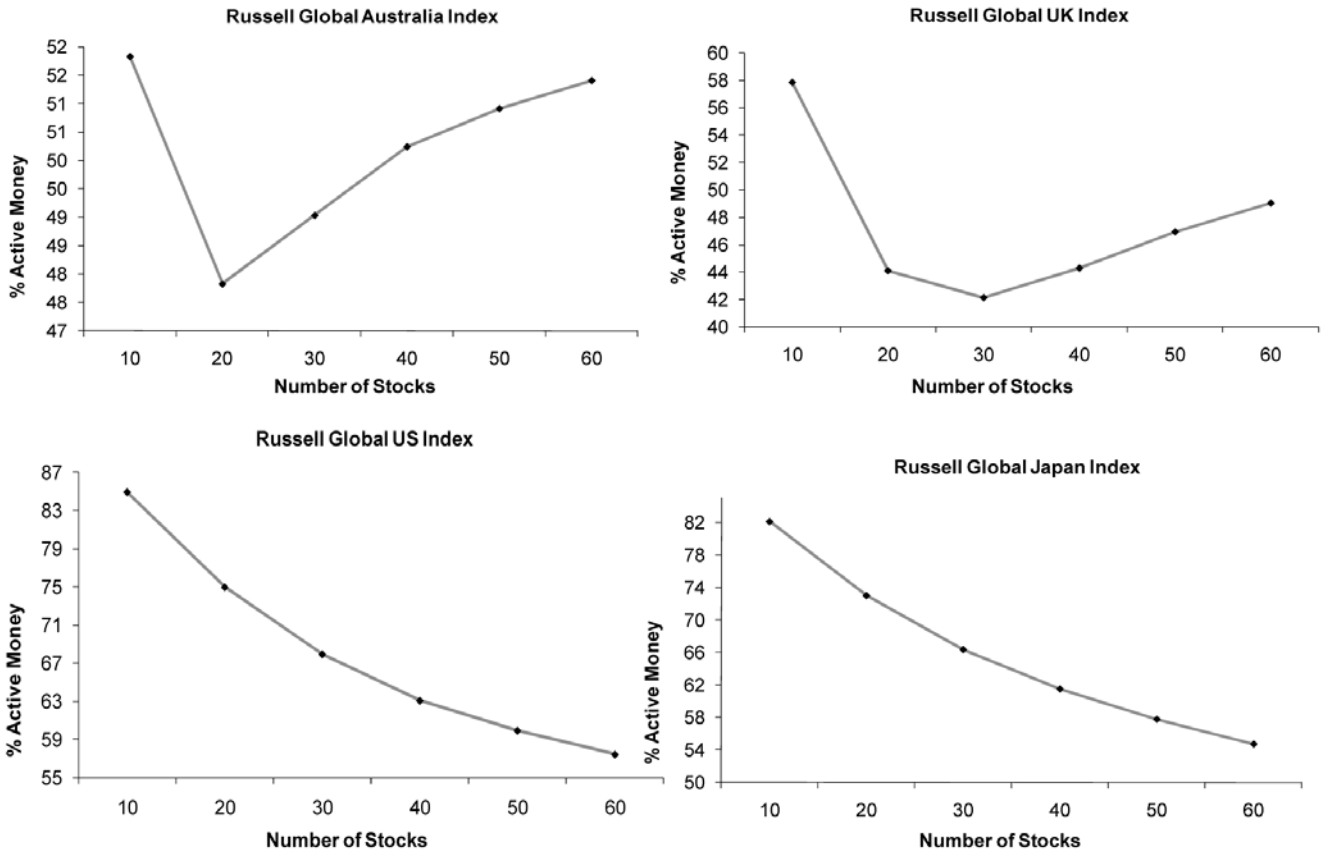


FIGURE 2: *Active Money profiles across market structures*



Source: Russell Investments.

Active Money in concentrated markets

In large and well-diversified markets, such as the United States and Japan, we find that, typically, there is a monotonic relationship between the number of stocks in a portfolio and the level of Active Money; as the number of stocks increases, we find that the level of Active Money decreases. However, not all markets are as diversified as the United States and Japan. In well-developed markets, such as the United Kingdom and Australia, we find significant index concentration in the top 20 companies.

In these concentrated markets we find that the typical relationship between the number of shares held and the level of Active Money can break down.

