Australian
National
University

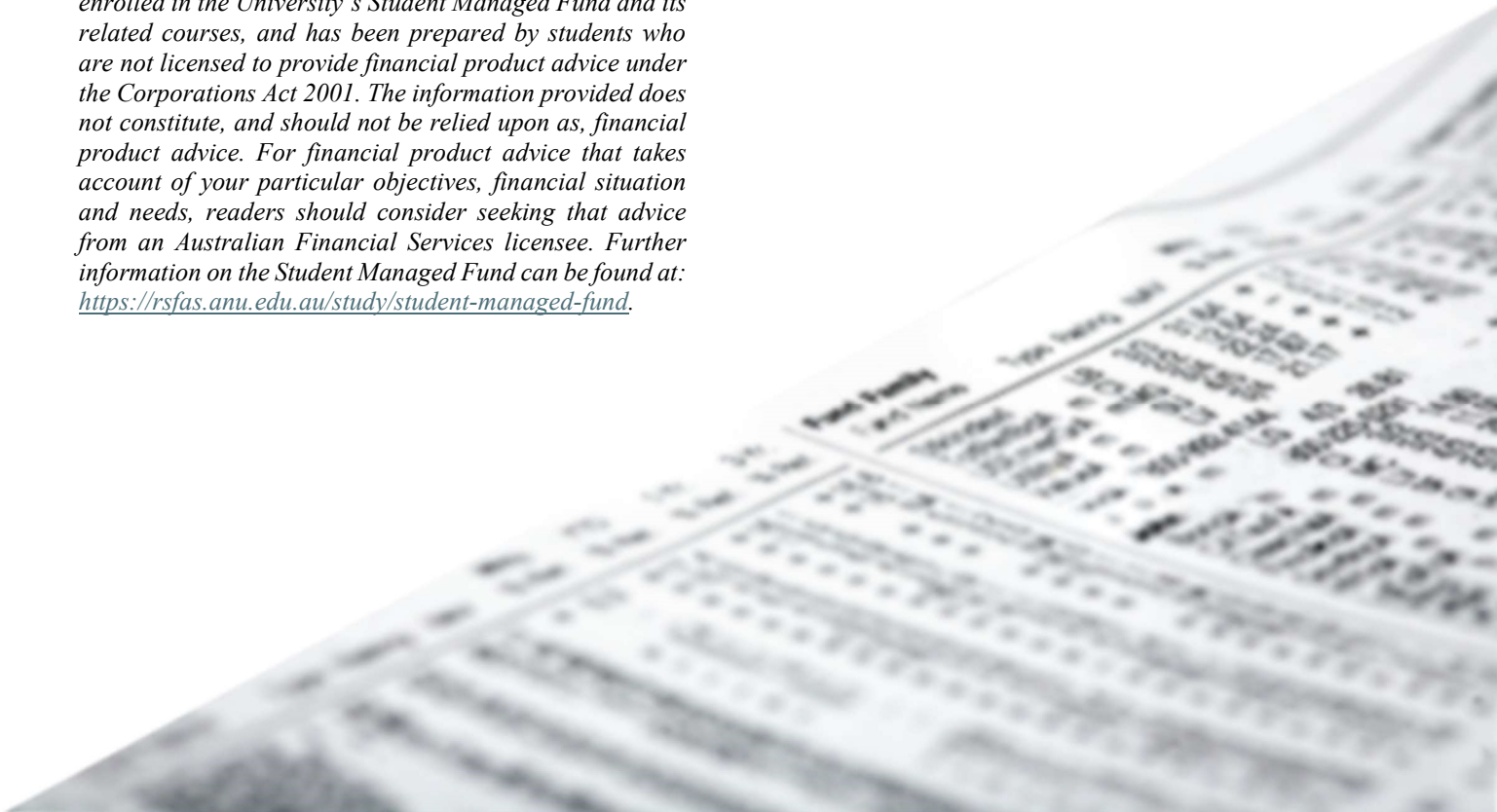# AA Portfolio Update: Semester 1 2021

ANU Student Managed Fund

Creation Date: 06/05/2021 | Version Date: 08/06/2021 (FINAL)

Contents

Glossary

AA – Asset Allocation

AC – Australian Cash

AE – Australian Equity

AAA – BetaShares Australian High Interest Cash ETF

AFI – Australian Fixed Income

ANU – The Australian National University

CF – Cash Flow

CPI – Consumer Price Index

ERR – Earnings Recovery Rate

EPS – Earnings Per Share

ETF – Exchange Traded Fund

FAAMGs – Facebook, Amazon, Apple, Microsoft and Google

Fed – Federal Reserve

GDP – Gross Domestic Product

IE – International Equity

IOZ – iShares Core S&P/ASX200 ETF

MMT – Modern Monetary Theory

PR – Payout Ratio

PE – Price/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

U.S. – the United States

VGS – Vanguard MSCI Index International Shares ETF

1 Asset Allocation Portfolio Update

The Asset Allocation (AA) team of the Student Managed Fund (SMF) recommends maintaining the current target strategic asset weights at present. The purpose of this update is therefore to outline the developments made over the semester, as well as the rationale for maintaining the current portfolio weights. The AA team has made significant progress over the past semester in two key areas. First is the modelling of equities, where we have deepened our understanding of the potential impact of the technology sector on our equity model inputs, including the price-earnings ratio (PE) and return on equity (ROE). This process has provided us with the confidence to make recommendations going forward on the growth versus defensive asset class mix, as well as the split between Australian Equities (AE) and International Equities (IE). Second, the team has been focusing on the inflation outlook, and has altered our scenario probabilities towards greater inflation risk. The team is interested in examining potential inflation hedges in coming semesters, to see if they might fit within the portfolio. For now, the AA team did not see a clear enough case to recommend a change in asset weights due to this increased inflation risk; although our analysis has reinforced the decision to switch from Australian fixed income (AFI) to Australian cash (AC) last semester, notwithstanding higher bond yields. The rationale for maintaining current portfolio weights is detailed in Section 4.

1.1 Equity Modelling & Inflation

This semester, we have made the following changes to our equity modelling and inflation scenario probabilities (see Section 2 for further discussion):

- Introduced an Earnings Recovery Rate (ERR) in setting PE and ROE in year 1 of our 10-year forward projections, to account for the expected earnings recovery during the post-pandemic period.
- Normalised the payout ratio in line with pre-pandemic levels.
- Adjusted the year 10 expected PE and ROE upwards, after considering historical trends and the impact of the emerging technology sector on these inputs.
- Increased probabilities on the high and medium inflation scenarios to reflect our revised inflation outlook.

