



Do factors have skills?

Investing using a rules based approach is gaining popularity. It is possible to construct portfolios using various company metrics and price signals, called factors, which outperform over time. For US markets, the length of history of data gives investors some confidence that these factors will outperform over long time periods. For other markets, it is harder to be as confident in the results, because of the scarcity of data. This distinction makes factor choice and portfolio construction more challenging outside US equities.

For investors new to rules based portfolio construction, there are two important questions to consider, first, is there a way in which we can measure if factor portfolios are “skilful”, and second, if they are skilful, to what extent are they a viable alternative to active management? We look at both these questions from the perspective of an Australian equities investor, making our conclusions distinct to the local market.

We start by looking on a broad level at manager skill in Australia.

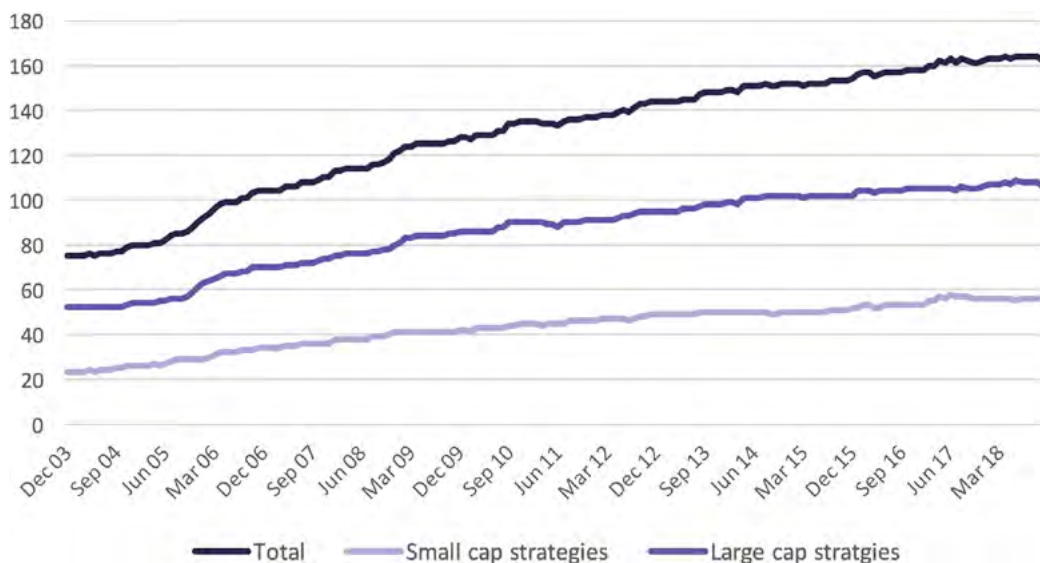
Manager skill in Australia One of the big questions in stock market investing is whether it is possible to beat the market over long periods of time. Of course, a lucky manager might be able to do better than the index for one, two, or even five years, but is it possible to do better for more than a decade, especially after fees are taken into account? In Australia, active managers enjoy a good reputation, with some studies supporting the idea that Australian equity managers can select stocks that do beat the market.

There are limits to the depths with which we can analyse manager performance. Funds open and close, they come with different investment styles that work at different points in the cycle, performance history is not nearly long enough to draw strong conclusions, and often manager investment processes evolve as assets increase. What we can do, however, is look at the managers available to investors right now, and look at their performance characteristics over the last few cycles.¹

Performance statistics

We collected data from the Morningstar database. The data covered 182 different products, some provided by the same asset manager, and 20 of which are no longer active.

Exhibit 1: Number of active Australian equity funds covered by Morningstar



Source: Platypus, Morningstar

The funds are all long only Australian equity funds, grouped according to large/small and value/blend/growth. The average length of track record is 127.8 months (10.7 years), the sample begins in December 2003 and finishes in November 2018. The number of managers increases over time (Exhibit 1).