To illustrate this point, in Figure 2, we have devised a series of naïve portfolios that equally weight the largest 10, 20, 30, 40, 50 and 60 stocks in the US, UK, Japanese and Australian markets. (All markets have been represented using the Russell Global Indices.) In Figure 2, we can see that for the well-diversified markets, United States and Japan, the monotonic relationship that we previously alluded to holds. However, for the more concentrated markets, United Kingdom and Australia, we see how the relationship between the number of shares held and the level of Active Money can break down. This is an issue of which both practitioners and academics need to be aware when analysing Active Money levels in the Australian market and one that provides limitations to applying observations from other, more diversified markets, to Australian portfolios.[5]

Active Money — empirical studies

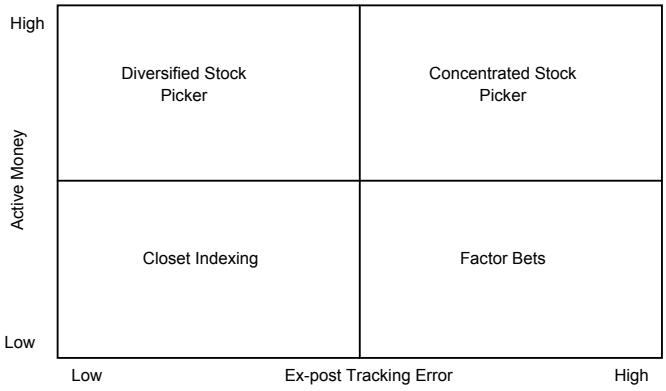
A literature review of Active Money and related concepts
There are many publicly available papers that have focused on the question of whether more concentrated funds deliver better risk-adjusted performance than funds which are less concentrated. Researchers have used metrics that utilise the second moment of portfolio weights, where more emphasis is placed on larger bets, in order to study concentration.

A study by the Brandes Research Institute (2004) defines a measure of concentration of a portfolio as the reciprocal of the Herfindahl Index based on the portfolio weights. Brandes' 'concentration coefficient' measure is not benchmark-relative and therefore not so interesting from our viewpoint. However, working with Russell-Mellon data for the period 1992-2003 for US and Global manager universes, the study concludes that there is no relationship between concentration and performance, or between concentration and information ratios.

Kasperczyk et al. (2006) investigate the relationship between sector deviation and performance with US Mutual Fund data for the period 1984–1999. They find that funds with higher industry concentration outperform funds with diversified portfolios, where the performance was measured in risk-adjusted terms. They also find that the higher concentration portfolios tend to overweight growth and small-cap stocks whereas the lower concentration funds are closet index funds.

Brands et al. (2005) use an analogue of the Herfindahl index for active weights at stock, industry and sector levels for a portfolio. The authors call their generic measure, the 'Divergence Index'. Working on an Australian dataset of 37 manager portfolios for the period 1995–2001, the authors find risk-adjusted higher performance for higher concentration funds. Furthermore, they find the greatest difference in returns with respect to stock

FIGURE 3: *Cremers and Petajisto (2009) classification of long-only funds*



deviation. Digging deeper, they find that the efficacy of stock deviation as a determinant of return increases if it is calculated after excluding the large cap stocks.

Cremers and Petajisto (2009) contrast Active Money and ex-post tracking error, associating the former primarily with stock picking and the latter with factor timing. They recognise that the effects of stock picking and factor timing on a portfolio's composition and returns cannot be easily disentangled and that many managers use both methods to some degree. The authors contend that Active Money is a better gauge of the degree of active management than tracking error as the latter understates the active management of diversified stock pickers and overstates the active management of managers who place a few factor bets.

Using US Mutual Fund data for the period 1990–2003, they find that the highest Active Money quintile outperformed the lowest quintile of managers on benchmark-relative and risk-adjusted bases. In contrast, similar sorts on tracking error did not yield statistically significant results, and the quintile returns decreased for higher tracking error quintiles. Further, they investigate how Active Money and ex-post tracking error interact, and suggest a two-dimensional classification of funds, as displayed in Figure 3, where the axes are Active Money and ex-post tracking error.

In double sorts, with the first sort on Active Money and the second on tracking error, funds with the highest Active Money and ex-post tracking error, the 'concentrated stock pickers', do best. This is followed by 'diversified stock pickers' (funds with high Active Money but low tracking errors), 'Closet indexers' (funds with low Active Money as well as tracking error revealing index-like performance), and 'factor bet' managers (with high tracking error and low Active Money) do worst. It is important to point out that the authors have worked with ex-post beta adjusted tracking error, which was calculated using six months of daily returns data.

In this paper, we test some of the results of Cremers and Petajisto (2009) for Australian institutional equity managers.

