Australian National University

ANU Student Managed Fund

Asset allocation recommendation: Semester 2, 2021

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Contents

Glossary

AA – Asset allocation
AC – Australian Cash
AE – Australian Equities
AAA – BetaShares Australian High Interest Cash ETF
AAE – Active Australian Equities
AFI – Australian Fixed Income
ANU – The Australian National University
AUD or A$ – Australian dollar
CF – Cash flow
CMT – Cash management trust
CPI – Consumer Price Index
EM – Emerging Markets
EM,U – Emerging Markets, Unhedged
DM – Developed Markets
DM,U – Developed Markets, Unhedged
DM,H – Developed Markets, Hedged
FAANG – Facebook, Amazon, Apple, Netflix and Google
GDP – Gross Domestic Product
IEM – iShares MSCI Emerging Markets AUD ETF
OECD – Organisation for Economic Co-operation and Development
PE – Price to earnings
RBA – Reserve Bank of Australia
ROE – Return on equity from existing operations
ROER - Return on equity from reinvestment
SMF – Student Managed Fund
SRI – Socially Responsible Investment
VGB – Vanguard Australian Government Bond Index ETF

1 Asset allocation recommendation

The Asset Allocation (AA) team of the Student Managed Fund (SMF) recommends a change to the target strategic asset weights involving adding +10% in Emerging Market equities (EM), funded by decreases of -5% in Australian Equities (AE) and -5% in Developed Market equities (Unhedged) DM,U. Adding EM would be the first allocation to an asset class outside of those included in the reference portfolio.

1.1 Proposed target weights

The following changes are being proposed to the SMF's target strategic asset allocation:

- Add an EM target weighting of 10% (effectively an overweighting of +10% versus the reference portfolio) by purchasing the iShares MSCI Emerging Markets AUD ETF (IEM).
- Decrease the AE target weighting from 60% to 55% (an underweighting of -5% versus the reference portfolio) by selling the iShares Core S&P/ASX 200 ETF (IOZ).
- Decrease the DM,U target weighting from 10% to 5% (an underweighting of -5% versus the reference portfolio) by selling the Vanguard MSCI Index International Unhedged ETF (VGS).

The proposed asset allocation change shifts the weightings within the growth portion of the AA portfolio, leaving the growth/defensive target weight at 80%/20% in line with the reference weights. The structure of the defensive portion of the portfolio remains unchanged, with target weights of 7.5% (-7.5% versus the reference weights) in Australian Fixed Income (AFI) and 12.5% (+7.5%) in Australian Cash (AC). Modelling by the AA team indicates that AC outperforms AFI in the high and medium inflation scenarios and the stagflation scenario, to which the AA team attach a significantly greater probability (combined 85.5%) relative to the low inflation and crisis scenarios. Nonetheless, the AA team sees diversification benefits in holding both AC and AFI in the portfolio and leaving the current defensive weightings unchanged (see Section 3.2 for further discussion).

Figure 1: Portfolio Weights

Asset classes	Reference portfolio	Current portfolio 1 Oct, 2021	Deviation vs. reference portfolio	Proposed target portfolio	Deviation vs. reference portfolio
Australian Equity	**60%**	**60.7%**	**+0.7%**	**55%**	**-5%**
AE (AAE portfolio)	50%	55.2%	+5.2%	50%	+0%
AE (AA portfolio)	10%	5.5%	-4.5%	5%	-5%
International Equity	**20%**	**19.5%**	**-0.5%**	**25%**	**+5%**
DM,H	10%	9.2%	-0.8%	10%	+0%
DM,U	10%	10.3%	+0.3%	5%	-5%
EM,U	0%	0%	+0%	10%	+10%
Australian Fixed Income	**15%**	**6.1%**	**-8.9%**	**7.5%**	**-7.5%**
Australian Cash (including accruals)	**5%**	**13.7%**	**+7.7%**	**12.5%**	**+7.5%**
TOTAL	**100%**	**100%**	**0%**	**100%**	**0%**

1.2 Key metrics

Figure 2 presents projected 10-year real returns for each asset. Figure 3 reports changes in real portfolio value and selected portfolio metrics over 10 years for the reference, current and proposed portfolios, allowing for a 4.5% distribution at the end of each year. These indicate the extent to which the objective of maintaining the real portfolio value and hence the distribution is attained, noting that a negative change implies that both are declining in real terms. Discussion of these estimates and the underlying assumptions appears in Sections 2 and 3.

Figure 2: Asset class expected real returns under 11 scenarios

Scenarios				10-year expected real return under 11 scenarios				
No.	Inflation	Growth / potential	Probability	Australian Equities	Developed Markets	Emerging Markets	Australian Fixed Income	Australian Cash
1	High	High	7%	3.71%	3.57%	5.56%	-1.99%	0.14%
2	High	Medium	18%	1.52%	0.93%	2.54%	-2.19%	-0.54%
3	High	Low	16%	-1.95%	-1.67%	0.85%	-2.80%	-1.08%
4	Medium	High	9%	5.50%	5.67%	8.99%	-0.92%	-0.35%
5	Medium	Medium	20%	3.35%	3.53%	6.46%	-1.39%	-0.80%
6	Medium	Low	12%	2.33%	1.26%	4.74%	-1.61%	-1.25%
7	Low	High	4%	7.40%	7.01%	8.96%	-0.03%	-1.04%
8	Low	Medium	6%	4.42%	4.26%	6.88%	-0.53%	-1.36%
9	Low	Low	4%	1.65%	1.45%	3.66%	-0.84%	-1.68%
10	Stagflation	Stagflation	3.5%	-6.26%	-6.51%	-3.29%	-3.17%	-0.82%
11	Crisis	Crisis	0.5%	-4.26%	-2.89%	-4.33%	-0.49%	-1.52%
Probability-Weighted			**100%**	**2.39%**	**2.21%**	**4.79%**	**-1.69%**	**-0.82%**

Figure 3: Expected real portfolio value after 10 years (allowing for distributions)

Scenarios				Expected change in real portfolio Value (% p.a.)		
No.	Inflation	Growth / potential	Probability	Reference portfolio	Current portfolio	Proposed portfolio
1	High	High	7%	-1.97%	-1.79%	-1.63%
2	High	Medium	18%	-3.79%	-3.67%	-3.54%
3	High	Low	16%	-6.38%	-6.23%	-6.00%
4	Medium	High	9%	-0.41%	-0.37%	-0.05%
5	Medium	Medium	20%	-2.14%	-2.10%	-1.81%
6	Medium	Low	12%	-3.22%	-3.18%	-2.91%
7	Low	High	4%	1.03%	0.93%	1.12%
8	Low	Medium	6%	-1.29%	-1.37%	-1.11%
9	Low	Low	4%	-3.48%	-3.55%	-3.34%
10	Stagflation	Stagflation	3.5%	-9.81%	-9.59%	-9.34%
11	Crisis	Crisis	0.5%	-7.61%	-7.69%	-7.75%
Probability-Weighted			**100%**	**-3.24%**	**-3.17%**	**-2.95%**
Year 10 Real Portfolio Metrics						
Expected Portfolio Value				0.736	0.741	0.759
Probability of Shortfall				96%	96%	96%
Expected Shortfall				-26.81%	-26.28%	-24.60%
Expected Utility				-0.686	-0.666	-0.614

Note: Shortfall is measured relative to a target of maintaining the real value of the portfolio after distributions.

1.3 Implementing the allocation

The AA team proposes that the changes in allocation are implemented as follows:

- Purchasing IEM holdings equal to 10% of the SMF portfolio
- Selling IOZ equal to 5% of the SMF portfolio
- Selling VGS equal to 5% of the SMF portfolio

Note that the current target portfolio weighting of 60% in AE is divided into two components, with 50% being allocated to the Active Australian Equity (AAE) component and 10% assigned to AA. The proposed 5% sale of AE is to come from the AE allocation budgeted to AA. This will leave the AE holdings substantially invested in the AAE component, with less than 1% remaining in the AA component based on current portfolio weights.

Figure 4 outlines the effect of the proposed trades, which will leave some small deviations from target weights. It is proposed that the Fund Convenor moves the overall portfolio towards the target weights by selectively trading holdings to fund the 4.5% distribution for 2021, subject to not completing smaller trades of less than 0.5% of the portfolio value to minimise the negative effects of brokerage costs. In the interim, the Fund will remain relatively overweight in growth assets and underweight in defensive assets (current deviation 1.2%), subject to market movements impacting on the weights.

