portfolio construction CONFERENCE
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# EXCHANGE TRADED FUNDS - A PORTFOLIO CONSTRUCTION TOOL FOR THE NEW REALITY

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*In recent years, investors globally (particularly in the US and Europe) have embraced Exchange Traded Funds (ETFs). Global ETF assets peaked in July 2009 at US$862 billion, with 1,768 ETFs with 3,129 listings, from 94 providers on 42 exchanges around the world*[1] *.With the recent increase in number of ETFs available on the Australian Securities Exchange, Australian investors are now able to gain exposures to a wide range of broad indices using ETFs. This paper shows an Australian investor might use ETFs either strategically or tactically to build more efficient international equity portfolios.*

## RAPID GROWTH OF ETFS

ETFs have fast become very popular, flexible, non-leveraged, non-derivative investment tools, used by both institutional and retail investors for a range of purposes – equitising cash, adjusting portfolio exposures (both long and short) to specific regions or countries, and/or implementing a long-term buy and hold strategy. Their rapid growth has been partly due to their unique structure and features, which afford them several benefits over traditional investments via managed funds, direct stock exposures, futures or swap contracts.

### Key differentiating features

*Cost-effectiveness* - The cost of investing in ETFs is generally lower than most actively managed equity funds and even some equity index funds. For most investors ETFs are much more cost effective than holding the same exposure via individual securities.

*Liquidity* - Due to their unique creation/redemption structures, high or low demand for an ETF is unlikely to affect its market price. If the demand for an ETF rises, new baskets of securities can be created. This process works in reverse if the demand should fall. This ensures the ETF value and price only represent the prices of the shares it holds.

*Accessibility* **-** ETFs can be bought or sold just like shares, traded through investment adviser, brokerage or internet trading accounts.

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[1] ETF Landscape Industry Preview from Barclays Global Investors, August 2009

*Transparency* - ETFs aim to reflect the performance of a broad benchmark index so investors know what they are investing in. Many ETFs also regularly disclose their holdings so exact underlying exposures can be monitored

*Diversification* - Passive investing gives exposure to entire broad indices. By holding a single ETF an investor therefore gains exposure to a broad diversified basket (sometimes many hundreds) of underlying securities.

## A TYPICAL AUSTRALIAN INVESTOR'S INTERNATIONAL EQUITY PORTFOLIO

The two most common benchmarks for Australian investors' international equity portfolios are the MSCI World Index and MSCI World ex-Australia Index. These are both free float-adjusted market capitalisation-weighted indices with exposure to around 23 developed international equity markets and some 1,700 companies. Given the similarity between these two indices, and for simplicity, the MSCI World Index is used as the proxy for the "typical" international equity benchmark for the remainder of this paper.

Australian Investors can readily construct a robust proxy for the MSCI World Index by using ASX-listed ETFs. It is possible, by combining just two ETFs, for an investor to gain immediate, cost effective exposure to a remarkably similar portfolio to that of the MSCI World Index.

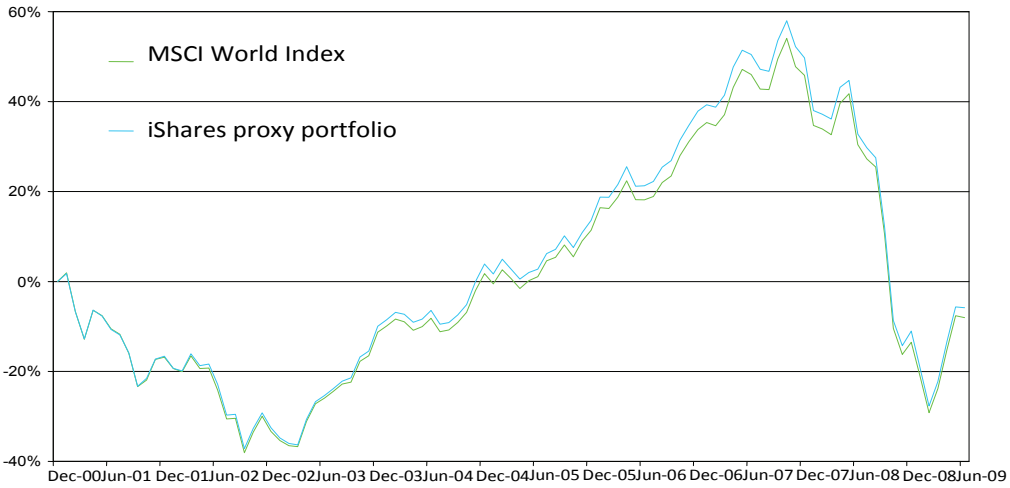
A simple 50:50 initial allocation of funds between an ASX=listed ETF investing in the S&P 500 Index[2] (US large cap) and an ASX-listed EFT over the MSCI EAFE Index[3] (Europe, Australasia and Far East) gives an investor a country exposure very similar to that of the MSCI World Index. Country misweights in the proxy portfolio are caused mostly by the zero exposure to Canada, which accounted for 4.7% of the MSCI World Index as at 30 June 2009.