Of the 75 strategies that existed in 2003, 64 were still in existence in 2018. The number of strategies grouped as small cap have grown about as fast as strategies grouped as large cap. Both Platypus strategies

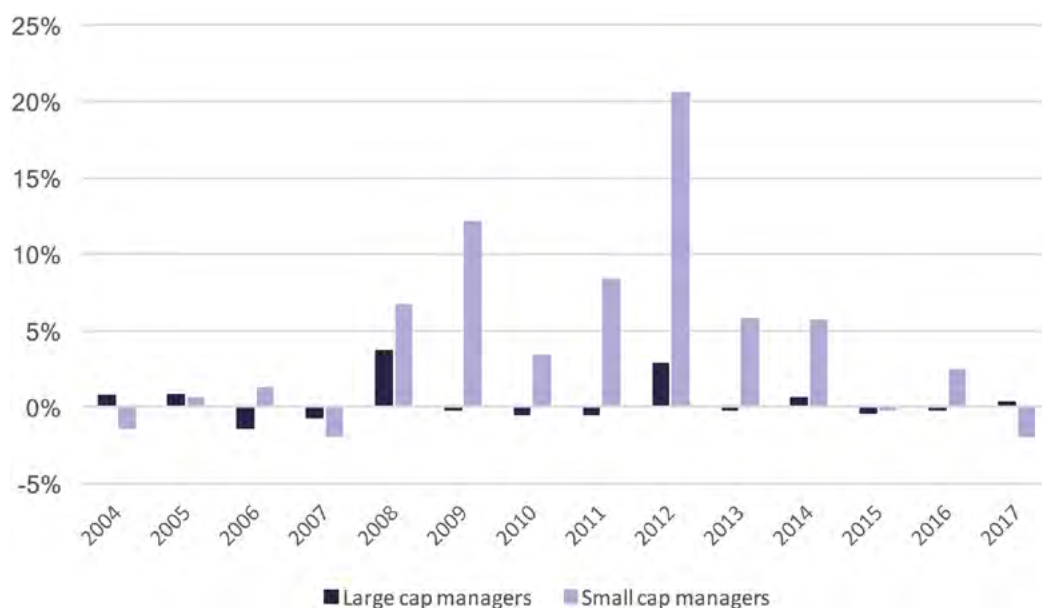
are grouped as large cap - even though both have a small cap bias, we still invest in the largest listed businesses in Australia. The number of strategies available to investors at the time of writing is 182. As an estimate, there are about 300 or so stocks in Australia that are investible for an institution that manages more than a billion or so, showing just how crowded active management in Australia has become. From here, we separate small and large cap managers because they are generally benchmarked against different indices, so focus on different stocks.

Exhibit 2: Average 12 month rolling alpha



Source: Platypus, Morningstar, IRESS

Exhibit 3: Median calendar year alpha



Source: Platypus, Morningstar, IRESS

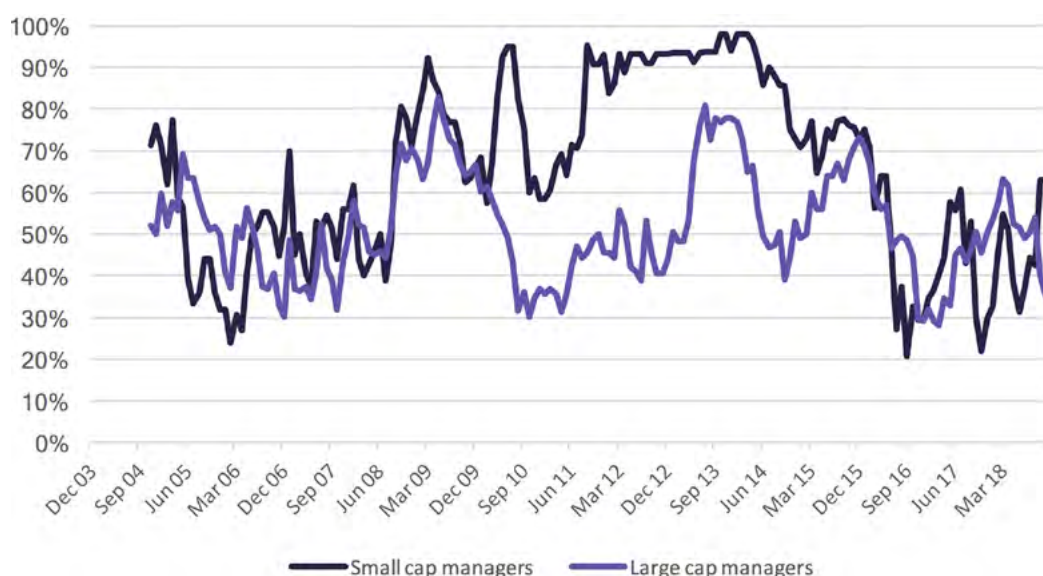
We use the S&P/ASX 200 as a large cap benchmark, and the S&P/Small Ordinaries as a small cap benchmark, both with dividends reinvested. Each month, on average only 50.8% of large cap managers outperform the ASX 200, while 56% of small cap managers outperform the Small Ords. We are trying to measure skill over time, so we look at how well managers do over a 12-month period.²