FIGURE 4: *Universe constituents across time*

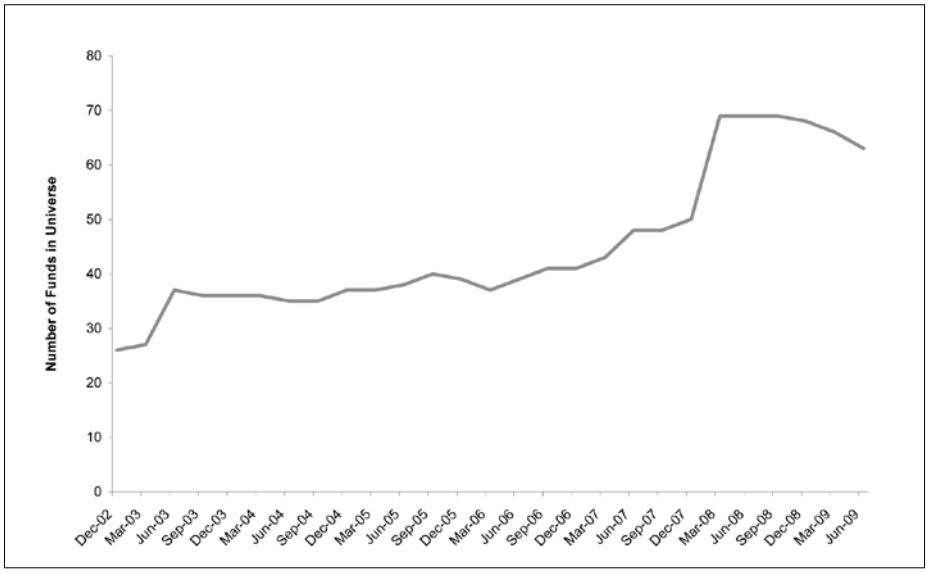
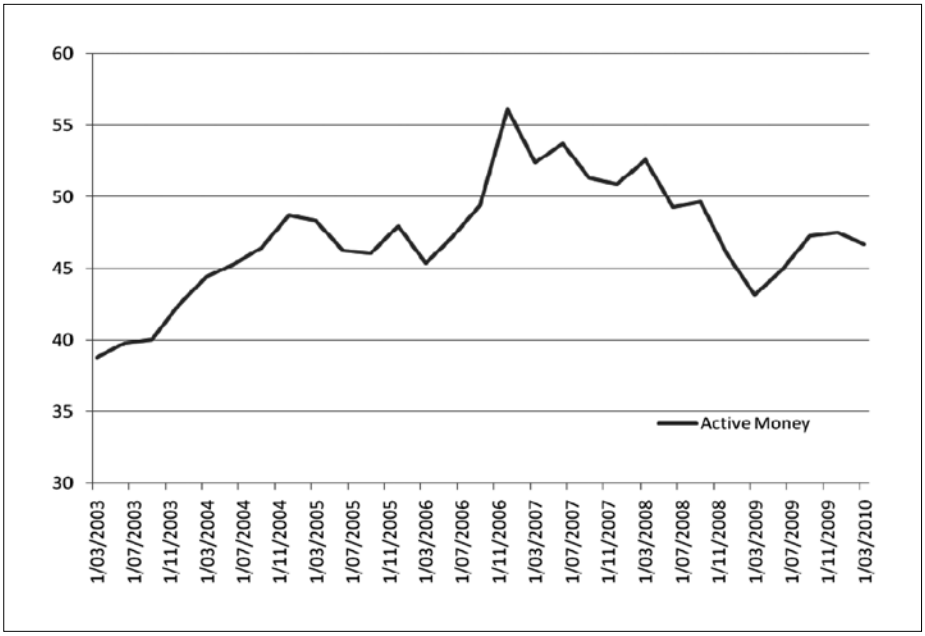


FIGURE 5: *Median Active Money over time*



Active money in Australian Equities

Data

In this paper, we have utilised quarterly holdings data from Russell Investment's Australian equity database. The funds analysed are representative accounts provided by the managers and do not include the assets under management (AUM) associated with the representative accounts. The data covers the period March 2003 to March 2010 and the underlying universe is controlled for survivorship bias. The number of funds in the underlying universe varies from year to year and averages 44 funds across the entire sample period. Figure 4 details the numbers of funds in the universe at each quarter.

The benchmark utilised for the analysis is the S&P/ASX 300 index.

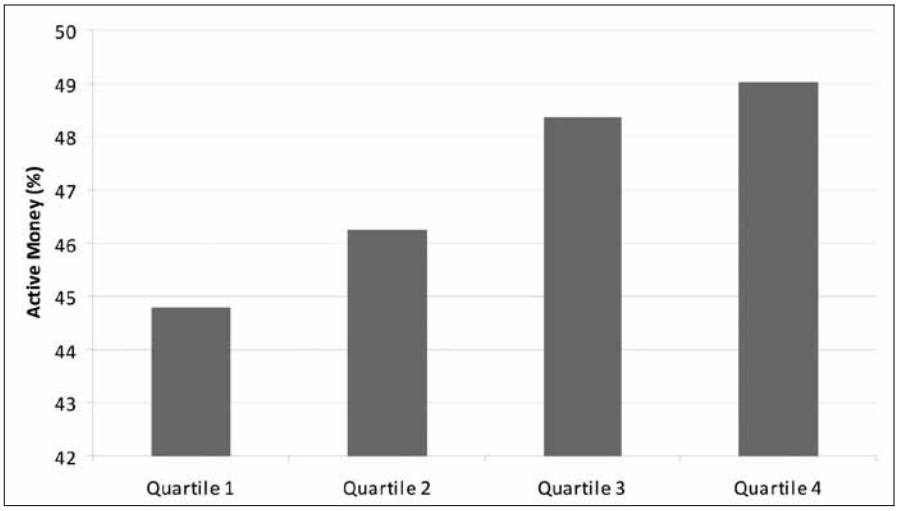
To generate the portfolio ex-ante tracking errors, we have utilised MSCI Barra's long-term Australian equity model[7] (AUE3L).[8] Fundamental stock level data has been sourced from both Aspect Financial and International Brokers' Estimate System (IBES).