Figure 4: Proposed asset allocation after implementation

Asset classes	Current portfolio 19 Sept, 2021	Proposed target weights	Proposed trades	Portfolio weights after trades	Interim portfolio weights vs. target
Australian Equity	**60.7%**	**55%**	**-5%**	**55.7%**	**+0.7%**
AE (AAE portfolio)	55.2%	50%	0%	55.2%	+5.2%
AE (AA portfolio)	5.5%	5%	-5%	0.5%	-4.5%
International Equity	**19.5%**	**25%**	**+5%**	**24.5%**	**-0.5%**
DM,H	9.2%	10%	0%	9.2%	-0.8%
DM,U	10.3%	5%	-5%	5.3%	+0.3%
EM,U	0.0%	10%	+10%	10%	+0.0%
Australian Fixed Income	**6.1%**	**7.5%**	**0%**	**6.1%**	**-1.4%**
Australian Cash (including accruals)	**13.7%**	**12.5%**	**0%**	**13.7%**	**+1.2%**
TOTAL	**100%**	**100%**	**0%**	**100%**	**0%**

2 Rationale for the recommendation

This section articulates the reasoning behind the proposal to reallocate 10% of the Fund's portfolio weighting to EM, funded through a 5% reduction in AE and a 5% reduction in DM,U.

EM offer higher returns compared with AE and DM over the SMF's 10-year investment horizon, thus helping to achieve the Fund's return objective of inflation plus 4.5% (see Section 1.2 above). The AA team portfolio construction model shows EM outperforming both AE and DM in all but the crisis scenario and offering a probability-weighted expected real return of 4.79% versus 2.39% for AE and 2.21% for DE. The difference in horizon returns is largely attributable to the divergence in forward PEs, with EM modelled to be trading at 13.90x, AE at 17.70x and DM at 19.85x on a

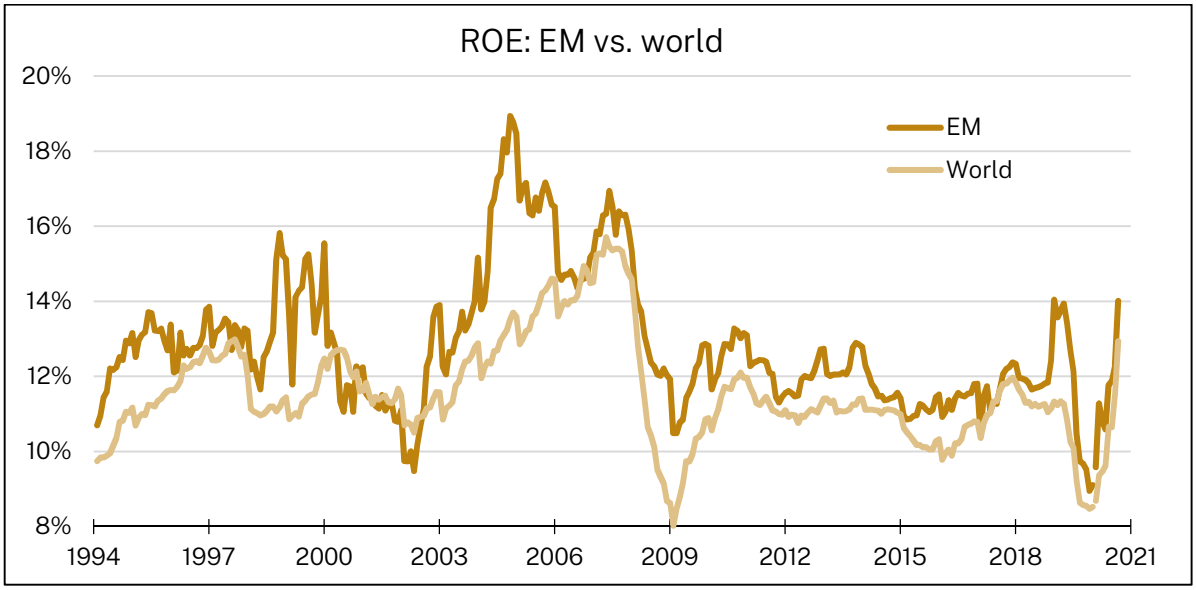
forward basis (see Figure 27 in Appendix E). We provide evidence below that the EM PE discount is not due to low corporate profitability and thus a poorer outlook for value generation.

The AA team investment thesis is that the EM PE discount and associated higher expected return reflects risk premia related to a range of factors including greater short-term volatility, illiquidity, ESG considerations and political risk. As the SMF is better able to bear some of these risks than the market given its long-term investment horizon, in particular short-term volatility and illiquidity, an opportunity is provided for the Fund to prudently capture higher returns to help meet its long-term objectives. We are also willing to bear idiosyncratic political risk, while noting the existence of geopolitical forces that might prove systemic. EM may also bring exposure to certain factors that matter to the SMF, specifically currency fluctuations, ESG considerations and portfolio concentration, thus indicating a need to limit the weighting.

2.1 EM PE reflects potential for strong returns on capital

Before discussing some of the risks, it is important to establish that the relatively low PE multiple for EM is not driven by a poor outlook for cash flows and value generation. If this were the case, it might be revealed by relatively low returns on capital. To the contrary, the ROE of EM has tracked above that for the Datastream Total World series over the past 20 years (see Figure 5).

Figure 5: Return on equity of Emerging Markets versus world equities



Higher ROEs can be the result of either greater profitability or higher leverage. Our investigations suggest that greater leverage is not the driver of EM's relatively strong ROE. In 2020, net leverage for EM companies decreased slightly due to conservative corporate behaviour and a focus on deleveraging, while leverage ratios of European and American companies increased on average by about 1.5x. This implies that leverage in EM is trending lower than in DM, which a report by Lazard Asset Management forecasts to continue (Lazard Asset Management, 2021). If stronger underlying profitability is the driver of the high ROE for EM, then this can combine with higher prospective growth arising from continued strengthening of institutions and rising GDP per capita to fuel earnings growth while creating value for shareholders.

2.2 Volatility

EM is a volatile asset class, demonstrated by the standard deviation of US$ returns being approximately one third higher than DM over the last 10 years (see Figure 6). The relationship of higher volatility appears to be structural, with EM US$ returns being significantly more volatile than DM (see Figure 6). This is a result of EM's developing status and greater economic sensitivity,

including to global trade. The AA team contends that market concern over short term volatility is contributing to the additional risk premia and hence the PE discount for EM. The SMF's long-term horizon means it is better able to bear volatility over the short run.

Figure 6: Standard deviation of 12-month rolling international index returns

Currency	US dollar		Australian dollar		Local currency	
Index	MSCI World	MSCI EM	MSCI World	MSCI EM	MSCI World	MSCI EM
September 2021	16.0%	27.8%	16.2%	23.0%	15.8%	54.6%
Last 20 years	18.2%	26.9%	16.1%	18.4%	17.1%	21.4%
Last 10 years	12.1%	16.9%	12.0%	11.5%	11.2%	13.0%

2.3 Illiquidity risk

EM are relatively illiquid when compared to DM. Oliver Wyman purport that illiquidity in EM is driven by a narrow investor base, limited pool of securities and financial products, and underdeveloped market technology (Alderighi, 2016). To the extent that illiquidity is contributing additional risk premia to the EM, it provides a source of return related to a risk that the SMF is able to bear given its long-term horizon. As outlined by the International Organization of Securities Commission (IOSCO), there are many initiatives EM are currently taking, and may take into the future, to improve liquidity (IOSCO Board, 2020). Such initiatives may positively impact valuation to the extent that they result in liquidity improvements in EM not currently expected by the market, which could provide a source of upside.

2.4 ESG risk

The relative discount to EM compared with AE and DM could also reflect the poorer ESG credentials. EM have a MSCI ESG rating of BBB, versus a rating of A for DM and AAA for AE (MSCI, 2021). The poor ESG score is driven by higher carbon intensity in EM of 303.9 tons per million US$ sales versus 135.5 tons for DM. Some constituents within the MSCI EM index are also the subject of United Nations Global Conduct violations associated with manufacturing controversial weapons. Investors may be placing a discount on EM due to these ESG traits. A discussion of how this impacts the SMF's view on EM is contained in Section 2.6.2.

2.5 Political risk

Political risk may be further contributing to the price discount placed on EM. Inherent to the 'emerging' aspect of EM are institutions of variable degrees of sophistication and efficacy, political instability, and greater sovereign uncertainty. Here the SMF is concerned with systemic political risk with long-term implications, rather than idiosyncrasies of EM political systems. While country political risk is likely to be mostly idiosyncratic, the main potential sources of political risk that might impact on the overall performance of the EM Index relate to China. This reflects not only China's 34% index weight, but also its political and economic influence within the Asian region and developing geopolitical tensions with the US. Geopolitical risks that have potential to cause widespread disruption include hostile trade sanctions, regional governance instability, cyber security threats and China's global agenda. There is also a risk of aggression against Taiwan (15% weight) and unrest along the Korean peninsula (South Korea 13% weight).