On this measure, small cap managers add more over the cycle than large cap managers (Exhibit 2 and 3). The average 12-month rolling alpha of small cap managers is 4.57%, and of large cap managers is 0.59%, all before fees and transaction costs. Of course, this is an average, so different managers will contribute positive and negative amounts at different times. The median alpha for each calendar year also shows strong performance by small cap managers (Exhibit 3).

Part of the reason for this might be the construction of the relative indices: the large cap index is more top heavy, with fewer stocks driving the performance of the index, resulting in smaller tracking errors and lower alphas.

We look at the percent of managers at each point in time that outperform on a 12-month rolling basis (Exhibit 4). Three things are interesting about this chart. First, in the final quarter of 2016, cheap stocks rallied strongly, and more expensive, growth stocks declined. During that quarter, an investor could outperform by buying the cheapest stocks as measured by price to book, price to earnings, or price to cash flow – all value metrics worked well.

Exhibit 4: Percentage of managers outperforming on a 12 month rolling basis



Source: Platypus, Morningstar, IRESS

As at November 2018, only 31 managers, or 19%, were characterised as value by Morningstar:

Exhibit 5: Number of managers by style

	Number of managers
Blend	91
Growth	40
Value	31

This implies that some managers with blended strategies have enough value in their portfolios to act as a hedge in markets that punish growth stocks. The second thing of interest is that the period in which the average small cap manager did very well matches the period in which most small cap managers did well – manager performance moved as a group. Paying performance fees in such an environment seems less compelling than if only a few managers outperform. It is hard to argue that a manager possesses unique skill if the rising tide is lifting all boats. Finally, we can speculate that sector exposures helped during that period. Capital Goods (which includes mining services) and Metals and Mining both had large drawdowns (Exhibit 6).

Exhibit 6: GICS Sector weights in S&P/Small Ordinaries



Source: Platypus, IRESS, FactSet

Measuring skill

One of the reasons that indexing is so popular is that it is hard to state categorically that a group of managers, let alone a single manager, has consistent stock picking skill, especially after fees. Investors generally have well-defined views on this topic, and often refer to statistics supporting their position.

One measure we can use to gauge the quality of returns is information ratio, defined as the alpha divided by the tracking error.³ The more alpha a manager can produce relative to risk⁴, the more likely they are to have skill.

Exhibit 7: Average rolling 12 month information ratio



Source: Platypus, Morningstar, IRESS

The average information ratio over the time period for small cap managers is 0.581, and for large cap managers is 0.1 (Exhibit 7). For context, above 0.6 is often considered high for an information ratio.

We can look at performance another way. Let us assume that we have 100 people, each with 100 coins. They are all standing up. We ask them to toss the coin, if it lands on heads, they stay standing, and if it lands on tails, they sit down. After one toss, on average 50 people will remain standing, after two tosses, 25 people will remain standing, and so on. The last person standing does not have any particular skill (we assume no one has cheated) – they are simply lucky. We can apply this logic to managers, and calculate the probability that any single manager from a group of managers will outperform. We assume that each year there is a 50% chance of outperforming.

Exhibit 8: Performance characteristics of active managers

	Small cap	Large cap
Outperforming years	12	12
Total calendar years	14	14
Total managers with 'Total years' track record	17	46
Number of managers with 12 outperforming years	1	1
Probability this is due to luck	19%	43%

Source: Platypus, Morningstar

In the data, only one manager has outperformed for 12 of the last 14 calendar years (Exhibit 8), both in large caps and small caps. Using this 14-year period, the probability that the managers with the best track records are a result of randomness is less than 50% - the best performers might not be random after all.