Our modelling indicates that both the growth and defensive asset classes within our portfolio offer relatively low expected returns, below that required to achieve our real return target of 4.5%. Nevertheless, there is no weighting adjustment that offers a significant improvement on our current allocation. The AA team has decided that it will only make a recommendation to adjust the asset weights if there is a clear case for a switch within our existing asset classes, or a new asset class is identified that is an appropriate fit for the Fund's objectives and constraints. While our modelling indicates that a higher allocation to AE would bring expected returns closer to the target, this would also involve taking on additional risk. Section 4 explains our decision to leave the weightings unchanged.

Portfolio Weights

Asset Classes	Reference Portfolio	Target Portfolio	Current Portfolio As at 17 May 2021
Australian Equity	60%	60%	60.5%
International Equity	20%	20%	20.0%
Australian Fixed Income	15%	7.5%	6.4%
Australian Cash (inc. accruals)	5%	12.5%	13.1%
TOTAL	100%	100%	100%

Note₁: The current 13.1% weighting in Australian Cash comprises 9.16% in the Betashares High Interest Cash ETF, 2.43% in the BT Cash Management Trust, 1.36% in accrued franking credits and 0.16% in accrued dividend income.
Note₂: Analysis in this report is based on prices as at 17 May 2021.

1.2 Key Metrics

The tables below present projected real asset returns and projected changes in real values for the reference, target and current portfolio over our 10-year forecast horizon. The estimated change in portfolio values allow for a 4.5% distribution at the end of each year, and hence can be interpreted as the outcome relative to the objective of maintaining the real portfolio value over the long run. The expected reductions in real portfolio value and the 87% probability of shortfall reflect the fact that a 4.5% real return objective is difficult to achieve in an environment where markets are priced for low real returns. Further discussion appears in Sections 2 and 3.

Asset Class Expected Real Returns under 10 Scenarios

Scenarios			Year 10 Expected Real Return under 10 Scenarios			
No.	Inflation	Growth / Potential	Probability	Australian Equities	International Equities	Australian Fixed Income	Australian Cash
1	High	High	11%	4.96%	3.94%	-1.25%	1.54%
2	High	Medium	13%	2.60%	1.13%	-1.45%	0.85%
3	High	Low	12%	-1.09%	-1.66%	-2.07%	0.30%
4	Medium	High	9%	6.55%	5.59%	-0.16%	1.06%
5	Medium	Medium	25%	4.23%	3.13%	-0.64%	0.60%
6	Medium	Low	12%	3.10%	0.46%	-0.86%	0.14%
7	Low	High	4%	8.30%	6.19%	0.74%	0.36%
8	Low	Medium	6%	5.01%	3.15%	0.24%	0.04%
9	Low	Low	4%	2.01%	0.07%	-0.08%	-0.29%
10	Crisis	Crisis	4%	-3.92%	-4.77%	0.26%	-0.12%
Probability-Weighted			100%	3.33%	1.97%	-0.80%	0.58%

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	Target Portfolio	Current Portfolio
1	High	High	11%	-1.01%	-0.81%	-0.75%
2	High	Medium	13%	-2.95%	-2.79%	-2.75%
3	High	Low	12%	-5.72%	-5.55%	-5.53%
4	Medium	High	9%	0.35%	0.44%	0.49%
5	Medium	Medium	25%	-1.54%	-1.45%	-1.41%
6	Medium	Low	12%	-2.75%	-2.68%	-2.65%
7	Low	High	4%	1.56%	1.54%	1.59%
8	Low	Medium	6%	-0.99%	-1.00%	-0.97%
9	Low	Low	4%	-3.36%	-3.37%	-3.36%
10	Crisis	Crisis	4%	-7.62%	-7.65%	-7.68%
Probability-Weighted			100%	-2.30%	-2.20%	-2.16%
Year 10 Real Portfolio Metrics						
Expected Portfolio Value				0.808	0.816	0.819
Probability of Shortfall				87%	87%	87%
Expected Shortfall				-20.20%	-19.47%	-19.23%
Expected Utility				-0.456	-0.433	-0.427

2 Equity Modelling

The equity modelling under the AA Investment Process entails specifying 10-year scenario projections and probabilities for the equity inputs of PE, ROE, payout ratio and franking credits, which are fed into DCF-based 'plowback' models to generate wealth and return paths for each scenario. Below we discuss the most significant deviations from historical data in our 10-year forecasts that have influenced our modelling, as well as improvements to the models made by the AA team during the current semester. Details on the revised projections can be found in the Appendices (Section 5).
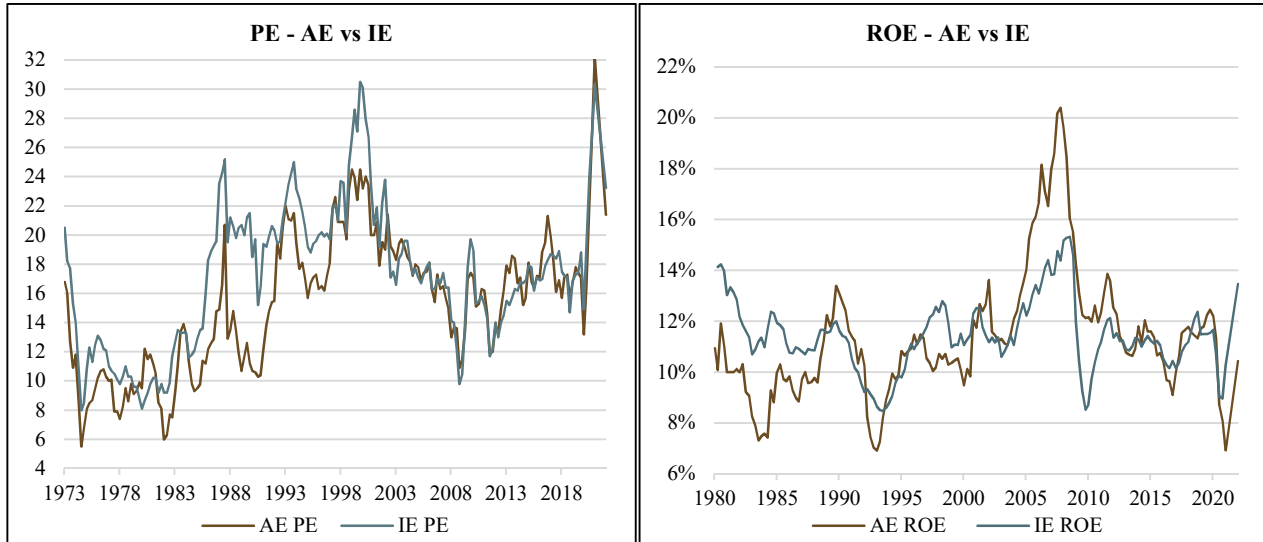
2.1 Earnings Recovery Rate

This subsection sets out the improvements made to the AE and IE models and the reasoning for the revisions. The AA team refers to historical data series for the equity inputs, with PE and ROE being the key inputs. The team then undertakes analysis and applies judgment in translating the historical data into forward projections.