The potential impact of political risk on the outlook for company earnings and equity market returns over the long-term is difficult to fathom. Also, political developments may not necessarily be all negative if they lead to improved governance and promote development of economies and markets. The Central Committee of the Communist Party of China and the State Council recently issued a report detailing a plan to improve regulation across the Chinese economy over the next 5 years. The Evergrande problem in China is only arising due to regulatory improvements in the country, and signals a desire to improve institutional and market integrity. These actions may provide a catalyst for other emerging economies to pursue their own regulatory reforms.

2.6 Other considerations

2.6.1 SMF currency exposure

Fluctuations in exchange rates affect the AUD returns of EM. From the SMF's perspective, the main consideration is whether currency movements might counter the higher returns that are forecasted for EM. While currencies are difficult to predict, over the long-term they might be expected to tend towards purchasing power parity (PPP). We thus may be able to use PPP as a valuation reference point to help gauge if there is any skew in long-term currency risk. According to OECD estimates, the AUD/USD at 0.73 is 7% above PPP of 0.68 while many EM currencies are trading significantly below PPP (OECD, 2021). For instance, the PPP discount for the Chinese Yuan is about 35%, while both New Taiwan Dollar and Korean Won are around 50% (Department of Foreign Affairs and Trade, 2021; OECD, 2021). While the extent to which long-term convergence to PPP will occur is highly debatable, these estimates at least suggest that long-term currency shifts could be more likely to enhance than detract from EM returns in AUD. It is also worth noting that the shorter-term currency movements for EM have historically reduced volatility for Australian investors (see Figure 6). This is in part due to how the AUD is correlated with EM, with both tending to move with the economic cycle (see Section 2.2.3).

While no major currency risk is clearly evident from investing in EM, currency movements are difficult to forecast and add uncertainty to any positions taken by the Fund in international markets. Beyond looking at PPP, the AA team currently does not have an explicit tool to evaluate foreign currency exposure. It is hence hesitant to overexpose the Fund without a mechanism to both forecast and measure the impact that foreign currency is having in the portfolio.

2.6.2 ESG considerations

As discussed above (see Section 2.1.4), one of the reasons for the discount on EM could be weaker ESG credentials than DM. This is a key consideration for the SMF given its Socially Responsible Investment (SRI) Policy, which aims to ensure that the Fund is invested in accordance with the ANU SRI Policy and SMF team beliefs. A central theme in the SMF's SRI Policy is a preference for investments that have better ESG qualities, all other things being equal. The MSCI EM index has a lower ESG score than the MSCI DM (World) index, and potentially includes companies that may be following questionable practices. In the absence of suitable SRI-focused ETFs, and in light of the SMF's objective to provide an immersive learning environment, investment in ETFs that may include some less socially responsible constituents is an unfortunate necessity. Consistent with the AA IP and SMF SRI Policy, we will continue to look for replacement ETFs that offer exposure to the underlying MSCI EM index but with more responsible constituent holdings.

2.6.3 Portfolio concentration

While investing in EM changes the geographical exposure of the Fund, the AA team does not consider this to add any substantial diversification benefits for two reasons. First is the existence of some common exposures between AE and EM, specifically the correlation in economic performance between Australia and Asia (particularly China). Second, the MSCI EM index draws 74% of its capital from only five countries, which poses an element of concentration risk. This concentration risk and the added exposure to common Asia-Australian risk factors is one consideration suggesting placing a limit on the EM weighting and funding the purchase through the sale of both AE and DM,U.

2.6.4 Funding the EM allocation

A key consideration in recommending that the 10% position in EM be funded from 5% each in AE and DM,U is that expected returns on both AE and DM,U are similar as well as less attractive than EM. It is also seen as an opportunity to diversify Australian exposure at the margin. While the optimiser indicates holding as much EM as possible (see Section 3.2), other considerations suggesting that it is prudent to limit exposure include geopolitical risk, ESG considerations, and restriction of foreign currency exposure until the ability to model currency is further developed.

3 Foundations of the investment thesis

3.1 Scenario modelling

The 'AA Investment Process' entails specifying 10-year scenario projections and probabilities across both economic drivers and asset class inputs; with the latter fed into DCF-based asset models to generate wealth and return paths for each scenario. Below is the discussion of the most significant deviations from historical data in our 10-year forecasts that have influenced our modelling and thus proposed asset allocation. Details on the projections can be found in the Appendices.

The AA team refers to historical data to inform its model, which is based on classifying the economic drivers of inflation and the output gap (measured by actual GDP to potential GDP) into scenarios. These scenarios consist of inflation-output gap pairings contingent on the historical series with qualitative adjustment based on AA team analysis. The drivers are translated into asset class inputs, with the main inputs being PE (price to earnings), ROE (return on equity), bond yields and cash rates. The AA team undertakes analysis and applies judgement in translating the asset class inputs into forward projections across each of the 11 scenarios. The key considerations underpinning the qualitative adjustments to the historical series are discussed below.

Based on work completed last semester, an adjustment is made to the DM ROE 10-year targets to recognise the influence of the technology sector. Research into Facebook, Amazon, Apple, Netflix, Google (FAANG) and Tesla indicates that this group of stocks contributes a further 2% to market ROE relative to history. This is supported by the potential for strong sources of future returns in artificial intelligence, chips, cloud computing, and electronic and autonomous cars. The 10-year targets for DM ROE are raised by ~1% in each scenario, subject to the constraint that they are equal to or lower than AE ROE in each scenario. The forecasted DM ROE in year 10 range from 7.0% to 14.5%, with the probability-weighted ROE at 11.41%.

An earnings recovery rate (ERR) was introduced last semester in response to pandemic-influenced decreases in earnings that led to a situation where trailing PEs (ROEs) were sitting at unsustainably high (low) levels. The ERRs for both AE and DM aim to align forward earnings and ROEs with what seems plausible, based on the AA team's current economic outlook and with reference to consensus earnings growth. Global economies have been strong recently as they recover from the initial shock of the pandemic and lockdowns, and the US and Europe begin to ease restrictions. For DM, a sizable portion of the earnings recovery has now been realised and recognised in earnings reported to June 2021, requiring the DM ERR to be adjusted downwards. For AE, trailing reported earnings are still depressed, as reflected in a PE of around 26x. This will persist in the short term due to a resurgence of lockdowns and restrictions, with the result that the earnings recovery will take a bit longer domestically than globally. An ERR is applied that brings the forward PE for AE down to 17.70x versus DM at 19.85x, with EM at 13.90x.

The AA team deems the medium levels for both economic drivers (inflation and the output gap) to be the most likely at the end of 10 years. However, we impose a positive skew on inflation and negative skew on the output gap within the scenario probabilities. High inflation is expected to be more probable due to aggressively easy monetary policy (including heavy quantitative easing and a term funding facility), increasing fuel and commodity prices, higher medical costs and health insurance premiums, and various supply side constraints. While there is an element of transitory inflation pressures, we see increased savings and cheap credit as potentially significant longer-term drivers of inflation that skew the risk towards higher inflation of a structural nature. We have increased the combined probabilities on the high inflation scenarios to 41% from 36%; while decreasing those on the medium inflation scenarios to 41% from 46%. The combined probabilities on the low inflation scenarios remains at 14%.

The AA team has also added a stagflation scenario with a probability of 3.5%, in accordance with increased expectations for higher inflation. This scenario represents an extreme outcome of a high inflation and low output gap. It is based on the stagflation crisis of the 1970s, which saw a change in income distribution away from capital and towards labour. In the stagflation scenario, structural issues in the economy lead to cost push pressures, particularly surrounding wages, and

taxes are increased putting pressure on overall economic activity. The current record asset prices at the tail-end of a global pandemic are occurring concurrently with mounting global supply chain issues, rising inventory levels and a potential unwinding of both monetary and fiscal and support. This situation creates the possibility of a perfect storm where growth stagnates, but prices rise due to cost-push pressures. The remaining 0.5% probability is attached to the 'crisis' scenario, which represents a deflationary situation involving low inflation and a low output gap.

3.2 Qualitative adjustments

This section outlines the considerations taken by the AA team that are not fully captured within the modelling.