So, where does this leave us?

Here are the following list of caveats:

The time period is relatively short, beginning in 2003. Analysis with this amount of data is not as robust as that with large datasets.

Only managers that submit their returns to Morningstar are considered.

We take no account of mandate restrictions that might hide stock picking skill. Sometimes, the best ideas don't end up with the largest portfolio weight for reasons other than fundamental conviction.

None of these results take account of fees or tax.

With these in mind, the numbers point to some evidence of skill in small cap managers, and of some skill in large cap managers with long and successful track records.

Factor skill in Australia

We asked these two questions at the start of the article: is there a way in which we can measure if factor portfolios are "skilful" and, if factors are skilful, to what extent are they a viable alternative to active management?

For large caps, given the statistics above, we think factor portfolios can be a viable alternative to active management if they can satisfy:

Have an information ratio above 0.7 on average

Outperform in at least 75% of calendar years

Have an average 12 month rolling alpha of at least 1% before fees

We have set the bar high. We think this is appropriate for anything that is new. Any proposed update has to be clearly better than the status quo; otherwise, there is little reason to change.

At this point, we run into some problems. It is relatively straightforward to back-test a portfolio, and show how it outperforms. However, back-tests that outperform by a large margin seem to be much more common than rich systematic investors. There are many reasons that this might be the case, but one that is clear is that it is difficult to implement factor portfolios well, especially in markets with only a few hundred stocks. There are industry standards (first applied and thought about for US stocks⁵) around portfolio construction for factor portfolios. Generally, systematic investors start with a factor model that they use to guess the outperformance of a list of stocks, they then use another model to estimate risk and any trading costs, and finally they combine the two into a final portfolio. They update the portfolio when new information arrives. One would think that this would be relatively straightforward, but frustratingly for investors, two fund managers that use similar factors can have very different results due to different decisions made in implementation. We think there is as much skill in implementation as there is in factor choice. In this way, estimating whether a simple factor back-test has skill, and comparing with realised fundamental manager track records is not a fair comparison. We should only compare realised track records over the same time period.

Even before we get to implementation, there are other, more fundamental problems. A factor back-test might have a turnover that makes it impossible to implement, and so no manager would be able to commercialise a product using the factor in the first place. A factor might also have biases such as sector or capitalisation, meaning that the factor might simply be making a hidden bet. Choosing to be always overweight Health Care stocks for example would lead to outperformance since 2003, but severe underperformance from 2001-2003. Another problem is that as the number of factors we consider increases, so does the probability of finding one that outperforms. If we look at 500 factors, using the same method we described using coins, there is a 99.8% chance that at least one of them outperforms in at least 85% of calendar years. We think this is actually the main reason there is such a disparity between back-tests and live performance. Often, the best performing factor over a certain historical time period is not the best investment over subsequent periods. To avoid these pitfalls, systematic investors try to only use factors which have an established rationale for existing, whether that be behavioural or economic.⁶

Using back-tests

Having cautioned against the pitfalls of back-tests, we can still go some way to measuring factor skill. We use the ASX 300, and create portfolios of 75 stocks using factors to distinguish between stocks. We use the following factors:

12 month momentum – stocks are ranked in order of past 12 month returns, with the highest ranked stock being the one with the largest prior returns

Price to book – stocks are ranked in order of price to book value, with the highest ranked stock being the one with the smallest price to book

Return on equity – stocks are ranked in order of return on shareholders' equity, with the highest ranked stock producing the highest return on equity

Earnings growth – stocks are ranked in order of sell-side estimated 12 month rolling earnings per share growth, with higher growth getting a higher rank

Size – smaller stocks are ranked higher than larger stocks

We rebalance the portfolios monthly, and weight all stocks equally. We do not take account of any trading costs, or think carefully about implementation. We realise that this would not be the case for any of the managers in the previous section, so for a factor to be skilful, the metrics must be strong.