In some of the figures for Active Money we consider more recent time periods, where the data was available.

Active Money through time

One of the several striking conclusions of the Cremers and Petajisto (2009) paper is that, in aggregate, Active Money

FIGURE 6: *P/E dispersion quartiles*



in active management has reduced over time. The authors use US mutual fund data for the period 1980–2002 and find a clear long-term trend towards lower Active Money.

In our analysis of the Australian equity universe, we do not reveal a linear trend over time, and our results are more suggestive of conscious Active Money adjustments by Australian fund managers in response to changes in the market. However, our analysis investigates a different time period from Cremers and Petajisto (2009). In Figure 4, we plot a time series chart of the universe of median active money levels through time, which highlights the non-linear trend.

Our results suggest that the changes in Active Money could be in response to the opportunity set of the market and may potentially present some agency costs. In Figure 5, we examine the relationship between Active Money and cross-sectional valuation dispersion. To measure valuation dispersion, we have taken a cross-sectional standard deviation of the underlying company P/E (price-to-earnings) ratios at the end of each quarter. We then sort the data into quartile buckets, with quartile 1 representing high valuation dispersion and quartile 4 representing low valuation dispersion.

The relationship that we have identified in Figure 5 suggests that Active Money is lowest when valuation dispersion is at its highest (Quartile 1) and Active Money is highest when valuation dispersion is at its lowest (Quartile 4). Valuation dispersion is often utilised as a measure of future return dispersion. Our results indicate that Australian fund managers reduce their Active Money levels when future return dispersion is greatest and increase Active Money when it is relatively low.

Previous research by Russell Investments (see Greenwood 1999) explores the notion of 'guardian' mentality, where active managers are more concerned with 'not losing' than they are with 'winning'. The results in Figure 5 are supportive of 'guardian' mentality in the Australian equity universe, where managers reduce the level of activeness in their portfolios as risk/opportunity increases and this could represent a significant agency cost to investors.

A less sceptical interpretation of the results is that Australian equity fund managers are actively managing the level of ex-ante tracking error in their portfolio to remain within their stated investment guidelines.

Despite the reason behind the changes in Active Money levels, the analysis in this paper supports the notion that Active Money is considered by Australian equity fund managers and is cyclical in nature. This increases the need for regular reporting of the level of Active Money for Australian equity funds. Regular reporting of Active Money by Australian equity funds will allow investors to make more informed decisions about the products that they select and also the amount of risk that they are willing to accept.

Active Money and returns

We investigate whether high Active Money corresponds to high alpha. In Cremers and Petajisto (2009), analyses with US retail data, sorting by Active Money in each quarter, reveal that the highest two deciles have significantly high positive alpha while the bottom three deciles have negative alpha. Using five-by-five double sorts with Active Money and ex-post tracking error, they find that funds with high Active Money and high ex-post tracking error, the concentrated stock pickers, have the highest alpha while funds with high tracking error and low Active Money do the worst. The low Active Money and low tracking error funds are the closet indexers and produce benchmark-like performance, and the high Active Money and low tracking error funds outperform their benchmarks.

Our data set for the Australian universe is not sufficiently large, especially for the earlier periods, to create deciles or five-by-five double sorts. Instead, we create quartiles for