The optimised asset allocation indicates a 100%/0% growth/defensive weight in the portfolio. The 100% growth allocation is maximising the EM constraint at 25% with the remaining 75% then being allocated to AE. The model is a quantitative tool designed to be used as an initial reference point for the AA decision. The optimiser is providing corner solutions, and is influenced by the increase in probability attributed to the high inflation scenarios and related outperformance by EM and AE. Given the optimiser's sensitivity to the model and input choices, it is inappropriate to submit to its recommendation without critical evaluation. The discussion below sets out the AA team's reasoning for deviating from the optimised weights towards the proposed target weights.

3.2.1 Growth versus defensive weights

We do not view it as appropriate to completely switch out of the AC and AFI defensive asset classes given the protection they provide in challenging economic conditions. AC and AFI are the two best performing asset classes in the newly added stagflation scenario, which hits equities the hardest due to a combination of PE multiple de-rating and depressed ROEs. In such a scenario, central banks are expected to increase the cash rate to suppress inflationary pressure, promoting AC as a defensive asset. AC and AFI also outperform all the other asset classes in the aggregate demand-driven crisis scenario. While these two scenarios combined comprise just 4% of the scenario probabilities, it is important to continue to hold defensive assets in the event either scenario does unfold.

3.2.2 Equity weights

Despite its superior returns, there are three primary reasons why the AA team has chosen to restrict EM to a 10% weighting instead of the 25% maximum weighting indicated by the optimiser. First, while EM outperforms AE and DM on a scenario probability-weighted basis over the 10-year investment horizon, it is outperformed by AE and DM in the crisis scenario, and by DM in the high inflation/medium output gap scenario. Second, EM constitutes 13% of the MSCI ACWI Index versus the 87% weight in DM. A full 25% allocation to EM would thus amount to very significant overweighting in EM versus DM. Focusing just on the international equities section of the portfolio, the proposed weighting of 10% for EM and 15% for DM amounts to an EM weighting of 40% relative to 13% weight in the MSCI ACWI Index. Third, we wish to limit our weight in unhedged investments until we have developed the ability to both monitor and forecast foreign currency exposure.

3.3 Conclusion

The AA team is recommending that EM be introduced at a 10% weighting funded by a 5% reduction in each of AE and DM,U, with the defensive assets within the portfolio remaining unchanged. The investment thesis underpinning the recommendation to add EM reflects their higher returns relative to AE and DM, which we believe arises from EM carrying risk premiums that the SMF is more willing to bear given its long investment horizon.

4 Appendices

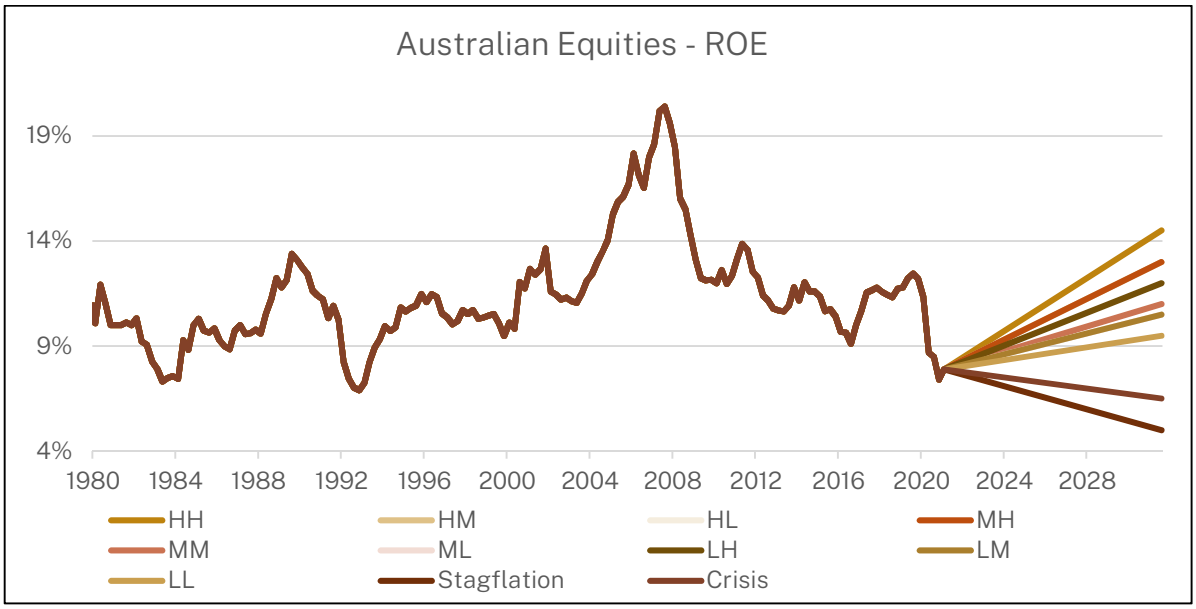
Appendix A: Year 10 asset model assumptions, inputs and forecasts

4.1.1 Australian Equities

Figure 7: Return on equity on existing operations (ROE) and reinvestment (ROER) of Australian equities, year 10 targets

Scenario	GDP/Potential					
Inflation		**High** *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
	High *4.5%*	ROE: 14.5% ROER: 14.5%	ROE: 13.0% ROER: 13.0%	ROE: 10.5% ROER: 9%		
	Medium *2.5%*	ROE: 13.0% ROER: 13.0%	ROE: 11.0% ROER: 10.5%	ROE: 10.5% ROER: 9.5%		
	Low *1%*	ROE: 12.0% ROER: 11.5%	ROE: 10.5% ROER: 9.5%	ROE: 9.5% ROER: 8.0%		
	Stagflation *7%*				ROE: 9.0% ROER: 7.5%	
	Crisis *0%*					ROE: 6.5% ROER: 3.5%

Figure 8: Return on equity (ROE) of Australian Equities
Historical data and year 10 targets

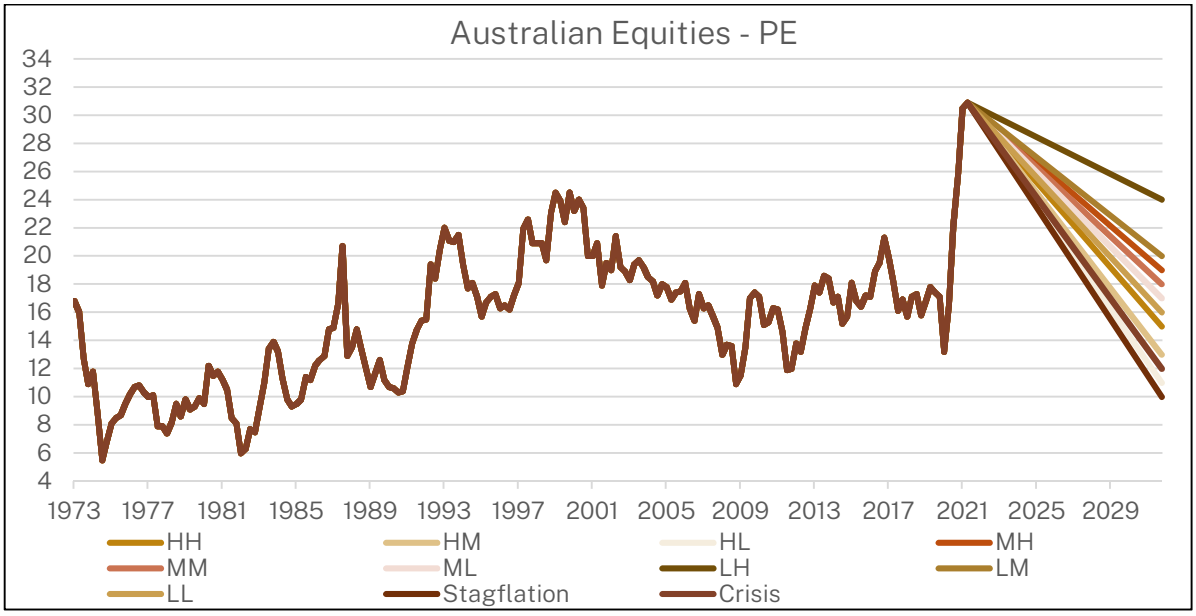


Note: Historical data is reported for ROE, while forecasts are formed as a blend of ROE on existing operations and ROER. Data is from the Datastream Australian Market series.