Despite minor country misweights, the proxy portfolio had a 99.9% correlation of returns to the MSCI World Index from 31 December 2000 to 31 March 2009. Figure 1 highlights just how closely the proxy portfolio replicated the MSCI World Index returns over this period. It outperformed the MSCI World Index (after fees) by 0.28% per annum over the period, with an annualised tracking error of 0.75% per annum.

[2] iShares S&P 500 historical returns. Prior to ASX listing, the underlying US listed fund returns are used.

[3] iShares MSCI EAFE historical returns. Prior to ASX listing, the underlying US listed fund returns are used. Prior to August 2001 (fund inception) Index returns are used instead of live fund data.

Figure 1: Performance of the MSCI World Index vs proxy portfolio ($US)




Source: MSCI and Barclays Global Investors

Given this very high correlation of returns, the analysis assumes that a 50:50 allocation of funds between the S&P 500 ETF and MSCI EAFE ETF will be an appropriate forward-looking proxy for the "typical" or core international equity portfolio for Australian investors.

**CORE/SATELIITE INVESTING**

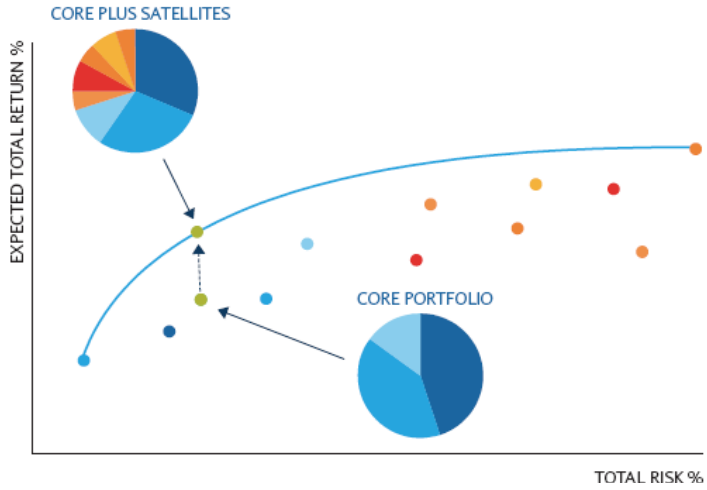
Constructing portfolios around a core/satellite model is not a new concept; large institutional investors have been using this strategy for years. The approach is logical. At the "core" is the diversification and cost efficiency of broad-market ETF index funds. To potentially boost returns, a hand-picked selection of complementary active strategies, country, region or industry exposures and/or individual securities make up the "satellites". This theory, represented in Figure 2, is consistent with Markowitz's mean-variance efficient portfolio theory.

The advantage of this approach is that a portfolio can be tailored to meet very specific risk/return requirements. Before the introduction of ETFs, the cost of gaining exposure to many of these illiquid, less investable satellite countries, regions and markets was prohibitive.

ETFs minimise this problem. They are cost-effective (Management Expenses and Fees starting as low as 0.09% per annum), allowing positions in a range of funds without excessive management fees[4].

[4] A list of ASX listed iShares ETFs and associated fees and expenses is shown in Appendix 1.