FIGURE 7: *Excess return and Active Money*

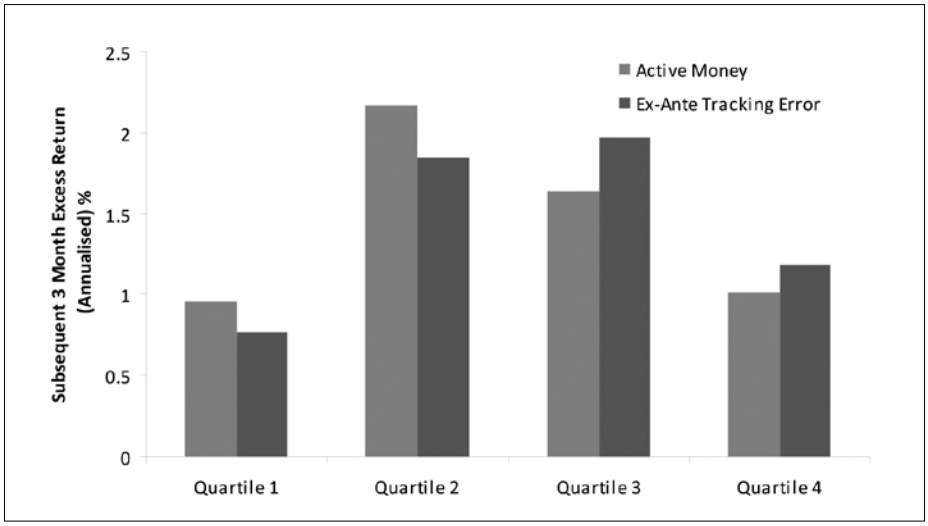


TABLE 2: *Excess return (annualised) and Active Money across markets*

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Australia	0.96	2.17	1.64	1.01
Europe	-0.62	-0.38	-0.49	0.45
EAFE	0.6	-0.14	0.05	1.54
Global	0.1	0.44	0.31	2.1
Japan	0.21	-0.44	0.17	0.83
US Market Oriented	0.31	0.36	0.57	1.08
US Growth	-0.33	0.61	0.44	1.54
US Value	0.49	1.36	0.92	0.63

Note: All values are percentages.

TABLE 3A: *Three-month excess returns (annualised) — first sorted by Active Money*

		Ex-ante tracking error	
		Low	High
Active Money	High	1.4	1.4
	Low	0.8	1.9

TABLE 3B: *Three-month excess returns (annualised) – first sorted by ex-ante tracking error*

		Ex-ante tracking error	
		Low	High
Active Money	High	1.6	1.1
	Low	0.7	2.0

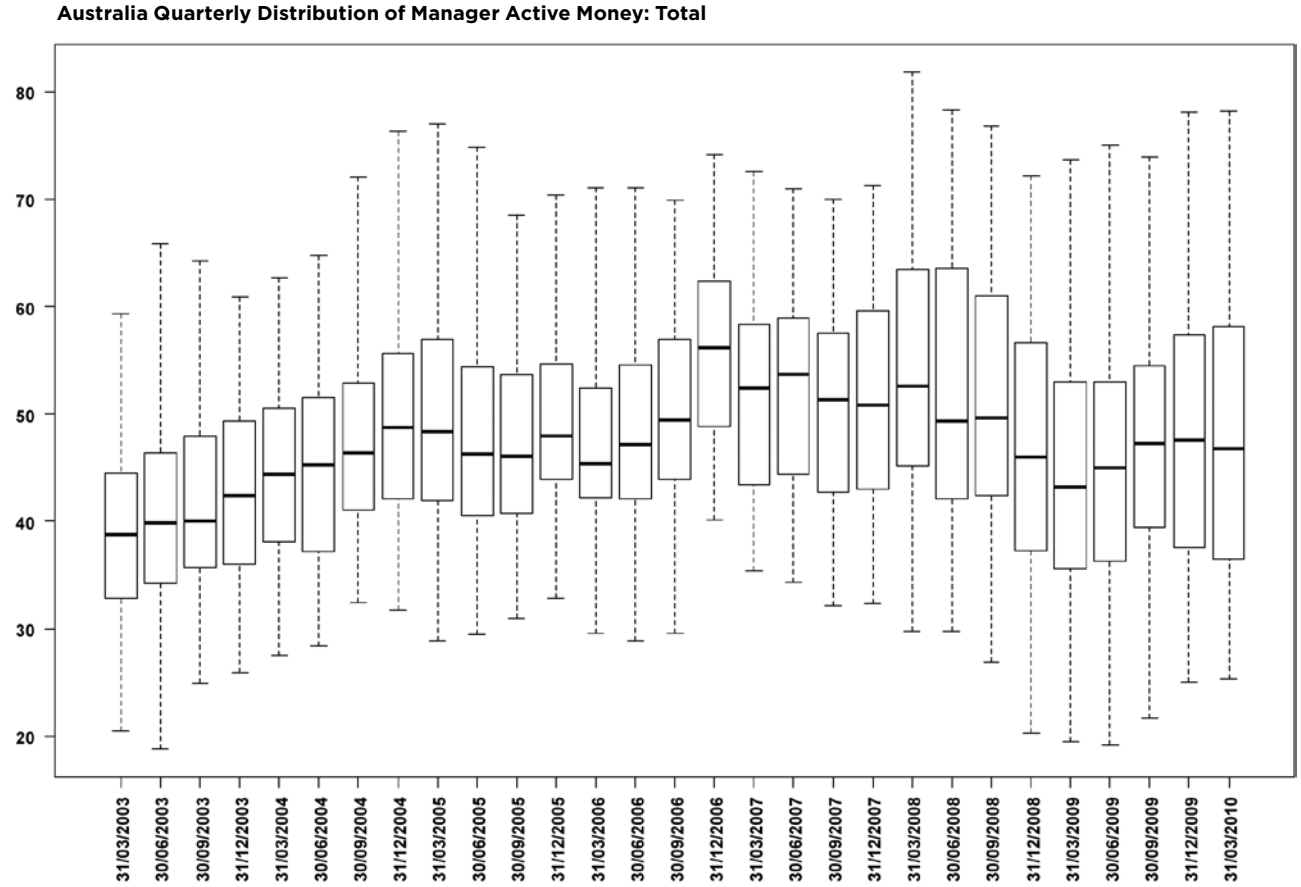
univariate sorts on Active Money or Barra ex-ante tracking error and two-by-two sorts for the bivariate sorts with Active Money and Barra ex-ante tracking error.