Figure 9: Price to earnings (PE) ratio of Australian equities, year 10 targets

Scenario		GDP/Potential				
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
Inflation	**High** *4.5%*	15	13	11		
	Medium *2.5%*	19	18	17		
	Low *1%*	24	20	16		
	Stagflation *7%*				9	
	Crisis *0%*					12

Figure 10: Price to earnings (PE) ratio of Australian Equities
Historical data and year 10 targets



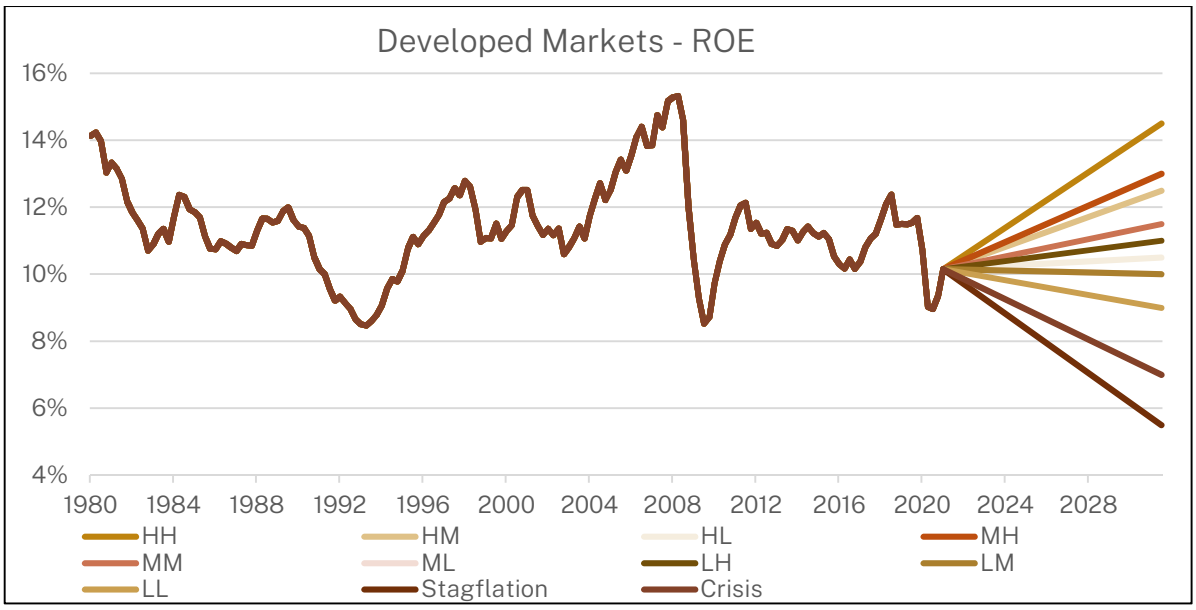
Note: This chart shows all available history for the AE PE ratio based on the Datastream Australian market series.

4.1.2 Developed Market equities

Figure 11: Return on equity on existing operations (ROE) and reinvestment (ROER) of Developed Markets, year 10 targets

Scenario	GDP/Potential					
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.950*	**Crisis** *0.935*
Inflation	**High** *4.5%*	ROE: 14.5% ROER: 14.5%	ROE: 12.5% ROER: 12.5%	ROE: 10.5% ROER: 9.0%		
	Medium *2.5%*	ROE: 13.0% ROER: 13.0%	ROE: 11.5% ROER: 11.5%	ROE: 10.0% ROER: 9.5%		
	Low *1%*	ROE: 11.0% ROER: 10.0%	ROE: 10.0% ROER: 9.0%	ROE: 9.0% ROER: 8.0%		
	Stagflation *7%*				ROE: 10% ROER: 8%	
	Crisis *0%*					ROE: 7.0% ROER: 5.0%

Figure 12: Return on equity (ROE) for Developed Markets proxy Historical data and year 10 targets

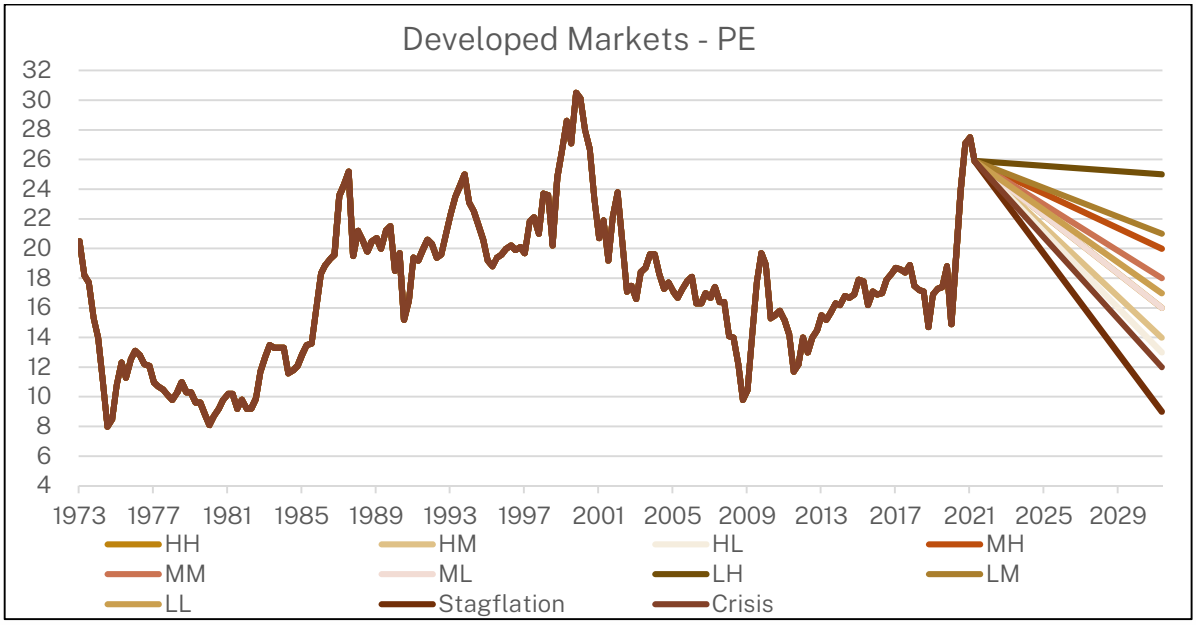


Note: Historical data is reported for ROE, while forecasts are formed as a blend of ROE on existing operations and ROER. Data is from the Datastream Total World series.

Figure 13: Price to earnings (PE) ratio of Developed Markets, year 10 targets

Scenario		GDP/Potential				
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
Inflation	**High** *4.5%*	16	14	13		
	Medium *2.5%*	20	18	16		
	Low *1%*	25	21	17		
	Stagflation *7%*				9	
	Crisis *0%*					12

Figure 14: Price to earnings (PE) ratio of Developed Markets proxy
Historical data and year 10 targets



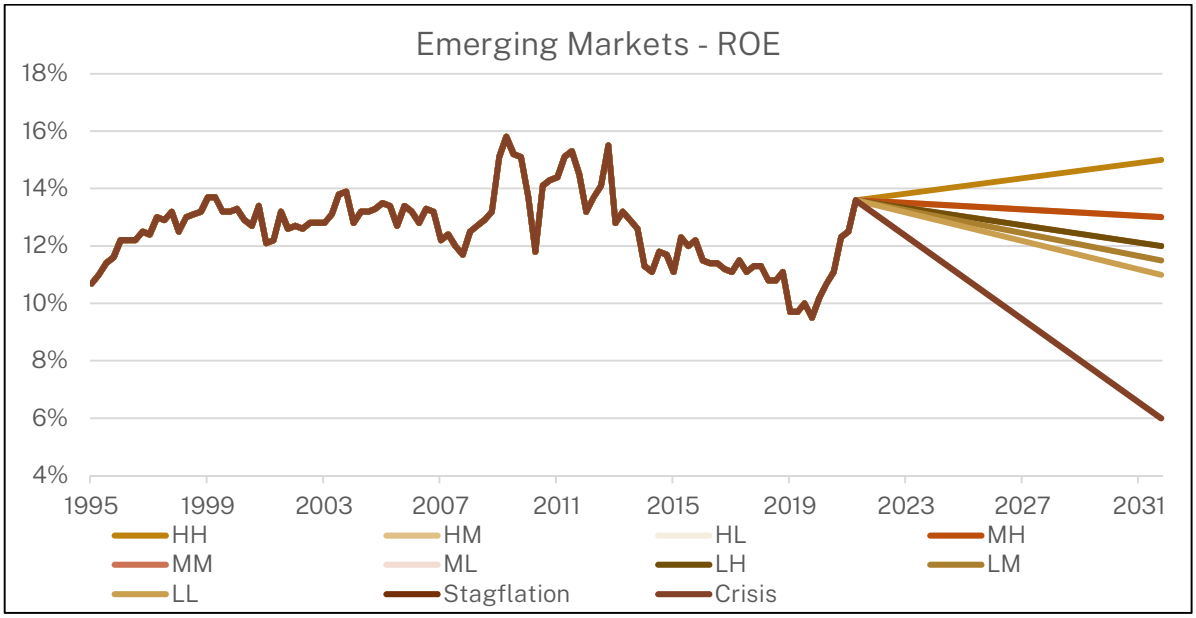
Note: This chart shows all available history for the Developed Markets PE ratio based on the Datastream Total World series.