One of the most notable adjustments has been to introduce an ERR in setting PE and ROE during year 1 relative to the current year 0, with scope for the ERR to differ across scenarios. The previous approach was to apply linear interpolation between year 0 and the projected value in year 10. This has been replaced with an initial adjustment in year 1, and then applying a linear interpolation from that base through to year 10. Current AE PE (ROE) stands at 32.23 (6.92%) and IE PE (ROE) stands at 30.36 (8.97%). The PEs are abnormally high and the ROEs abnormally low relative to the historical range[1]. The adjustment of the 1-year forward PE (ROE) downwards (upwards) using the ERR recognises that there was a significant but not sustained drop in earnings associated with the unexpected shock of the pandemic, with the lockdown policies introduced by governments having a major dampening effect. It is apparent that earnings are currently bouncing back quickly, assisted by the combination of gradual reopening of economies, government fiscal stimulus, increases in money supply and lower interest rates. This creates a situation where AE and IE PEs (ROEs) are at unsustainably high (low) levels based on trailing earnings, but are trading on much lower PEs and higher ROEs looking forward after allowing for the impending economic and earnings recovery. Applying a forward ERR in our equity model allows us to capture the sharp earnings improvement that is underway.

In determining the ERRs to apply to AE and IE, the team considered historical data and analyst projections. Referring to the historical series, the impact of the ERR on the change in ROE and PE for IE is smaller and smoother than for AE. For AE, the ERRs range from 35% to 60% (average 49%) across the scenarios; while for IE they range from 10% to 40% (average 29%). The probability-weighted average 1-year forward PE (ROE) after ERR adjustment is 21x (10.4%) and 23x (13.5%) for AE and IE, respectively. The forward AE and IE PEs (ROEs) currently projected by brokers are 18x (12%) and 21x (15%), which for the most part is closer to pre-pandemic levels[2]. Thus, compared to market analysts, our estimation incorporates some conservatism. This allows for the continued need for social distancing, ongoing risk of new cases and mutation of the COVID-19 virus.

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[1] PE since 1973 ranges from 5 to 25 in Australia and 5 to 30 internationally. ROE since 1980 ranges from 7% to 21% in Australia and 8% to 16% internationally. ROE data starts later than PE data.

[2] Pre-pandemic AE PE (ROE) is 18x (13%); Pre-pandemic IE PE (ROE) is 19x (12%).

Australian Equity Inputs after introducing Earnings Recovery Rate

	Scenarios			Australian Equity					
No.	Inflation	Growth/ Potential	Probability	ERR	ROE t=0	ROE t=1	Change in EPS t=1	PE t=0	PE t=1
1	High	High	11%	60%	6.92%	11.07%	61.37%	32.23	20.14
2	High	Medium	13%	58%	6.92%	10.93%	59.35%	32.23	20.40
3	High	Low	12%	56%	6.92%	10.79%	57.33%	32.23	20.66
4	Medium	High	9%	52%	6.92%	10.52%	53.30%	32.23	21.20
5	Medium	Medium	25%	50%	6.92%	10.38%	51.28%	32.23	21.49
6	Medium	Low	12%	48%	6.92%	10.24%	49.26%	32.23	21.78
7	Low	High	4%	45%	6.92%	10.03%	46.24%	32.23	22.23
8	Low	Medium	6%	40%	6.92%	9.69%	41.19%	32.23	23.02
9	Low	Low	4%	38%	6.92%	9.55%	39.18%	32.23	23.36
10	Crisis	Crisis	4%	35%	6.92%	9.34%	36.15%	32.23	23.87
Probability-Weighted			100%	51%	6.92%	10.44%	52.21%	32.23	21.40

Note: ROE at t=1 is calculated as the multiple of the ROE at t=0 and ERR; PE at t=1 is calculated as the ratio of PE at t=0 to ERR.

International Equity Inputs after introducing Earnings Recovery Rate

	Scenarios			International Equity					
No.	Inflation	Growth/ Potential	Probability	ERR	ROE t=0	ROE t=1	Change in EPS t=1	PE t=0	PE t=1
1	High	High	11%	40%	10.28%	14.39%	46.96%	30.36	21.69
2	High	Medium	13%	39%	10.28%	14.28%	45.91%	30.36	21.84
3	High	Low	12%	38%	10.28%	14.18%	44.86%	30.36	22.00
4	Medium	High	9%	33%	10.28%	13.67%	39.61%	30.36	22.83
5	Medium	Medium	25%	30%	10.28%	13.36%	36.46%	30.36	23.35
6	Medium	Low	12%	28%	10.28%	13.15%	34.37%	30.36	23.72
7	Low	High	4%	23%	10.28%	12.64%	29.12%	30.36	24.68
8	Low	Medium	6%	20%	10.28%	12.33%	25.97%	30.36	25.30
9	Low	Low	4%	18%	10.28%	12.13%	23.87%	30.36	25.73
10	Crisis	Crisis	4%	10%	10.28%	11.30%	15.47%	30.36	27.60
Probability-Weighted			100%	31%	10.28%	13.47%	37.62%	30.36	23.24

Note: ROE at t=1 is calculated as the multiple of the ROE at t=0 and ERR; PE at t=1 is calculated as the ratio of PE at t=0 to ERR.

## 2.2 Payout Ratio

Another adjustment to the equity models is to apply payout ratio (PR) normalisation. Previously the PR projections were built in as a fixed value due to their relatively stable historical trend. PRs for AE and IE at Q4 2020 peaked at 80.9% and 52.3%, respectively, both of which appeared to be unsustainably high relative to history. We lowered the forward payout ratios to pre-pandemic levels of 73% for AE and 43% for IE in year 1, and kept them fixed at that level in the following forecasted years.
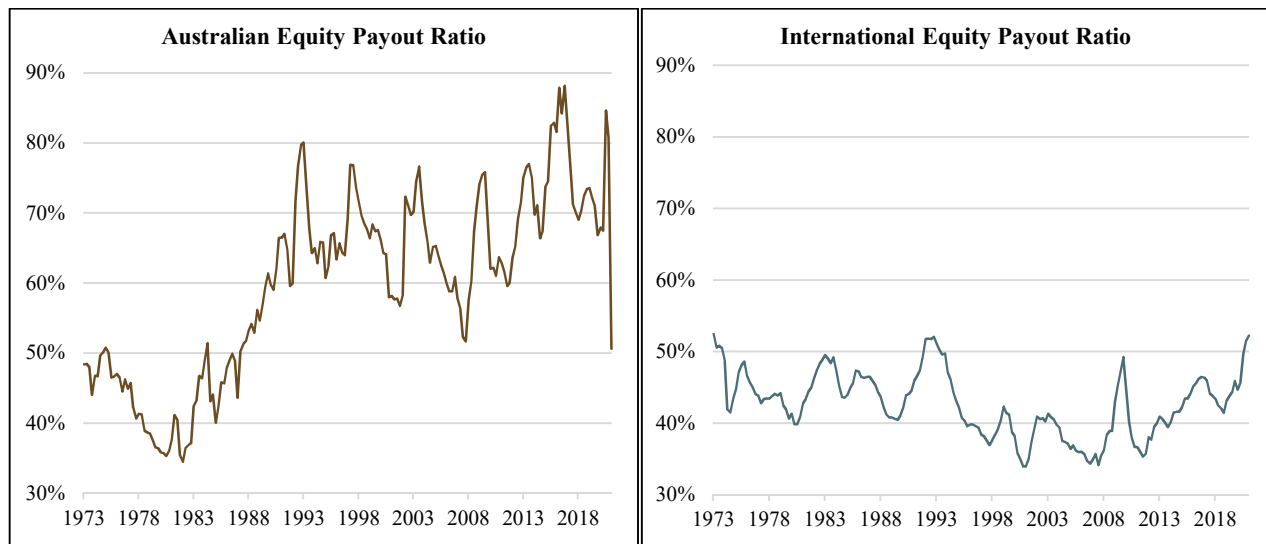
2.3 Equity Inputs - 10-Year Expectations