The univariate sort results for Active Money displayed in Figure 6 show that, unlike in Cremers and Petajisto (2009), all Australian equity managers show positive returns, where excess returns are defined as the total return on the portfolio minus the total return on the benchmark.

Further, for Australian equity managers we find no strong relationship between the level of Active Money or ex-ante tracking error and subsequent performance. The results in Figure 7 are contrary to previous studies by Brands et al. (2005), which find a positive relationship between portfolio concentration and future excess returns. We have used a different data set and different time period from Brands et al. (2005), so the results are not directly comparable.

While it may seem somewhat intuitive that more concentrated or higher risk portfolios should result in higher excess returns, the underlying assumption behind that logic is that all portfolios are built using the same insight. We find the results presented in this paper for Australian equity managers more palatable than those presented by Cremers and Petajisto (2009) and Brands et al. (2005) as we believe the biggest driver of excess returns is manager skill, not Active Money levels. If you could determine future excess returns by the level of Active Money, then active manager research would be a simple proposition.

FIGURE 8: *Cross-sectional distribution of Active Money*



After running the same univariate analysis on Russell manager universes in other markets, however, we find results similar to that of Cremers and Petajisto (2009). In six of the eight markets we looked at, we find that managers with the highest quartile of Active Money produced the largest subsequent three-month return. We find this relationship to be strongest in the more diversified markets.[9] However, we find little support for a linear relationship between Active Money and subsequent returns.

Using the framework utilised by Cremers and Petajisto (2009) in Tables 3A and 3B, we find that the highest returns accrue to the 'factor bet' managers, with the 'diversified stock pickers' marginally outperforming the 'concentrated stock pickers' during the period. Not surprisingly, the smallest excess returns accrued to the 'closet indexers'.

In Figure 8, we plot the cross-sectional distribution of Active Money levels for the underlying universe at each quarter. We find that there is a reasonably large distance in each inter-quartile range and this provides us with confidence that there is a clear distinction between each quartile.

Active Money and risk

At each quarter end, we consider the rankings of managers in the Australian equity manager universe in terms of Active Money alongside rankings based on Barra ex-ante tracking errors. In Figure 9, we display the rank correlations between Active Money and Barra ex-ante

An analysis of the universe trends based on Barra ex-ante tracking error alone would suggest that Australian equity managers were increasing the 'activeness' of their portfolios from September 2007 to January 2009. However, a study that takes both Barra ex-ante tracking error and Active Money into account would conclude that most managers have moved their portfolios closer to the benchmark and, hence, were aiming to manage and perhaps reduce their risk.

FIGURE 9: *Rank correlations between Active Money and Barra ex-ante tracking error for the Australian universe*