Figure 2: Core/satellite investing




## INTERNATIONAL EXPOSURE VIA THE MSCI WORLD INDEX

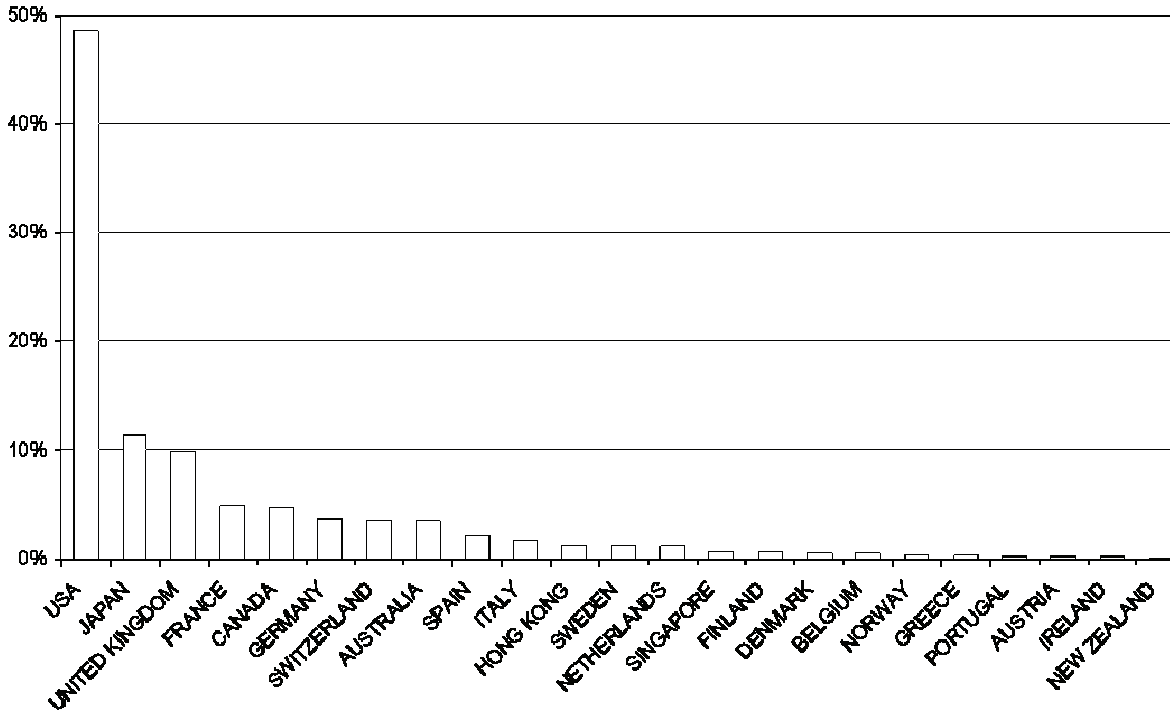
### US equity exposure dominates the portfolio

The core portfolio discussed previously (benchmarked to the MSCI World Index) has approximately 50% of funds allocated to the US large-cap equity market. The returns for most international equity portfolios are therefore influenced largely by the performance of the US equity market. To put this in perspective, the correlation between the returns of the MSCI World Index and the S&P 500 Index was 97% for the eight years to 31 March 2009. Is this an optimal strategic country allocation? When the international equity portfolio is considered purely from a mean-variance efficiency perspective, it seems possible that a 50% allocation to the US large-cap equity market might not be the most efficient country mix available to international equity investors.

### Asian and Emerging Market exposures

Another potential shortfall of the traditional portfolio is the focus on developed equity markets. This leads to a portfolio which is highly concentrated across just a few large countries, as seen in Figure 3. The three largest markets (US, UK and Japan) constitute over 70% of the MSCI World Index. The remaining 20 countries have very small allocations in the benchmark, while many other less developed or emerging markets are not included at all.

Figure 3: Country allocations of the MSCI World Index as at 30 June 2009




Source: MSCI and Barclays Global Investors

**EMERGING MARKET EXPOSURE VIA ETFS**

As can be seen in Figure 4, despite recent poor performance, returns (in US$) to 30 June 2009 of the MSCI Emerging Markets Index[5] have still significantly outperformed the developed international indices since December 2000.

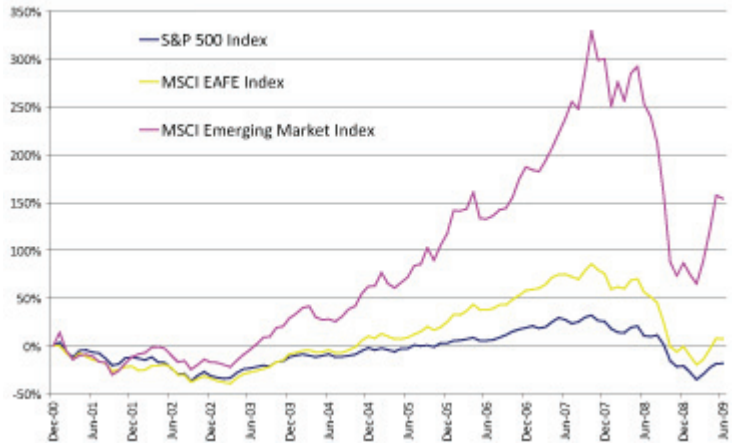
Emerging Asian equity markets are sizable and have experienced accelerated growth over recent years accompanied by improved market liquidity and breadth. Despite this recent growth, especially in China and India, the core portfolio currently offers exposure to the Asia (ex-Japan) region only via an allocation of around 0.5% to Singapore and 1.0% to Hong Kong.

There are also several other rapidly growing, emerging non-Asian equity markets, particularly Russia and Brazil, which have been subject to much discussion regarding their potential to deliver strong

[5] The MSCI Emerging Markets Index is a free float-adjusted market capitalisation index that is designed to measure equity market performance in 22 different global emerging markets

future investment returns. As with the Asian developing markets discussed above, neither Russia nor Brazil is included in the MSCI World Index.