This subsection details the rationale for year 10 expectations and model inputs for AE and IE. Again, the AA team refers to historical data series for the key equity inputs of PE and ROE, and then undertakes analysis and applies judgement and further research in translating the historical data into year 10 projections.

Analysis since 1973 reveals a long, gradual trend of rising PE in Australia and across the globe, with both PEs currently at the high end of the range (see chart on previous page). The PEs remain relatively high after applying the ERR, which creates a downside skew going from the year 1 levels to our 10-year projections, with the balance of probabilities tilted towards the equity market eventually returning towards levels seen in the pre-pandemic environment (see fan charts on page 9 and page 10). The AA team applies higher PEs in times of lower inflation and higher growth, on the basis that investors will be willing to pay a higher price per unit return when inflation is low and the economy strengthens.

Our year 10 projections for the AE PE are primarily built on history while considering the underlying driving factors, specifically the influence of the financial and material industries[3]. We assume that the financial industry is likely to remain relatively resilient over our forecast horizon. Initially the sector will be supported by the expected recovery of net interest margins and reduction in bad debts for the banking industry post-COVID. Although technology disruptions such as blockchain systems may threaten the financial sector in due course, we are of the belief that the impact will be limited within the SMF forecast horizon. Reasons include the shortage of blockchain-skilled developers[4], the lack of regulatory framework[5], and competitive advantages that banks possess in credit analysis of loans. While the material sector may be cyclical, Australian producers have competitive advantages in terms of their large scale and low costs that should support ongoing resilience, specifically in resources. Building upon these considerations, our scenario modelling forecasts the AE PE in year 10 to range from 11x to 24x, with the probability-weighted PE across all scenarios of 16.2x.

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[3] IOZ ETF (iShares core S&P/ASX 200 ETF) is the Australian equity index the Asset Allocation team invests in, and the two major components are financial and material industries, accounting for 29.8% and 20.5% respectively.

[4] The implementation of blockchain system in financial industry requires highly qualified and skilled blockchain professionals to incorporate the blockchain technology into financial services, manage the complex peer-to-peer networks and protect users' and stakeholders' security and privacy.

[5] The regulatory framework is required to define the legislative obligation of users and stakeholders and protect users' and stakeholders' benefits.

The IE PE projections start by applying an ERR in setting the level for year 1, and then set the year 10 target after giving consideration to both history and the impact of emerging technology companies[6]. To guide our projections, the AA team undertook an in-depth analysis of the FAAMGs (Facebook, Apple, Amazon, Microsoft, and Google) and Tesla, with a view to understanding the impact on IE inputs due to both the accounting treatment of intangible assets and growth potential. Appendix 5.4 presents charts of the IE PE (and ROE) including and excluding the FAAMGs plus Tesla. The AA team did not incorporate the influence of the technology sector into the IE PE year 10 projections last semester, which were intentionally set as conservative due to lack of confidence in driving factors of IE PE. We have hence concluded that our projections for year 10 IE PE last semester were downward-biased, and have adjusted them upwards across all scenarios this semester. This largely recognises that technology companies provide a boost to the IE PE due their potential to generate earnings growth supported by relatively higher return on capital. This contribution may further increase with rising economic growth, which would only reinforce their earnings generating ability. To the extent that PE ratios reflect expectations of future growth potential, our analysis of the technology sector suggested elevating the overall IE PE. The new probability-weighted year 10 forecast for the IE PE of 16.8x is 1.7 units higher than the last semester's projections, and range across scenarios from 13x to 25x. This allows for some degree of convergence between the AE and IE PE, but with the IE PE settling at a moderately higher level.

In determining year 10 ROE, the AA team again starts with historical ranges, and applies an ERR to set the level in year 1. Our year 10 ROE forecasts create an upside skew from year 1 levels for the AE ROE, and a downside skew from the year 1 level for the IE ROE. The difference in skew stems from the year 1 ROE being higher relative to the historical range for IE than AE. Specifically, AE ROE in year 1 is trading in the middle of the range, which allows greater room for ROE growth in scenarios of high and medium economic growth over the 10-year estimation period. IE, on the other hand, is trading in the top half of the range after the ERR, which reduces the ROE growth potential across the scenarios. Our 10-year outlook has the ROEs broadly spanning the range seen during the pre-pandemic environment (see fan charts on page 9 and page 10). Within this, the AA team applies higher ROEs in times of higher inflation and higher growth, noting that companies will experience stronger growth and generate higher return when the economy strengthens.

Our year 10 AE ROE projections are primarily built on history. The prior discussion on the impact of financials and materials with respect to the AE PE also transfers onto our view of the AE ROE. This gives us confidence to forecast with reference to the historical range, although we assume that the higher levels of ROE seen during the China-driven mining boom of the mid-2000s were a one-off event that is unlikely to be repeated. The forecasted AE ROE in year 10 ranges from 6.5% to 14.5%, with the probability-weighted ROE across all scenarios standing at 11.48%.

With regards to IE ROE, the AA team predicted higher IE ROE year 10 targets compared to last semesters' projections after allowing for the impact of the technology sector. Our research of the FAAMGs and Telsa indicates that this group of stocks contributes about an additional 2% to the current market ROE relative to history. (See chart in Appendix 5.4.) This, combined with their ability to generate strong future returns through development of products in the areas of artificial intelligence, chips, cloud computing, and electronic and autonomous cars, lead us to elevate IE ROE year 10 targets by approximately 1% in each scenario compared to last semester's forecasts[7]. After considering the historical trends, we kept the IE ROE targets equal to or slightly less than AE ROE across all scenarios. The forecasted IE ROE in year 10 ranges from 7.0% to 14.5%, with the probability-weighted ROE at 11.41%.