Exhibit 9: Performance characteristics of factors

	Average 12 month rolling alpha	Average 12 month rolling information ratio	Number of years outperforming (out of 14)
12 month momentum	8.6%	1.15	11
Price to book	-4.6%	-0.48	4
Return on equity	4.1%	0.70	8
Earnings growth	1.4%	0.54	9
Size	-7.6%	-0.57	5

Source: Platypus. Data taken from same time period as used for active managers above (Dec 2003 to Nov 2018)

Going back to our original criteria:

Have an information ratio above 0.7 on average: *Momentum and Return on equity*

Outperform in at least 75% of calendar years: *Momentum*

Have an average 12 month rolling alpha of at least 1% before fees: *Momentum, Return on equity and Earnings growth*

Relative to active management, 12-month momentum stands out (Exhibit 9). On the opposite end of the spectrum, price to book, often used as a measure of a stock's value, has underperformed since 2003, only adding to index returns in 4 calendar years out of 14. These numbers are unique to Australia. Different markets will produce different factor returns, and factor portfolios should be cognisant of local market conditions. It would be a brave asset allocator who invested in a manager that produced a risk reward similar to price to book over the past 14 years.

Implemented portfolios

Exhibit 10: Performance characteristics of large cap factor managers

	Inception date	Average 12 month rolling alpha (before fees)	Average 12 month rolling information ratio	Percentage of outperforming years
Factor manager A	Jul-06	-0.1%	-0.02	45%
Factor manager B	Nov-08	0.7%	0.18	56%
Factor manager C	Nov-05	-0.8%	0.00	33%
Factor manager D	Dec-96	0.3%	0.31	71%
Platypus Systematic Growth	Nov-09	1.4%	0.70	75%
Factor manager E	Sep-09	1.5%	0.25	38%

Source: Platypus, Morningstar

We can compare the results of factor portfolios using the Morningstar data for large cap factor managers (Exhibit 10). We use the full list of available factor based managers in the Morningstar data. Although these numbers are before fees, they include all implementation costs, and are genuinely out of sample. To the best of our knowledge, all these managers use factor models, optimisation and risk control, which separates these numbers from those shown in the back-test data. The average 12-month rolling alpha is 0.5% and the average information ratio is 0.24, compared to 0.59% and 0.15 for the average large cap manager. Using this data set, factor strategies on average add similar amounts of value to fundamental strategies, but at a lower tracking error.

Implemented portfolios

We posed two questions in the introduction:

1. Is there a way in which we can measure if factor portfolios are "skilful" such that we can be confident enough to invest?
2. If they are skilful, to what extent are they a viable alternative to active management?

Using traditional metrics, it depends which factor and to which market you are referring. There are some factors in Australia that work well, and have done so for many decades, and there are some factors for which if investment returns are your objective, the data is not supportive. On most traditional measures, the ones that work well (momentum being the standout), could be called skilful.

As a viable alternative, as a group factor portfolios deliver better risk/reward on average than fundamental portfolios. For investors that are willing to choose the factors most appropriate for the local market, supported by the data⁷, the rewards for factor investing are higher than simply the same returns for lower risk.

1. Cong Chen, Comerton-Forde, C., Gallagher, D. R., & Walter, T. S. (2010). Investment manager skill in small-cap equities. Australian Journal of Management, 35(1), 23–49. <https://doi.org/10.1177/0312896209354216> (<https://journals.sagepub.com/doi/10.1177/0312896209354216>); Bennett, S., Gallagher, D. R., Harman, G., Warren, G. J., & Xi, L. (2016). Alpha generation in portfolio management: Long-run Australian equity fund evidence. Australian Journal of Management, 41(1), 107–140. <https://doi.org/10.1177/0312896214539815> (<https://journals.sagepub.com/doi/10.1177/0312896214539815>)
2. For more information see www.platypus.com.au
3. We use 12-month rolling alpha because some managers do very well when they are small and young, then less well when they are large and old. Taking the average mitigates this effect.
4. Tracking error is defined as the annualised standard deviation of monthly alpha.
5. We acknowledge that this simple measure does not incorporate total portfolio risk. However, all managers under comparison are Australian equity long only managers, so we can use this measure as a way to distinguish between managers.
6. See <https://www.platypusassetmanagement.com.au/news/indexing-and-factor-investing> for some commentary on the differences between the US market and the rest of the world.
7. We would caution against investing in products that have found factors that no one else has heard of before.
8. We have written some thoughts on why momentum works better here than elsewhere. See <https://www.platypusassetmanagement.com.au/news/momentum-in-australia> for more details.

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