Figure 4: MSCI Emerging Markets Index, the MSCIS&P500 Index and the MSCI EAFE Index ($US)




Source: MSCI and Barclays Global Investors

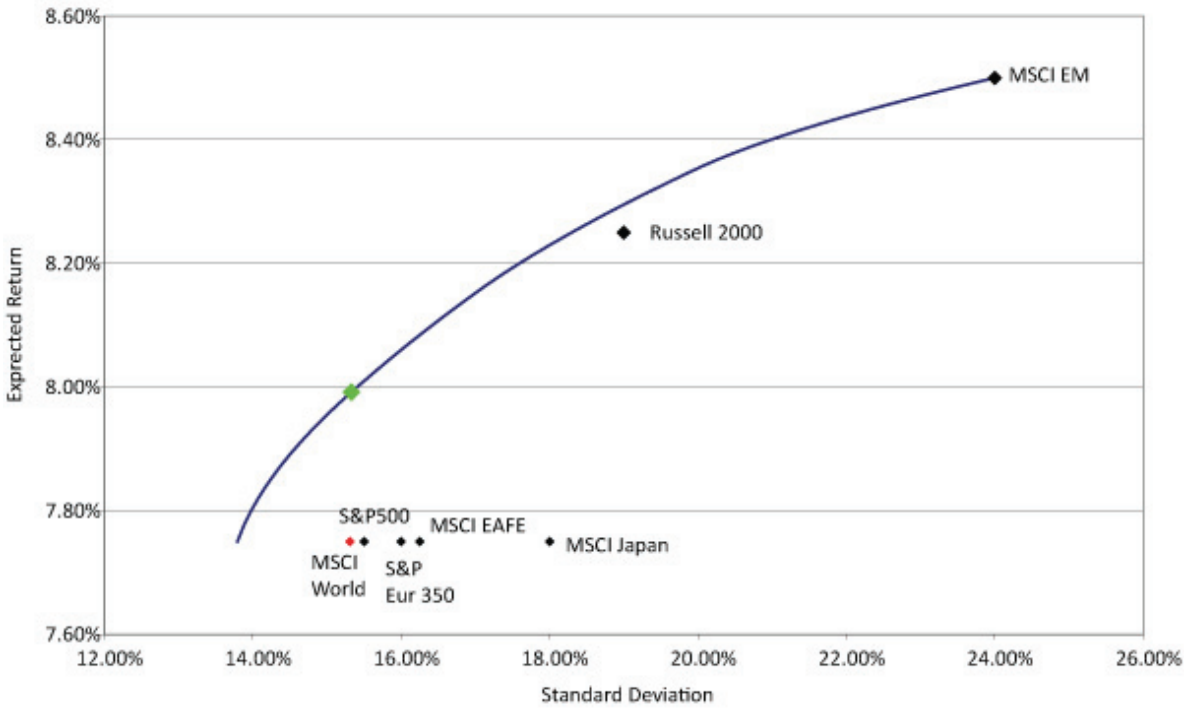
In the past, gaining exposure to many of these less developed equity markets was costly and difficult, if not impossible, especially for investors with smaller portfolios. This was largely due to lack of liquidity in the underlying markets, foreign investment restrictions in certain countries, political and regulatory instability and prohibitive transaction costs. ASX-listed ETFs allow investors to gain quick, simple, cost effective access to emerging market equities, overcoming many of the barriers to entry.

## LONG-ONLY PORTFOLIO OPTIMISATION

Using portfolio optimisation software, AND long-term forward-looking expectations of return and risk as detailed in Appendix 1, the efficient frontier in Figure 5 was constructed. The frontier shows a spectrum of theoretically optimal long-only portfolios available by combining six regional and country specific ETFs. The resulting frontier suggests that a theoretically optimal portfolio (shown as the light green point on the efficient frontier) might deliver a return of 0.25% per annum above the MSCI World Index, while incurring no additional volatility.

Substituting other long-term expectations will no doubt yield different optimal allocations to those presented here, but the framework presented should nonetheless be a very useful tool as part of the portfolio decision-making process.

Figure 5: Long-only international equity efficient frontier with long-term expected returns




Note: Refer Appendix 1 for the long-term risk/return forecasts and correlations used in this analysis.

Figure 6 – Optimal long-only portfolio allocations with long-term expected returns