It is worth noting that the low probability-weighted real return for AE of 3.33% and IE of 1.97% are mainly driven by the abnormally high PEs at the start of the forecast period, thus setting up a baseline from which there is a skew towards mean reversion in the market valuation. AE also benefits from access to franking credits, which are largely responsible for the difference in expected return versus that offered by IE.

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[6] VGS ETF (Vanguard MSCI Index International Shares) is the international equity index the Asset Allocation team invests in, and the largest component is the US Information Technology Sector, accounting for 21.7% of the VGS portfolio. The top ten holdings include Facebook, Apple, Amazon, Google and Microsoft (FAAMGs) plus Tesla, which totally contribute 15% to the VGS portfolio.

[7] Comparing to our last semester's estimations, we increased year-10 IE PE projections to a larger extent than year-10 IE ROE. This is because we intentionally forecasted year-10 IE PE in a conservative and pessimistic level as we were not confident in IE PE driving factors last semester (referring to the AA Asset Allocation Recommendation report of October 2020 for more details). This leaves us with a greater room to increase IE PE than IE ROE. Our estimations of IE ROE last semester were broadly similar to history, ranging from 6% to 13%.

Australian Equity PE
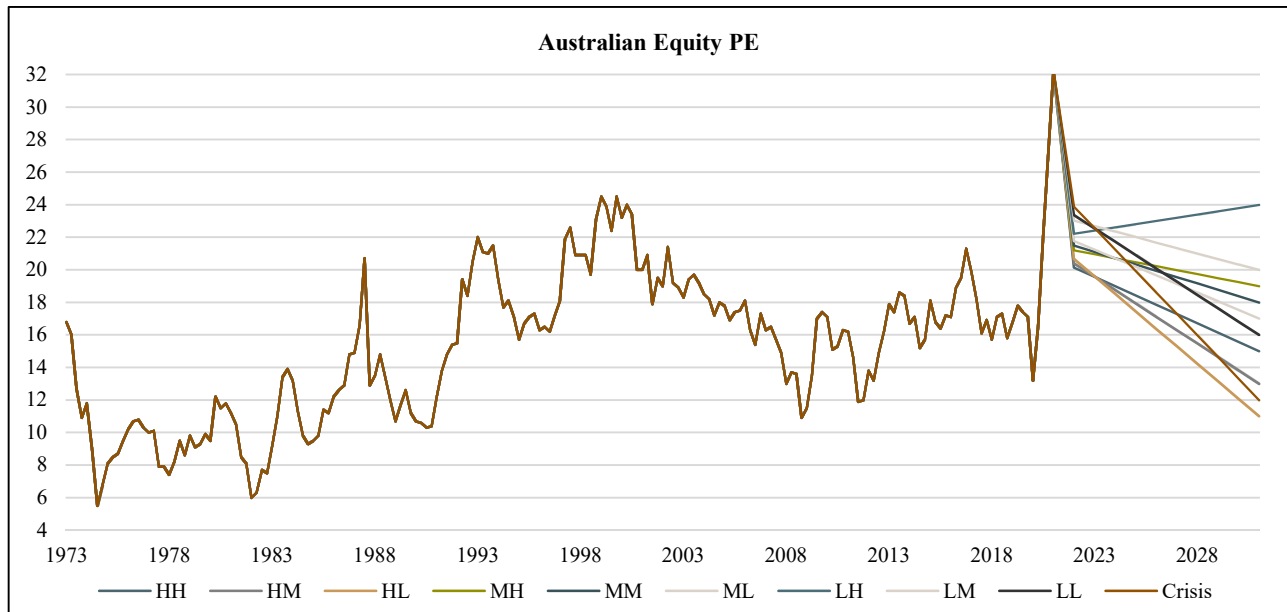
Note₁: This chart shows all available history for the Australian Equities PE ratio based on the Datastream Australian market series.
Note₂: The first letter characterises the inflation environment and the second characterises GDP/potential (output gap), with H, M, and L standing for High, Medium, and Low, respectively. For example, HH denotes High Inflation and High GDP/Potential.

Australian Equity ROE
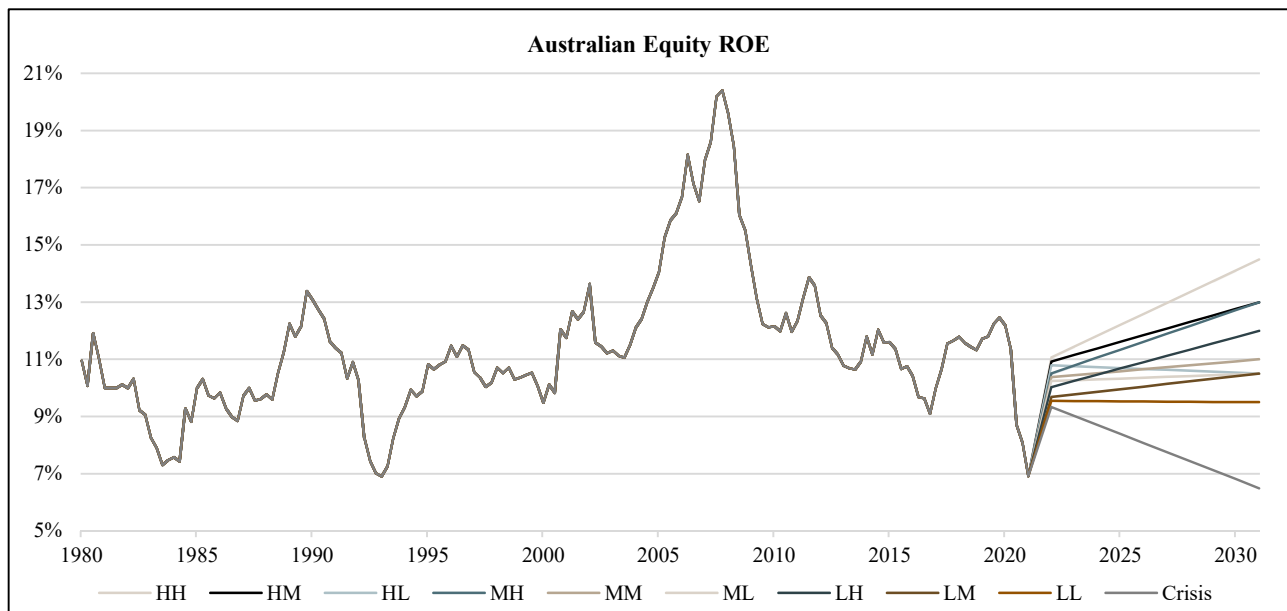
Note₁: Historical data is reported for ROE, while forecasts are formed as a blend of ROE on existing operations and ROER.
Note₂: This chart shows all available history for the Australian Equities ROE based on the Datastream Australian market series.
Note₃: The first letter characterises the inflation environment and the second characterises GDP/potential (output gap), with H, M, and L standing for High, Medium, and Low, respectively. For example, HH denotes High Inflation and High GDP/Potential.