4.1.3 Emerging Market equities

Figure 15: Return on equity on existing operations (ROE) and reinvestment (ROER) of Emerging Markets, year 10 targets

Scenario	GDP/Potential					
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
Inflation	**High** *4.5%*	ROE: 15.0% ROER: 15.0%	ROE: 13.0% ROER: 13.0%	ROE: 12.0% ROER: 9.5%		
	Medium *2.5%*	ROE: 13.0% ROER: 13.0%	ROE: 12.0% ROER: 11.0%	ROE: 11.5% ROER: 10.5%		
	Low *1%*	ROE: 12.0% ROER: 11.0%	ROE: 11.5% ROER: 10.5%	ROE: 11.0% ROER: 10.0%		
	Stagflation *7%*				ROE: 11% ROER: 9%	
	Crisis *0%*					ROE: 6.0% ROER: 5.0%

Figure 16: Return on equity (ROE) of Emerging Markets
Historical data and year 10 targets

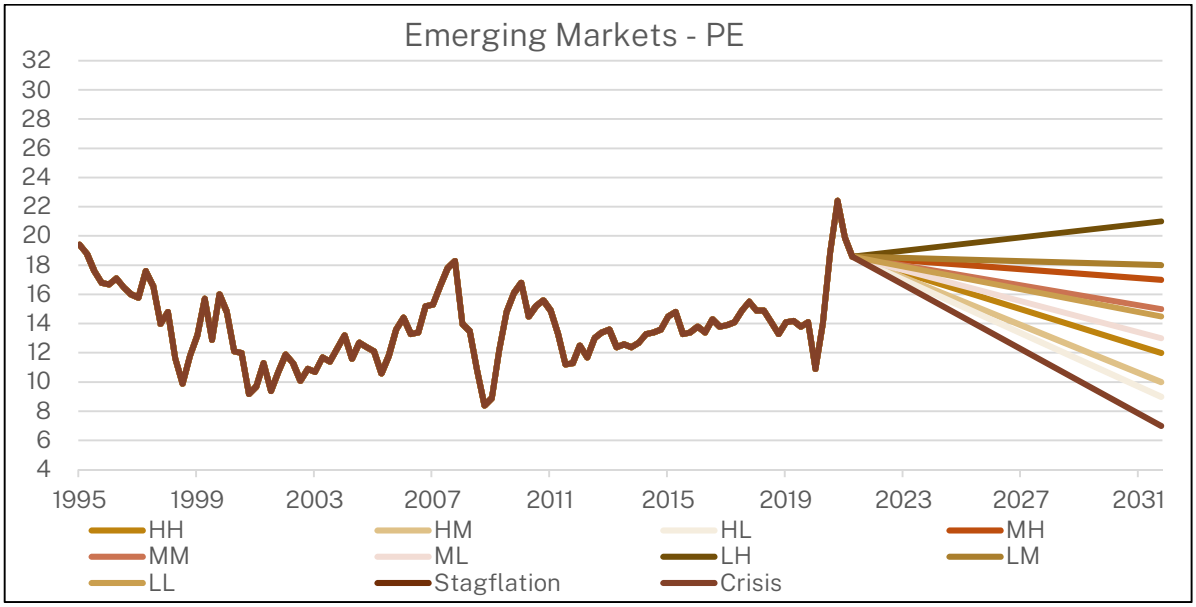


Note$_1$: Historical data is reported for ROE, while forecasts are formed as a blend of ROE on existing operations and ROER. The data is from the Datastream Emerging Market series.

Figure 17: Price to earnings (PE) ratio of Emerging Markets, year 10 targets

Scenario	GDP/Potential					
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
Inflation	**High** *4.5%*	12	10	9		
	Medium *2.5%*	17	15	13		
	Low *1%*	21	18	14.5		
	Stagflation *7%*				7	
	Crisis *0%*					7

Figure 18: Price to earnings (PE) ratio of Emerging Markets historical data and year 10 targets



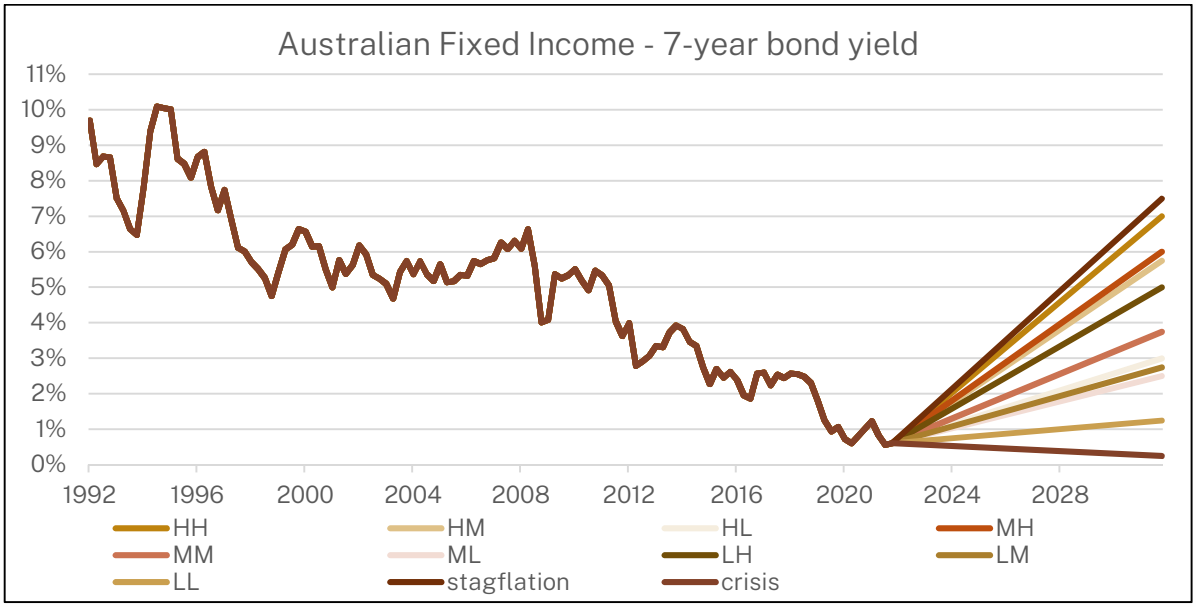
Note: This chart shows all available history for the EM PE ratio based on the Datastream Emerging Market series.

4.1.4 Australian Fixed Income

Figure 19: Seven-year bond yield, year 10 targets

Scenario		GDP/Potential				
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
Inflation	**High** *4.5%*	7.00%	5.75%	3.00%		
	Medium *2.5%*	6.00%	3.75%	2.50%		
	Low *1%*	5.00%	2.75%	1.25%		
	Stagflation *7%*				7.5%	
	Crisis *0%*					0.25%

Figure 20: Seven-year bond yield, historical data and year 10 targets



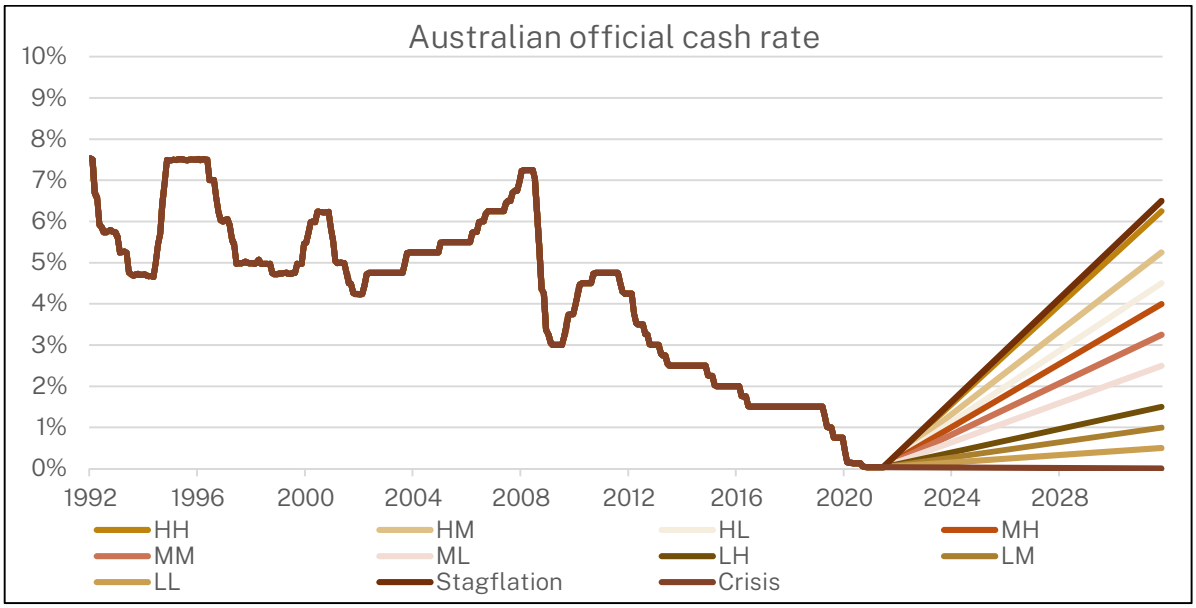
Notes: This chart shows history from 1992 as this is considered the most representative period. A proxy for 7-year bond yields is formed by interpolating between 5-year and 10-year government bond yields as reported by the Reserve Bank of Australia.