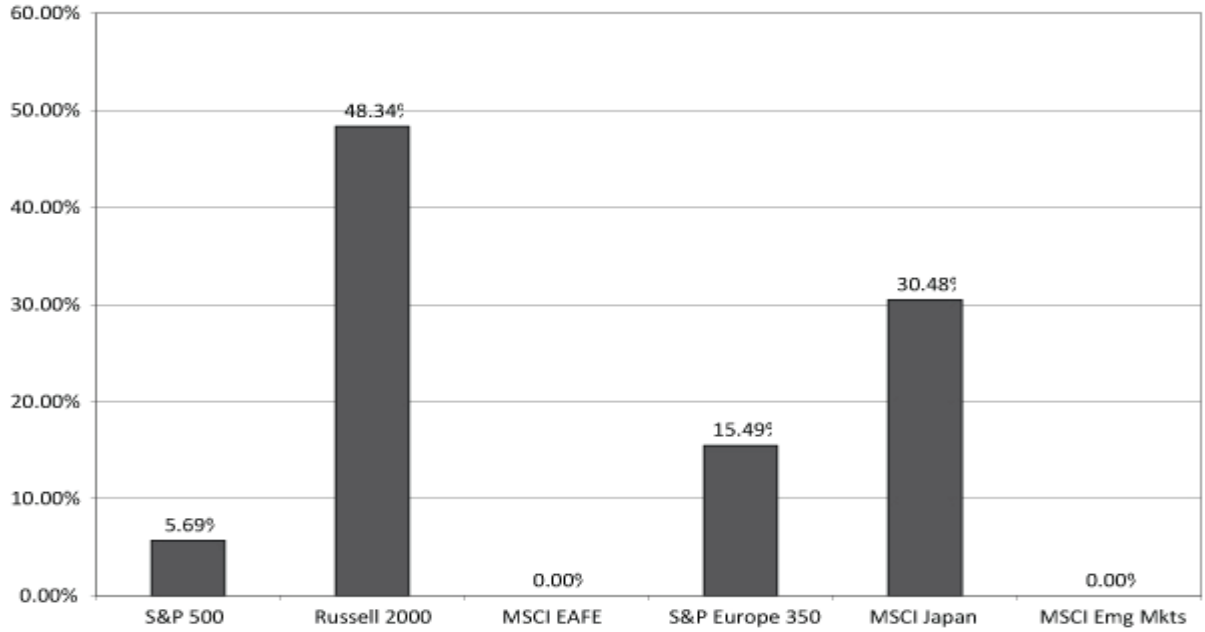


Figure 6 shows the asset mix of the optimal portfolio represented by the light green point on the efficient frontier in Figure 5. This is the portfolio available at the same risk level as the MSCI World Index, given the assumptions outlined in Appendix 1.

The resulting optimal portfolio looks quite different to the earlier MSCI World proxy portfolio at first glance, with an allocation of approximately 50% to a broader US equity exposure that also captures small caps and the remainder split across a mix of European and Japanese markets. This portfolio can be obtained by purchasing four ASX-listed ETFs, with total Management Expenses and Fees (MEF) of 0.37% per annum.

The results of the long-only portfolio construction example above, perhaps unsurprisingly, favour those investments with higher expected returns for a given level of risk (e.g. Russell 2000 ETF), and those with lower correlations to the returns of other assets (e.g. MSCI Japan ETF).

## EXPRESSING SHORT/MEDIUM-TERM VIEWS – TACTICAL ASSET ALLOCATION

As a general rule, riskier markets would be expected to deliver a higher return (or risk premium), commensurate with their additional volatility over the long horizon. If this relationship was not expected to hold over the longer term, investors would not allocate funds to those riskier assets.

Over shorter time horizons, asset returns will deviate from long-run expectations, with specific markets outperforming or underperforming relative to others over shorter periods. These deviations from fair value can present investors with opportunities to take advantage of short-term mispricings, by over (under) weighting those markets which are undervalued (overvalued) – in other words, Tactical Asset Allocation (TAA). Of course, the investor must have the skill to forecast which markets will deliver returns, and which will languish - by no means an easy task.

### Implementing TAA – long-short portfolio optimisation

If an investor has skill in forecasting which markets will outperform (or underperform) relative to others, then they may wish to tactically position their portfolio to take advantage of these short-term price deviations. For those markets expected to outperform, it is easy for an investor to capitalise on this information, by simply allocating additional funds to overweight a region or market. For markets expected to perform poorly, a traditional long-only investor can simply choose to underweight these assets, or not invest in them at all.

With ETFs, an investor can now, quickly, simply and cost-effectively, use negative information with higher conviction, by taking a short position[6] in an entire country or region in just a single trade. This long-short portfolio construction framework is generally recognised as a more efficint methodology when pursuing actively managed strategies.