International Equity PE
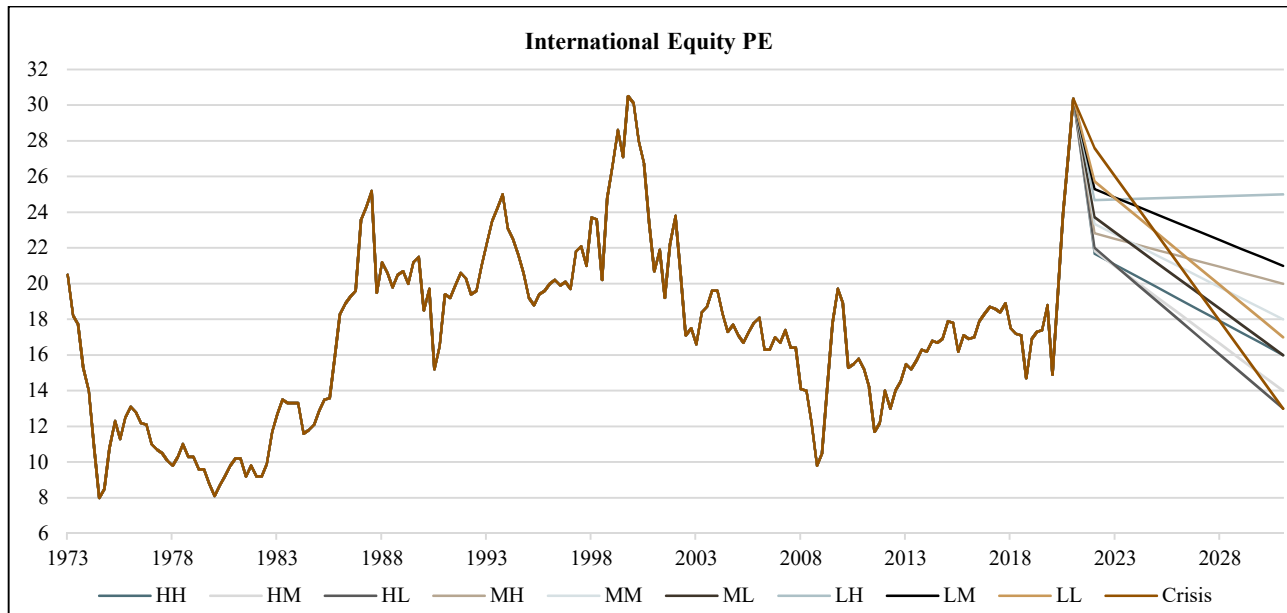
Note₁: This chart shows all available history for the International Equities PE ratio based on the Datastream total world series.
Note₂: The first letter characterises the inflation environment and the second characterises GDP/potential (output gap), with H, M, and L standing for High, Medium, and Low, respectively. For example, HH denotes High Inflation and High GDP/Potential.

International Equity ROE

Note₁: Historical data is reported for ROE, while forecasts are formed as a blend of ROE on existing operations and ROER.
Note₂: This chart shows all available history for the International Equities ROE based on the Datastream total world series.
Note₃: The first letter characterises the inflation environment and the second characterises GDP/potential (output gap), with H, M, and L standing for High, Medium, and Low, respectively. For example, HH denotes High Inflation and High GDP/Potential.
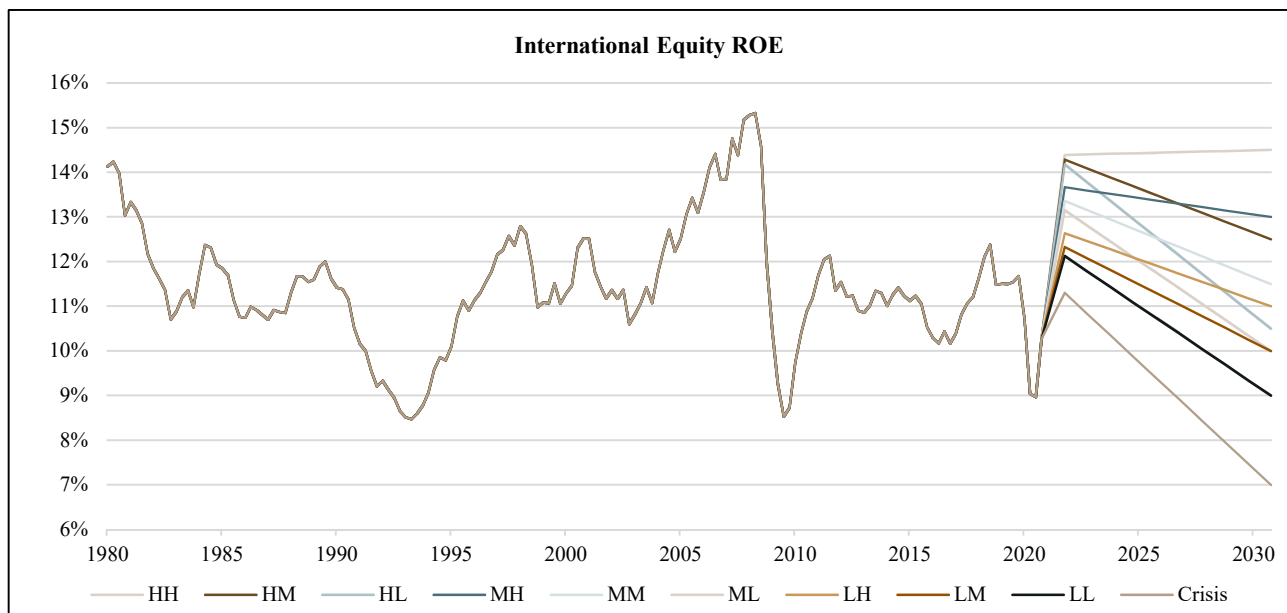
3 Inflation

This section details the AA team revision to its expectations around inflation. Along with economic activity (as captured by GDP/potential), inflation is one of the two key drivers in the Portfolio Construction Model used by the AA team. For the purposes of this report, it is worth noting that the quantity theory of money equation underpins much of the AA team's reasoning. This theory states that inflation(P) multiplied by real GDP(T) equals the supply of money(M) multiplied by the velocity of money(V) (i.e. '$PT = MV$').