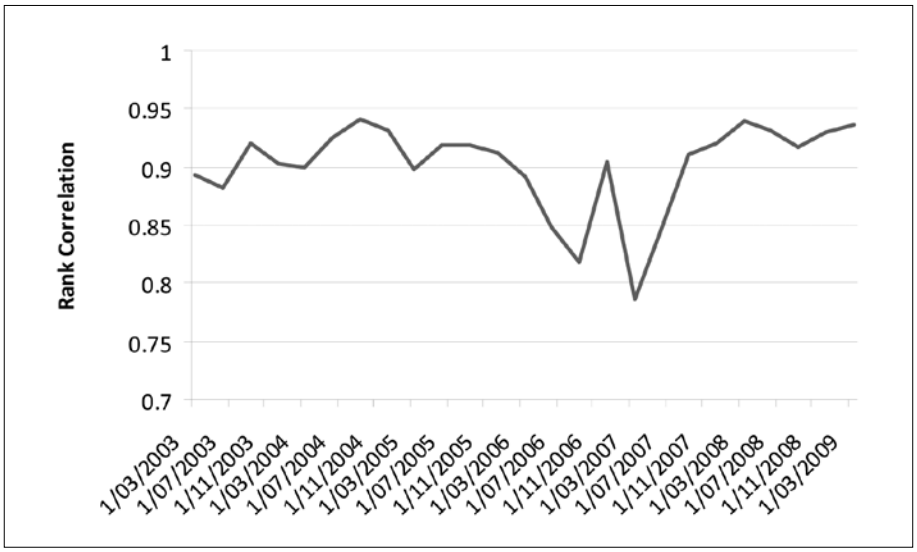
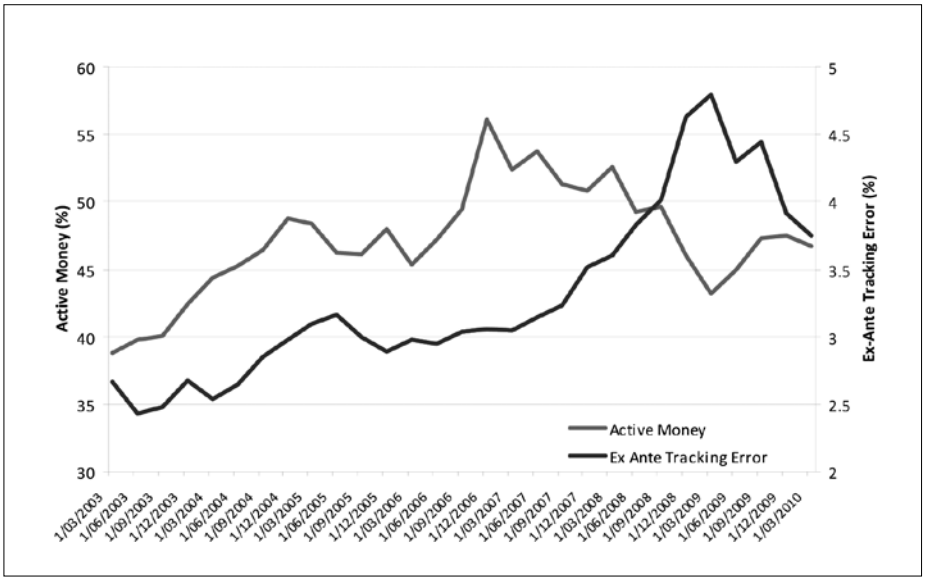


FIGURE 10: *Active Money and Barra ex-ante tracking error*



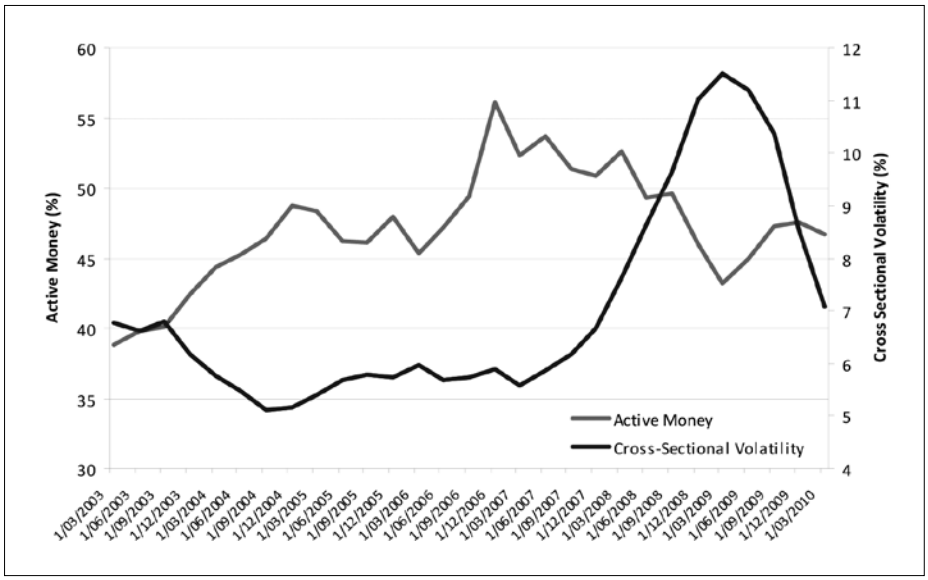
tracking error for the Australian universe over time, with the average rank correlation being 0.9.

The result in Figure 9 is quite striking in the multi-manager context. A major concern for multi-managers is the need to understand the relative risk of manager portfolios, that is, questioning whether Manager A is riskier than Manager B can sometimes be as important as whether Manager A increased its risk with reference to its past. Figure 9 shows that for the former question, Active Money and Barra's ex-ante tracking error give very similar relative rankings over time in the Australian universe.