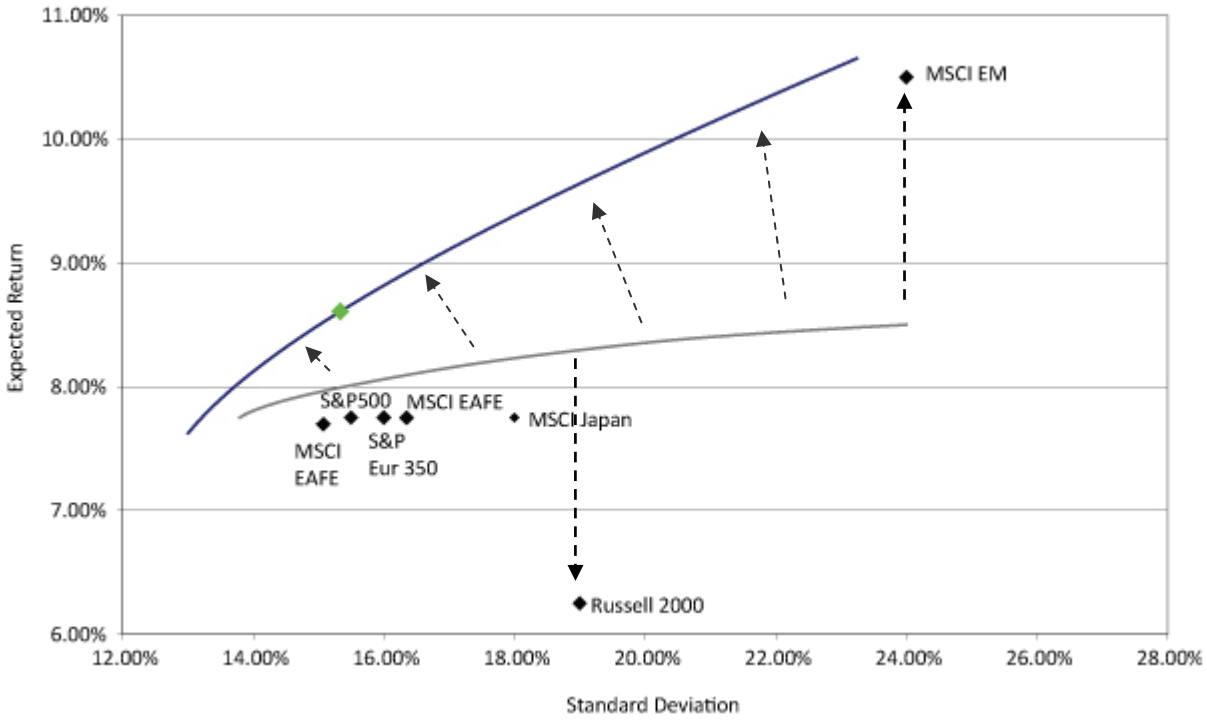
[6] For a more detailed description of long-short portfolio construction theory, see Appendix 2.

To demonstrate how this might work in practice, the previous case study is repeated under a revised scenario. Expectations for the broad core portfolio (that is, the S&P 500 Index & MSCI EAFE Index) remain unchanged, but short term expectations for one satellite region, Emerging Markets, are that it will outperform long-term expectations by 2% per annum. Another satellite region, US Small Caps, is expected to underperform long-term expectations by 2% per annum. Standard deviation and correlations between asset returns remain unchanged from the prior example, as outlined in Appendix 1. In addition to adjusting market return expectations to include these expected short-term mispricings, the portfolio is also allowed to take short positions of up to 10% in any single fund.

This partial long-short framework allows an unconstrained portfolio construction process to better take advantage of negative information on relative returns of specific countries, regions or sectors.

Figure 7 shows the resulting efficient frontier (dark blue) under these new expectations and constraints. The result of allowing modest short positions in the relatively less attractive markets is a more efficient set of portfolios along the new frontier. Unsurprisingly, this new frontier is therefore above the previous frontier, due in part to the higher expected return for Emerging Markets and also due to the ability to now take short positions in those relatively less attractive regions.

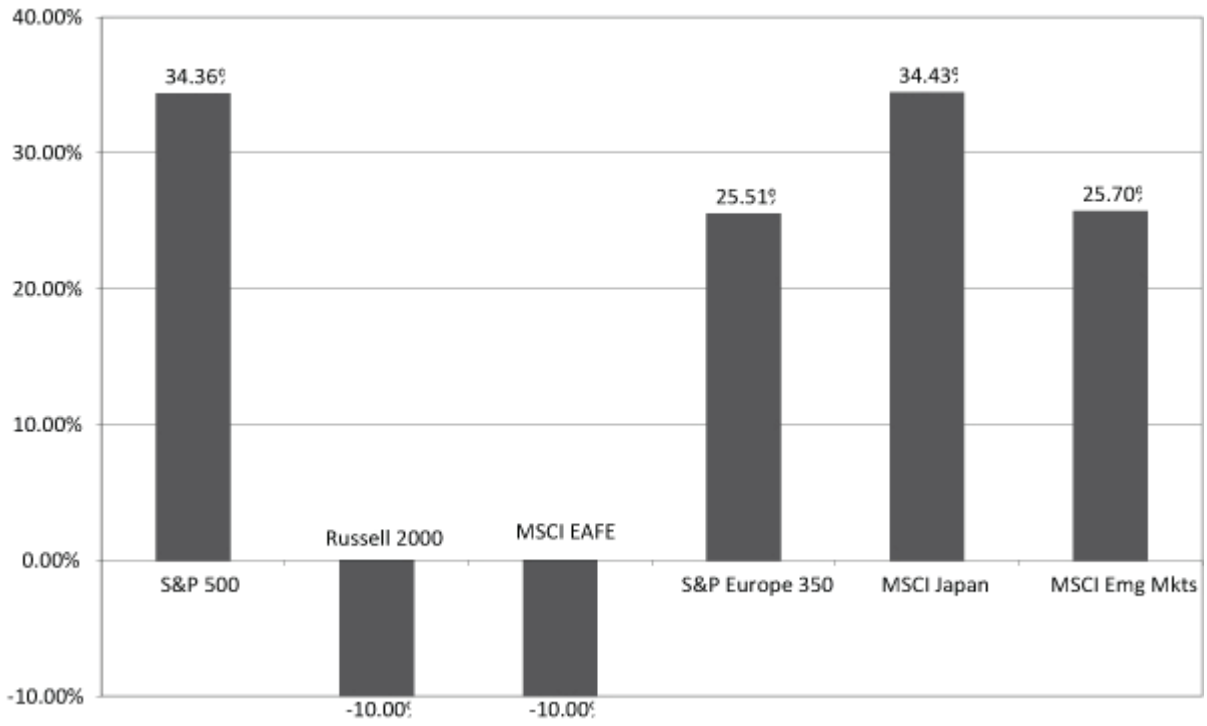
Figure 7: Long-short international equity efficient frontier with short-term mispricings