3.1 Inflation Assumptions

The AA team has increased the probability on the higher inflation scenarios over the 10-year forecast horizon, while reducing the probability of lower inflation scenarios. The combined probabilities on the high inflation scenarios have been significantly increased to 36% from 24%; while those on the medium inflation scenarios were slightly increased to 46% from 44%. The combined probabilities on the low inflation scenarios are reduced significantly to 14% from 28%, while the crisis scenario was left unchanged at 4%. Each scenario assumes a linear progression from the current inflation measure towards the 10-year forecast. The projections assume that inflation trends over a 10-year horizon towards 4.5% in the high inflation scenarios, 2.5% in the medium scenarios, 1% in the low scenarios and 0% in the crisis scenario.

The above changes to scenario probabilities reflect the belief that the combination of a significant increase in the supply of money, the potential for recovery in the velocity of money, and limited scope for an increase in global productivity are acting to increase the risk of higher inflation. We also consider that the change in monetary policy stance by the US Federal Reserve (Fed) and Reserve Bank of Australia (RBA) in moving away from fixed inflation targets towards 'average' targets increases the probability of inflation attaining higher levels, for instance exceeding the 3% upper bound of the RBA's target range. Further justification for the increase in the AA team's inflation assumptions can be found in the next subsection.

3.2 Justification

Demand: Money Supply

In response to the COVID-19 pandemic, global central banks acted with speed and scale to ensure market liquidity. This has significantly increased the supply of money through two primary mechanisms. First, central banks engaged in unconventional monetary policy such as forward guidance and asset purchasing programs. Since the beginning of 2020, the Fed has added over US$3.5 trillion in assets to its balance sheet. Second, central banks encouraged credit creation by lowering their benchmark rates to near-zero, including the Fed lowering the Fed funds rate from 1.75% to 0.25% and the RBA lowering the Australian cash rate from 0.75% to 0.1%. These actions from central banks have resulted in a significant increase in the supply of money in the economy. In the 12 months to February 2021, M2 in the United States increased by 27%, significantly above its previous average growth rate of approximately 4%.

Analysis by the AA team plots US M2 growth against US CPI (lagged by 2 years), and finds a correlation of 0.62 between the two variables with an R-squared value of 0.40. This provides an empirical basis for the assumption that a significant increase in money supply increases the probability of inflation tending towards the high scenario forecast of 4.5%. The AA team believes it is unlikely central banks will take measures to reduce money supply back to its historical trend due to growing government debt and uncertainty surrounding the recovery amid the COVID-19 vaccine rollout, and wariness over potential for a large negative impact on real economic output and the markets from withdrawing the stimulus. This situation will pave the way for sustained relatively high money supply to eventually feed through into upward pressure on inflation. It is also important to note that the record fiscal stimulus has led to much more of the additional money ending up in consumer spending accounts as compared to the increases in money supply seen during periods such as 2008/09, which tended to reside more in the form of bank reserves.

Demand: Velocity of Money

Concurrent with the increase in money supply discussed above, the COVID-19 pandemic saw a severe decline in the velocity of money in 2020. The AA team believes that lockdowns, falling consumer confidence and heightened global uncertainty were key drivers in the decline in the velocity of money. Many people sat on the cash injected into their

accounts, which partly arose as a consequence of record fiscal stimulus. Critically, the drivers of lower velocity of money are likely to be transitory in nature. As COVID-19 vaccines continue to be developed and administered around the world, restrictions are eased and economies recover, confidence should return and many of the physical barriers to consumption will be removed. The cash sitting in consumer bank accounts will likely fuel significant consumer-driven demand in the economy. If this were to occur, velocity of money may trend back towards its pre COVID-19 level.

Supply: Deglobalisation, Supply Chains, Social Distancing

The impacts of COVID-19 may also have an impact on aggregate supply through highlighting the fragility of global supply chains and the effects of ongoing social distancing requirements. Global supply shortages, particularly related to healthcare, may lead to organisations restructuring their supply chains to reduce reliance on overseas inputs. The 'new normal' way of both producing and consuming economic output, as well as the risk of lockdowns, may also lead to a reduction in global supply. If COVID-19 has resulted in structural changes that lower global aggregate supply, it may put upward pressure on prices.

It is worth noting there is a counter argument that technological innovation will increase productivity, thereby reducing costs or increasing total potential economic output. The AA team is of the belief that the impact from COVID-19 will outweigh any impact from technological innovation on global supply.

Modern Monetary Theory

One of the strongest arguments against an increase in money supply leading to inflation is founded in Modern Monetary Theory (MMT). MMT proposes that an increase in the money supply associated with deficit spending will lead to real economic growth instead of causing inflation provided there is a sustained output gap in the economy. Applied to the current economic situation, the proponents of MMT suggest that the significant increases in money supply will thus lead to real economic growth as there is ample unused economic capacity.

The AA team believes that this interpretation of MMT is not readily applicable to the current situation. The magnitude of the increase in money supply is too great when compared with economic output gap. If inflation were to increase, MMT proposes that an increase in taxes is a key tool for fiscal policy makers to reduce demand. However, due to the level of government debt and political incentive not to increase taxes, the AA team believes this will be politically difficult to implement in the magnitude required to rein in excess demand.

Average Inflation Targets

In 2020, both the Fed and RBA announced a movement away from targeting a fixed inflation level towards an average of inflation over time. Critically, instead of acting proactively to avoid inflation breaching the upper target bound, central banks will now have a lagged response to a rise in inflation. This lagged response from central banks, along with the potentially variable and delayed effect of any response, has increased the risk of central banks losing control of inflation and unanchoring inflation expectations. The change in monetary policy has also created uncertainty as to how high inflation must rise, or for how long, before central banks will respond. The Fed's 'over the long-run' and RBA's 'over time' leaves much to analysts' imaginations.

Additionally, central banks have consistently assured the market that benchmark rates will not be increased for some years. To the extent that asset markets are pricing in near-zero interest rates in the short-to-medium term, an increase to interest rates – to mitigate high inflation – may cause market havoc. Central banks are likely to face significant trade-offs between maintaining asset prices, maximising economic output and controlling inflation when they look to increase interest rates. This increases inflation risk by raising the chances that the action required to rein in inflation might not be taken in sufficient time or in sufficient measure.

4 Rationale for Maintaining Current Portfolio Weights

The AA team process involves first considering the optimised asset weights arising from our model, and then applying qualitative adjustments to arrive at our proposed asset allocation. Our optimiser indicates a 100/0 growth/defensive weight, with the growth component invested 85% in AE and 15% in IE. The weighting of 85% in AE is in line with the upper constraint on AE weights under the SMF Investment Policy Statement. The model is a quantitative instrument used to guide our allocation decisions, but not make them. While we are influenced by the model and its signals, we are hesitant to completely dive into its optimised suggestions given that models are fallible, and optimisers can be sensitive to modelling choices and tend to yield corner solutions. However, it is useful in pointing out the direction in which we might consider shifting the portfolio. The discussion below sets out how the AA team moves from the 'optimised' weights to the proposed weights.