4.1.5 Australian Cash

Figure 21: Australian official cash rate, year 10 targets

Scenario		GDP/Potential				
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.900*	**Crisis** *0.935*
Inflation	**High** *4.5%*	6.25%	5.25%	4.50%		
	Medium *2.5%*	4.00%	3.25%	2.50%		
	Low *1%*	1.50%	1.00%	0.50%		
	Stagflation *7%*				6.50%	
	Crisis *0%*					0.00%

Figure 22: Australian official cash rate, historical data and year 10 targets



Note: This chart shows history from 1992 as this is considered the most representative period. Cash rate data is sourced from the Reserve Bank of Australia.

Figure 23: BetaShares High Interest Cash ETF spread vs official cash rate, year 10 targets

Scenario	GDP/Potential					
		High *1.015*	Medium *0.995*	Low *0.980*	Stagflation *0.900*	Crisis *0.935*
Inflation	High *4.5%*	1.60%	1.30%	1.00%		
	Medium *2.5%*	0.90%	0.80%	0.70%		
	Low *1%*	0.60%	0.50%	0.40%		
	Stagflation *7%*				2.00%	
	Crisis *0%*					0.20%

Appendix B: Nominal asset returns

Figure 24: Asset class expected nominal returns under 11 scenarios

Scenarios				Year 10 Expected Nominal Return under 11 Scenarios				
No.	Inflation	Growth / Potential	Probability	Australian Equities	Developed Markets	Emerging Markets	Australian Fixed Income	Australian Cash
1	High	High	7%	8.05%	7.90%	10.07%	2.11%	4.33%
2	High	Medium	18%	5.77%	5.16%	6.83%	1.91%	3.63%
3	High	Low	16%	2.16%	2.45%	5.07%	1.27%	3.05%
4	Medium	High	9%	8.75%	8.93%	12.35%	2.14%	2.73%
5	Medium	Medium	20%	6.54%	6.72%	9.74%	1.65%	2.26%
6	Medium	Low	12%	5.48%	4.39%	7.97%	1.43%	1.80%
7	Low	High	4%	9.82%	9.43%	11.42%	2.22%	1.20%
8	Low	Medium	6%	6.77%	6.61%	9.29%	1.72%	0.87%
9	Low	Low	4%	3.94%	3.74%	6.00%	1.40%	0.54%
10	Stagflation	Stagflation	3.5%	-1.06%	-1.32%	2.08%	0.19%	4.69%
11	Crisis	Crisis	0.5%	-2.63%	-0.87%	-2.70%	1.20%	0.15%
Probability-Weighted			**100%**	**5.86%**	**5.67%**	**8.35%**	**1.72%**	**2.69%**

Appendix C: Australian, Developed Market and Emerging Market Equities – Historical trends

Figure 25: Return on equity (ROE) ratio of Australian Equities (AE), Developed Markets (DM) and Emerging Markets (EM), historical data

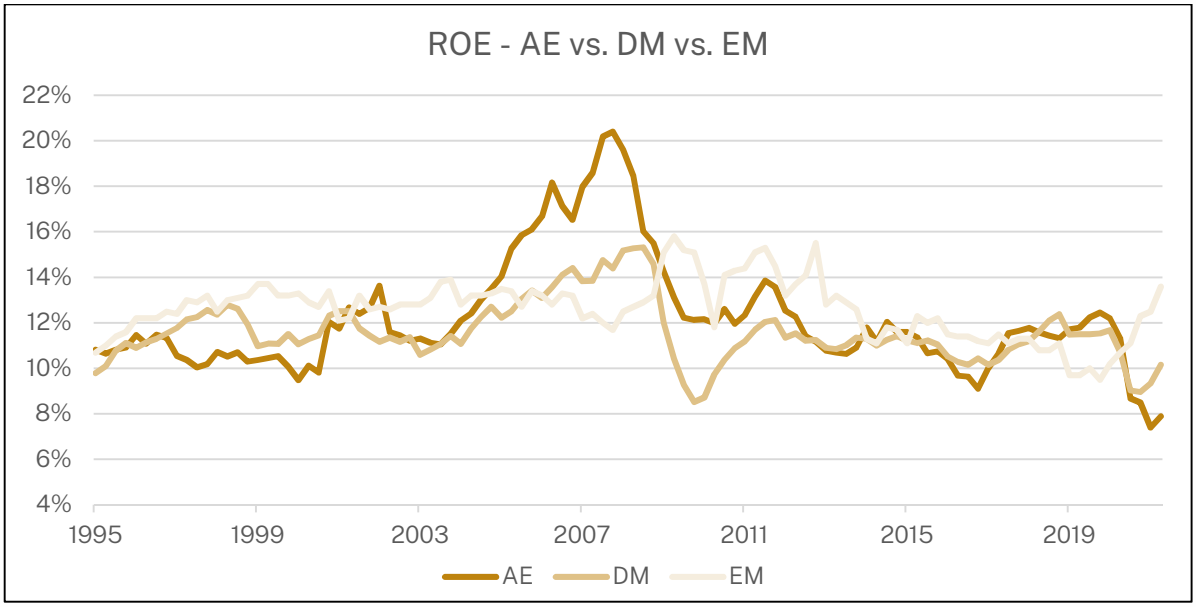


Figure 26: PE ratio of AE, DM and EM, historical data

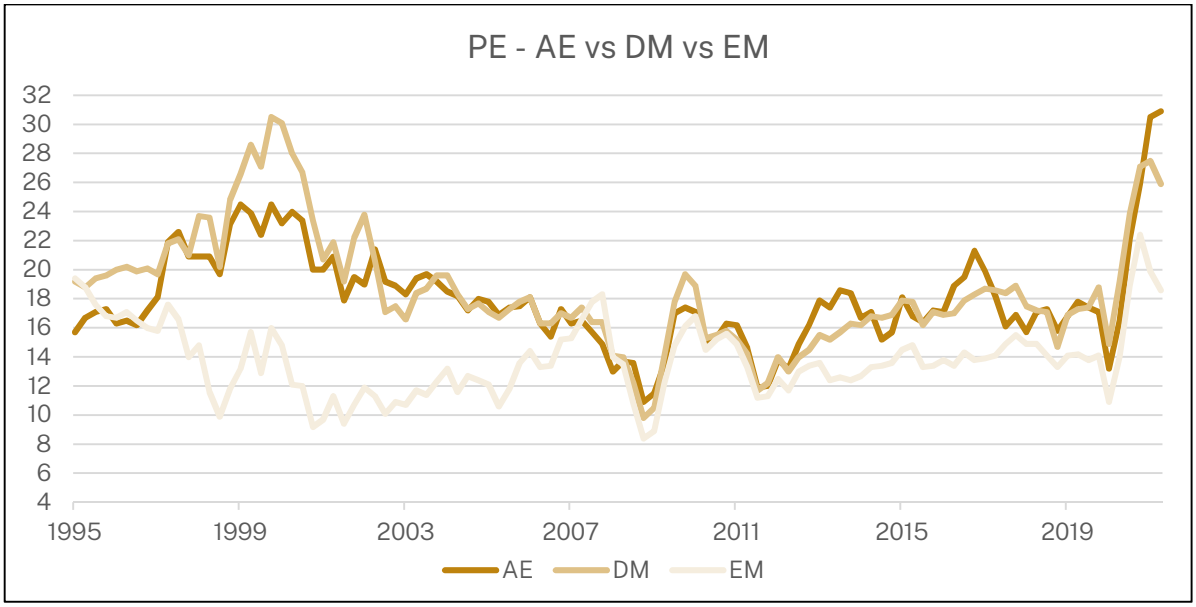
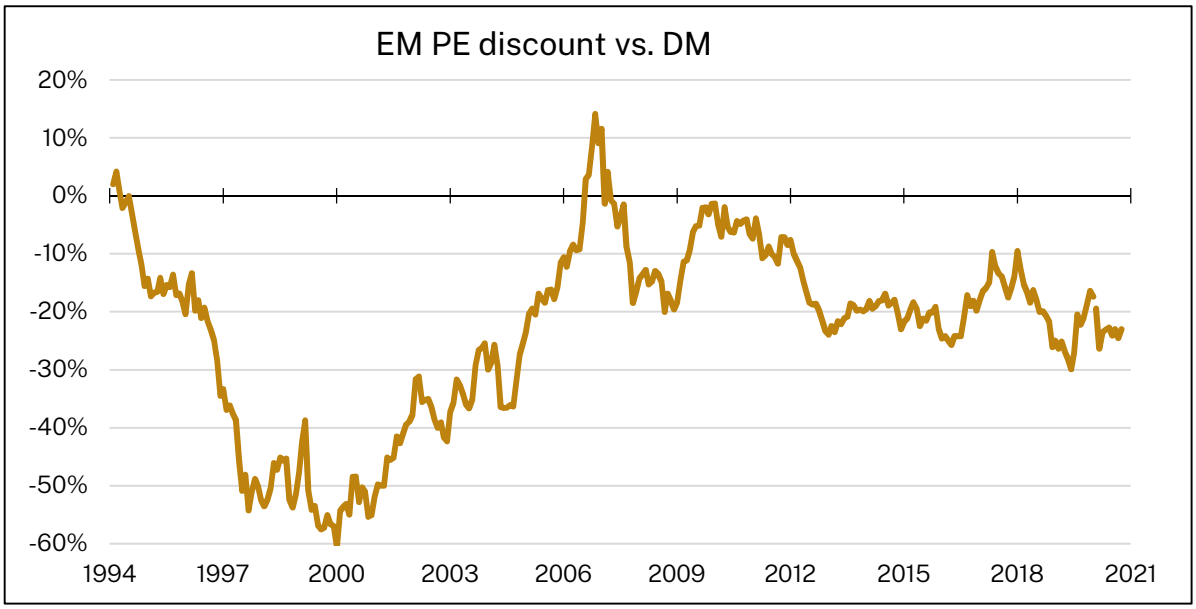