Note: Refer Appendix 1 for the long-term risk/return forecasts and correlations used in this analysis.

Figure 8 shows the asset mix of the new optimal portfolio, represented by the green point on the efficient frontier graph in Figure 7. Given the revised expectations and the more efficient partial long-short portfolio construction, this new optimal portfolio is expected to outperform the MSCI World Index by around 0.85% per annum, while incurring no additional portfolio volatility.

Figure 9: Optimal long-short portfolio allocations with short-term mispricings




**A PORTFOLIO CONSTRUCTION TOOL FOR THE NEW REALITY**

Due to the rapid recent increase in the number of ASX-listed ETFs, Australian investors are now able to more easily and effectively implement precise portfolio ideas. The illustrative case studies presented here are intended to highlight just a few applications of ETFs within a diversified investment portfolio – from cost effective strategic portfolio construction, equitising cash in a portfolio, or implementing tactical positions. As the suite of local products continues to grow, and the local familiarity and comfort with these products increases, we can expect Australian investors to embrace ETFs in a similar manner to their counterparts elsewhere around the globe.

## APPENDIX 1 – REGION AND COUNTRY RISK/RETURN AND CORRELATION ASSUMPTIONS

The results of the optimisation techniques used in this paper are highly sensitive to the input values for sub-portfolio returns, volatilities and correlations. If expectations for any of these variables differ from these placeholder assumptions, resulting efficient portfolios will also differ.

Figure 10: Risk and return assumptions for the long-only portfolio analysis

| Asset Class | Return | Risk | Benchmark |
|---|---|---|---|
| US Large Cap | 7.75% | 15.50% | S&P 500 |
| US Small Cap | 8.25% | 19.00% | Russell 2000 |
| Developed non-US | 7.75% | 16.25% | MSCI EAFE |
| Europe | 7.75% | 16.00% | S&P Europe 350 |
| Japan | 7.75% | 18.00% | MSCI Japan |
| Emerging Markets | 8.50% | 24.00% | MSCI Emg Mkts |
| *Typical* International Investor | 7.75% | 15.31% | MSCI World |

Figure 11: Return correlation assumptions for underlying regional and country indices

| | S&P 500 | Russell 2000 | EAFE | Eur 350 | Japan | Emg Mkt |
|---|---|---|---|---|---|---|
| S&P 500 | 1.00 | 0.83 | 0.86 | 0.85 | 0.42 | 0.80 |
| Russell 2000 | 0.83 | 1.00 | 0.79 | 0.76 | 0.46 | 0.80 |
| MSCI EAFE | 0.86 | 0.79 | 1.00 | 0.97 | 0.64 | 0.82 |
| S&P Europe 350 | 0.85 | 0.76 | 0.97 | 1.00 | 0.42 | 0.77 |
| MSCI Japan | 0.42 | 0.46 | 0.64 | 0.42 | 1.00 | 0.53 |
| MSCI Emg Mkts | 0.80 | 0.80 | 0.82 | 0.77 | 0.53 | 1.00 |

Historical correlations between underlying indices were used as estimates for forward-looking expectations. Index cross correlations were calculated and compared for various time periods. These remained remarkably stable over 18 months, three years, five years and seven years to 30 June 2007. The longest available full data series (July 2000 to June 2007) was used as the forward-looking correlation expectations for the underlying sub-indices.