Even though Active Money and Barra ex-ante tracking error yield high rank correlations, we find that the overall levels of the two measures develop quite differently over time. In Figure 9, we observe that the Australian universe level Active Money peaked at the end of 2006, after which it showed a steady decline, whereas Barra ex-ante tracking error shows an increasing trend from September 2007 onwards. An analysis of the universe trends based on Barra ex-ante tracking error alone would suggest that Australian equity managers were increasing the 'activeness' of their portfolios from September 2007 to January 2009. However, a study that takes both Barra ex-ante tracking error and Active Money into account would conclude that most managers have moved their portfolios closer to the benchmark and, hence, were aiming to manage and perhaps reduce their risk.

These results highlight the importance of evaluating portfolio risk utilising multiple metrics to get a true sense of the key drivers. On closer inspection of the results from September 2007 to January 2009 (see Figure 10),

FIGURE 11: *Active money and cross-sectional volatility*



we can see that the level of cross-sectional volatility in the Australian market increased significantly and had a significant impact on the Barra ex-ante tracking error numbers.

To conclude this section, we find that Active Money is comparable to Barra's ex-ante tracking error as a cross-sectional predictor of rankings (see Figure 11). We show that Active Money can provide risk insights distinct from those gained from Barra's ex-ante tracking error and, hence, we recommend that the study of Active Money trends for a single manager, comparison of managers in a universe and at the universe level be a fundamental component of portfolio analysis.

Summary of findings

In this paper, we review the concept of Active Money and how it can be utilised by investors to measure the level of 'activeness' and the level of risk in investment products.

One of the criticisms emanating from the global financial crisis has been the lack of transparency of funds to investors. This lack of transparency has resulted in investors not being fully aware of the risks to which they were exposed. Active Money allows for increased transparency of a fund's characteristics, while also protecting the proprietary insights of the investment manager.

While Active Money is not a panacea for the limitations of portfolio analysis, it does provide a meaningful addition to the portfolio analysis framework and offers insights that are both complementary and additive to traditional portfolio analytics. We believe that the Australian funds management community would benefit from the disclosure of a fund's Active Money levels on a quarterly basis and should be incorporated in funds' quarterly reporting.

Our key findings are:

- In six of the eight markets we investigated, we find that managers with the highest quartile of Active Money produced the largest subsequent three-month returns. We find this relationship to be strongest in the more diversified markets. However, we find little support for a monotonic relationship between Active Money and subsequent returns.
- For Australian equity fund managers, we find no strong relationship between the level of Active Money or ex-ante tracking error and subsequent performance. These results are contrary to those observed in other markets, however, the results support the notion of no axiomatic relationship between Active Money and subsequent performance.
- For Australian equity fund managers, we find that Active Money levels show a cyclical pattern through time. Interestingly, we find a hierarchical and inverse relationship between Active Money and valuation dispersion.
- Active Money and Barra ex-ante tracking error most often yield similar relative risk rankings. This was evidenced by the high rank correlations between manager Active Money and Barra ex-ante tracking error that were observed across time.
- Active Money trends can provide risk insights distinct from industry standard risk models at the aggregate manager universe level and for comparing managers in a universe, especially when the level of volatility within a market suddenly changes. ■

Notes

1. G. Pandit (2010), '130/30 Long/short Australian equities — squeezing more out of up and down markets', Portfolio Construction Conference, August.
2. J. Eggins (2008), 'Boutique investment managers', Russell Research.
3. M. Cremers and A. Petajisto (2009), 'How active is your fund manager? A new measure that predicts performance', *Review of Financial Studies.*
4. The Herfindahl index, also known as the Herfindahl-Hirschman Index, came about as a measure of the size of firms in relation to the industry, and an indicator of the amount of competition among them. It is defined as the sum of the squares of the market shares of the firms, but is now used more generally to estimate the concentration of any group of entities where the weight of each entity in the group is available. The index values vary between 0 and 1 with higher values indicating higher concentration.
5. It is more likely for a fund to hold a concentrated number of stocks but value weight by market cap within the portfolio to reduce tracking. In this scenario, a naive portfolio holding the largest 20 stocks in Australia value-weighted by market cap would have a lower active share than a similar 20 largest US stocks portfolio, due to the concentration of the Australian market.
6. M. Cremers and A. Petajisto (2009), 'How active is your fund manager? A new measure that predicts performance', *Review of Financial Studies.*
7. Y. Liu and J. Menchero (2008), 'The Barra Australia equity model over different horizons (AUE3S/L)', MSCI Barra Research.
8. Though our choice of tracking error estimate does not allow for a like-for-like comparison of results with the Cremers and Petajisto (2009) paper, it is consistent with their view that the tracking error is a measure, predominantly, of the factor bets taken by a manager. Whereas ex-post tracking error is a result of both stock selection and factor bet performance, Barra's ex-ante tracking error forecast mainly focuses on factor information.
9. Though economically significant, the results are not statistically significant.

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