Figure 27: Emerging Markets PE discount versus Developed Markets



Appendix D: Detailed portfolio weights

Figure 28: Portfolio weights – Detailed breakdown

Asset Weights	Reference target portfolio	Proposed portfolio	Deviation vs. reference
GROWTH ASSETS			
Active Australian Equities Portfolio	50%	50%	-
Australian Equities in AA Portfolio	10%	5%	-5%
Total Australian Equities	**60%**	**55%**	**-5%**
Developed Markets, Hedged	10%	10%	-
Developed Markets, Unhedged	10%	5%	-5%
Emerging Markets, Unhedged	0%	10%	+10%
Total International Equities	**20%**	**25%**	**+5%**
Total Growth Assets	**80%**	**80%**	**0%**
DEFENSIVE ASSETS			
Australian Fixed Income	15.%	7.5%	-7.5%
Australian Cash	5%	12.5%	+7.5%
Total Defensive Assets	**20%**	**20%**	**0%**
TOTAL	**100%**	**100%**	**0%**

Appendix E: Macro driver assumptions and inputs

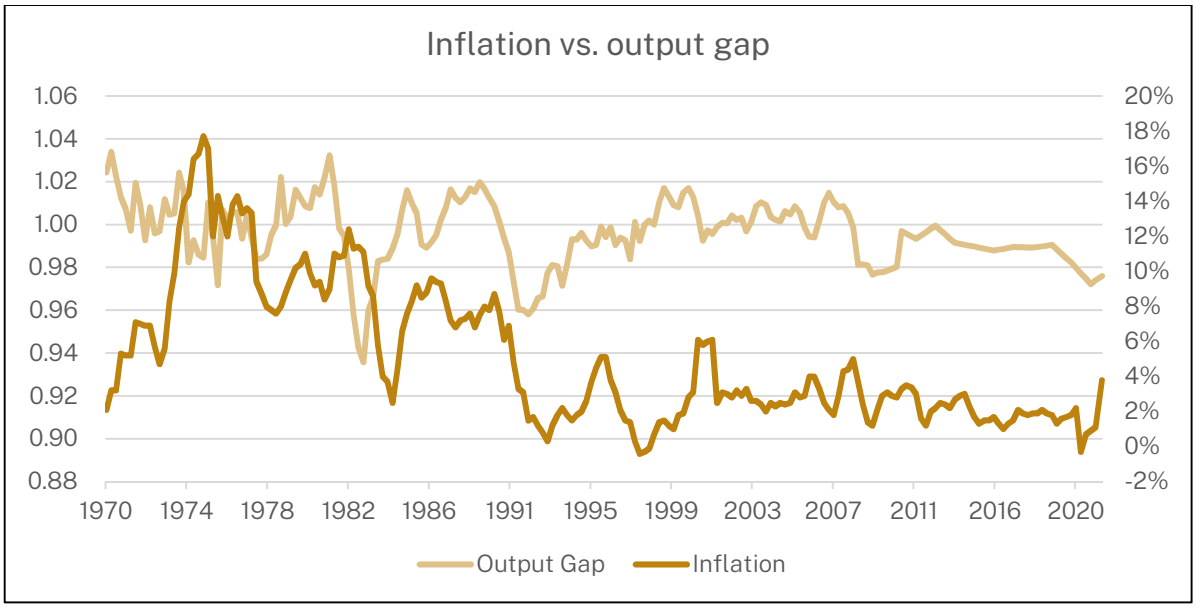
Figure 29: Inflation paths

Scenario	Historical Level (1992-present)	Historical probability (1992-present)	Forecast level	Forecast probability
High	6.1%	23.0%	4.5%	41%
Medium	3.0%	53.1%	2.5%	41%
Low	1.6%	23.9%	1.0%	14%
Stagflation			7%	3.5%
Crisis			0%	0.5%

Figure 30: GDP/Potential paths

Scenario	Historical level (1992-present)	Historical probability (1992-present)	Forecast level	Forecast probability
High	1.017	24.8%	1.015	20%
Medium	1.002	50.4%	0.995	44%
Low	0.989	24.8%	0.980	32%
Stagflation			0.950	3.5%
Crisis			0.935	0.5%

Figure 31: Historical inflation vs. output gap (1970 – present)



Note: This chart shows the history for Australian inflation and output gap (GDP/Potential) commencing in 1970, when data for some asset class inputs becomes available. Inflation data is sourced from the Reserve Bank of Australia, and output gap data is sourced from the Organisation for Economic Co-operation and Development (OECD).

Figure 32: Forecasted scenario probabilities

Scenario		GDP/Potential				
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Stagflation** *0.950*	**Crisis** *0.935*
Inflation	**High** *4.5%*	7%	18%	16%		
	Medium *2.5%*	9%	20%	12%		
	Low *1%*	4%	6%	4%		
	Stagflation *7%*				3.5%	
	Crisis *0%*					0.5%

Figure 33: historical scenario probabilities (1992-present)

Scenario	GDP/Potential			
		High *1.017*	**Medium** *1.002*	**Low** *0.989*
Inflation	**High** *6.1%*	6.2%	15.0%	1.8%
	Medium *3%*	15.0%	25.7%	12.4%
	Low *1.6%*	3.5%	9.7%	10.6%

References

Alderighi, Stefano., Paul Calvey, Siobhan Cleary, Quinton Goddard, Daniela Peterhoff. 2016. "Enhancing liquidity in emerging market exchanges." *Oliver Wyman Insights*, 4 https://www.oliverwyman.com/content/dam/oliver-wyman/global/en/2016/oct/Liquidity-in-Emerging-Markets-Exchanges-.pdf.

Board of the IOSCO. 2020. "Liquidity provision in the secondary markets for equity securities." https://www.iosco.org/library/pubdocs/pdf/IOSCOPD660.pdf.

Department of Foreign Affairs and Trade. 2021. "Taiwan [Factsheet]." https://www.dfat.gov.au/sites/default/files/taiw-cef.pdf.

Lazard Asset Management. 2021. "Outlook on emerging markets." 7-8 https://www.lazardassetmanagement.com/docs/product/-p94-/145/lazardonemergingmarkets_2021q3_en.pdf.

MSCI. 2021. "ESG fund ratings." *Website*, https://www.msci.com/our-solutions/esg-investing/esg-fund-ratings/funds.

OECD Data. 2021. "Purchasing power parities." *Web Database*, https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm.

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