Figure 12: Revised short-term return assumptions for underlying regional and country funds

| Asset Class | Return | Risk | Benchmark |
|---|---|---|---|
| US Large Cap | 7.75% | 15.50% | S&P 500 |
| US Small Cap | 6.25% | 19.00% | Russell 2000 |
| Developed non-US | 7.75% | 16.25% | MSCI EAFE |
| Europe | 7.75% | 16.00% | S&P Europe 350 |
| Japan | 7.75% | 18.00% | MSCI Japan |
| Emerging Markets | 10.50% | 24.00% | MSCI Emg Mkts |
| *Typical* International Investor | 7.75% | 15.31% | MSCI World |

Figure 13: Management Expenses and Fees (MEF) assumptions

| ETF | ASX Code | MEF |
|---|---|---|
| iShares S&P Asia 50 | IAA | 0.50% |
| iShares MSCI BRIC | IBK | 0.72% |
| iShares MSCI Emerging Markets | IEM | 0.72% |
| iShares S&P Europe 350 | IEU | 0.60% |
| iShares MSCI Hong Kong | IHK | 0.52% |
| iShares S&P MidCap 400 | IJH | 0.20% |
| iShares MSCI Japan | IJP | 0.52% |
| iShares S&P SmallCap 600 | IJR | 0.20% |
| iShares MSCI South Korea | IKO | 0.63% |
| iShares S&P Global 100 | IOO | 0.40% |
| iShares Russell 2000 | IRU | 0.20% |
| iShares MSCI Singapore | ISG | 0.52% |
| iShares MSCI Taiwan | ITW | 0.63% |
| iShares MSCI EAFE | IVE | 0.34% |
| iShares S&P 500 | IVV | 0.09% |
| iShares S&P Global Consumer Staples | IXI | 0.48% |
| iShares S&P Global Healthcare | IXJ | 0.48% |
| iShares S&P Global Telecommunications | IXP | 0.48% |
| iShares FTSE/Xinhua China 25 | IZZ | 0.74% |

***Brokerage*** - It should be remembered that ETF transactions will also result in brokerage commissions on each trade executed. The amount of brokerage paid will vary, depending on the broker used and the type/level of service offered by that broker.

***Bid/Ask Spread*** - The cost of acquiring the underlying securities for the fund is included in the ETF's own bid/ask (buy/sell) spread. The bid/ask spread for a stock is the difference between the price available for an immediate sale (bid) and an immediate purchase (ask).

***Short Selling*** **-** Standard margin rules apply and investors can sell ETFs short and do it on a downtick (unlike ordinary stocks, which are limited to uptick short sale only). There will be costs associated with short selling ETFs, which will vary depending, among other things, on the institution lending the stock, the characteristics and availability of the stock being borrowed.

## APPENDIX 2 – LONG-SHORT PORTFOLIO CONSTRUCTION

Traditionally, investment managers constructed portfolios by taking long positions in investments they believed would outperform their broad index benchmark. A long-only investor will hold a portfolio that is constructed by allocating capital across their preferred investments from the universe of available investment choices. The maximum allocation to any single investment in a long-only framework is 100% of the portfolio's value and the minimum investment is zero. The most aggressive negative stance a traditional long-only investor can therefore take in their portfolio is to choose not to invest in a particular security. This introduces the long-only constraint, which is particularly binding when the investment in question accounts for just a small portion of the overall benchmark.

For example, consider the case of an international equity investor with an MSCI World benchmark who forecasts that the Singapore equity market will underperform the broad index in the coming period. The most aggressive stance that this long-only investor may take is not to invest in the Singapore region. This however will not have a dramatic effect on total portfolio return relative to the broad MSCI World benchmark, given Singapore accounts for just 0.5% of the MSCI World benchmark. Even if Singapore was to underperform the broad benchmark by 10% over a particular period, the overall portfolio would outperform the broad MSCI World benchmark by just 0.05%.

Long-short portfolio construction was first introduced to the institutional investor community in the late 1980s. As the name implies, long-short investors will take both long positions that are expected to increase in value as well as short positions that are expected to decrease in value. Taking short positions involves selling securities that you do not actually own with the aim of buying them back at a later point for a lower price. This therefore enables an investor to make money from a falling investment and thus make better use of negative information.

It is often therefore argued that that long-short strategies are able to make more efficient use of an investor's capital than long-only investing. This is because negative opinions regarding investments can be fully reflected when constructing portfolios, regardless of benchmark weights. For example, in the above example, the long-short investor could take a short position of 5% in the iShares MSCI Singapore fund. If the MSCI Singapore Index then underperformed the MSCI World Index by 10% over a particular period, the overall portfolio would outperform the broad MSCI World benchmark by 0.55% as a result of the short position.

Despite the simplicity of the above example there are many practical difficulties with managing long-short portfolios. These include the difficulties of estimating and hedging the many risks to which a portfolio is exposed, and the requirement to manage unsuccessful short positions in an active manner. Short positions that are losing money grow to become an increasingly large part of the portfolio, and their price can increase without limit.

Possibly the most difficult decision however is successfully predicting those investments that will perform better than others. Most investors grossly underestimate the difficulty of this task.