The AA team does not think it is suitable to completely switch out of defensive assets and into growth assets. First, removing defensive assets from the portfolio would damage the diversification of the Fund, and limit our exposure to only two asset classes. Second, our model suggests growth assets provide a modest premium to defensive assets relative to that offered historically. For instance, the real expected return on AE of 3.33% and on IE of 1.97% exceed that on AC of 0.58% by 2.75% and 1.39% respectively. Third, the fund portfolio will be exposed to huge downside risks if inflation turns out to be high. This situation would hurt both equities and bonds during the transition to higher inflation, during which defensive assets (especially cash) are likely to provide a lesser loss and hence protect the Fund to some extent.

With regard to AFI versus AC, the AA team notes they both provide near-zero expected real returns of -0.80% and +0.58% respectively. Ideally, the AA weighting changes should be done with a larger margin than what we see currently for AFI relative to AC. Furthermore, though AFI struggles in the case of rising inflation, it still provides some protection for the Fund in low inflation states, in particular the crisis where it is the best performing asset class within the Fund's portfolio. Thus, if current economic events continue to transpire towards a real crisis, it is desirable to hold onto some AFI and retain the option to further switch out of AFI into AC once that point is reached. Finally, the case for increasing the bet size on AFI vs AC seems harder to make given the rise in bond yields since last semester, with the Australian 10-year bond yield increasing from 0.8%-0.9% to around 1.7%. The action of central banks in trying to keep a lid on the yield curve also reduces the urgency, as it makes it harder (but not impossible) for bond yields to run significantly higher for now. The AA team will keep this situation under watch. If bond yields correct back down, a stronger case may emerge for a further AFI to AC switch. If yields go higher still, at least we are on the right side with the current position.

Our model suggests that AE will outperform IE (as well as all other assets) to a limited extent, with a 10-year horizon real return of 3.33% compared to IE's 1.97%. AE also delivers a higher return than IE across all scenarios thus demonstrating stochastic dominance. This relative performance of AE versus IE is mainly due to the franking credits. Nevertheless, a margin just above 1% is not strong enough to support a proposal of switching IE to AE, allowing for uncertainty around the modelling. In addition, any further tilt towards AE will reduce portfolio diversification and increase the home bias risk.

In conclusion, we decided to leave the current portfolio untouched for now. Looking forward, we will keep an eye on interest rates. We will also start researching new asset classes that may provide an inflation hedge, while being consistent with the Fund achieving its overarching long-term return objective.

5 Appendices

5.1   Appendix A: Year 10 Asset Model Assumptions, Inputs and Forecasts

5.1.1 Australian Equities

Australian Equities: Return on Equity on Existing Operations (ROE) and Reinvestment (ROER)
Year 10 Targets

Scenario / State		GDP/Potential			
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Crisis** *0.935*
Inflation	**High** *4.5%*	ROE: 14.5% ROER: 14.5%	ROE: 13.0% ROER: 13.0%	ROE: 10.5% ROER: 9.0%	
	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%	
	Crisis *0%*				ROE: 6.5% ROER: 3.5%

Australian Equities: Price to Earnings (PE) Ratio
Year 10 Targets

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

5.1.2 International Equities

International Equities: Return on Equity on Existing Operations (ROE) and Reinvestment (ROER)
Year 10 Targets

Scenario / State		GDP/Potential			
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**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: 11.0%	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%	
	Crisis *0%*				ROE: 7.0% ROER: 5.0%

International Equities: Price to Earnings (PE) Ratio
Year 10 Targets

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

5.1.3 Australian Fixed Income

Seven-Year Bond Yield
Year 10 Targets

Scenario / State		GDP/Potential			
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**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%	
	Crisis *0%*				0.25%
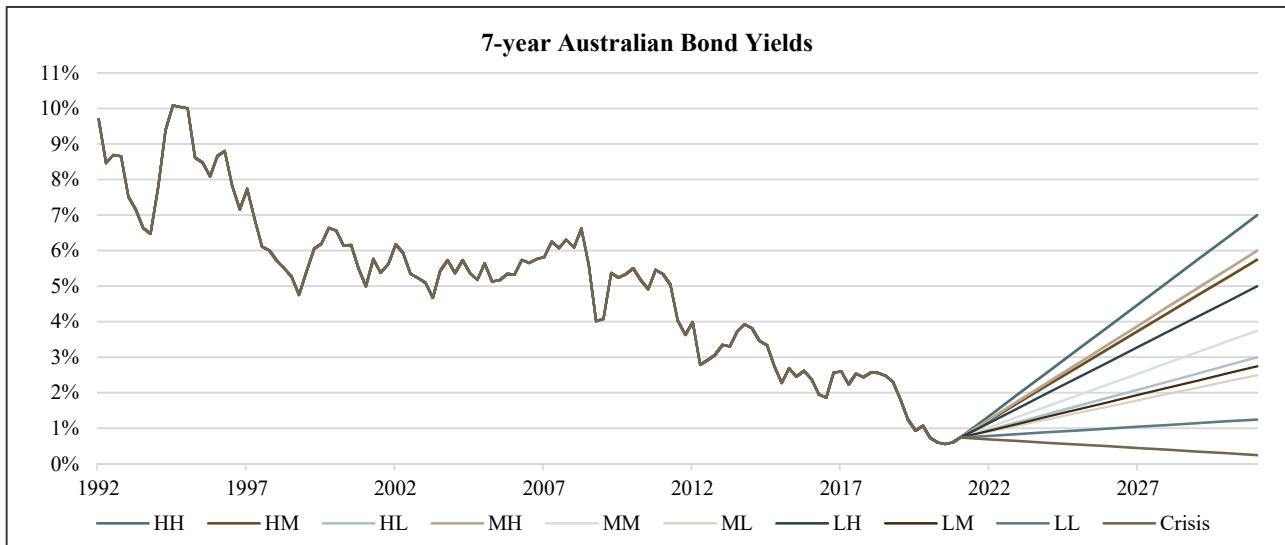
7-year Australian Bond Yields

Note: Each line forecasted from the year 2020 represents one of the 10 scenarios employed in our analysis. The first letter characterises the inflation environment and the second characterises GDP/potential (output gap), with H, M and L standing for High, Medium and Low, respectively. For example, HH denotes High Inflation and High GDP/Potential. We translate our 10-year bond yield and cash rate forecasts into 7-year bond yields for the purpose of modelling the AC ETF.

5.1.4 Australian Cash

Australian Official Cash Rate
Year 10 Targets

Scenario / State		GDP/Potential			
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**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%	
	Crisis *0%*				0.00%

BetaShares High Interest Cash ETF Spread over Official Cash Rate
Year 10 Targets

Scenario / State		GDP/Potential			
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**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%	
	Crisis *0%*				0.20%
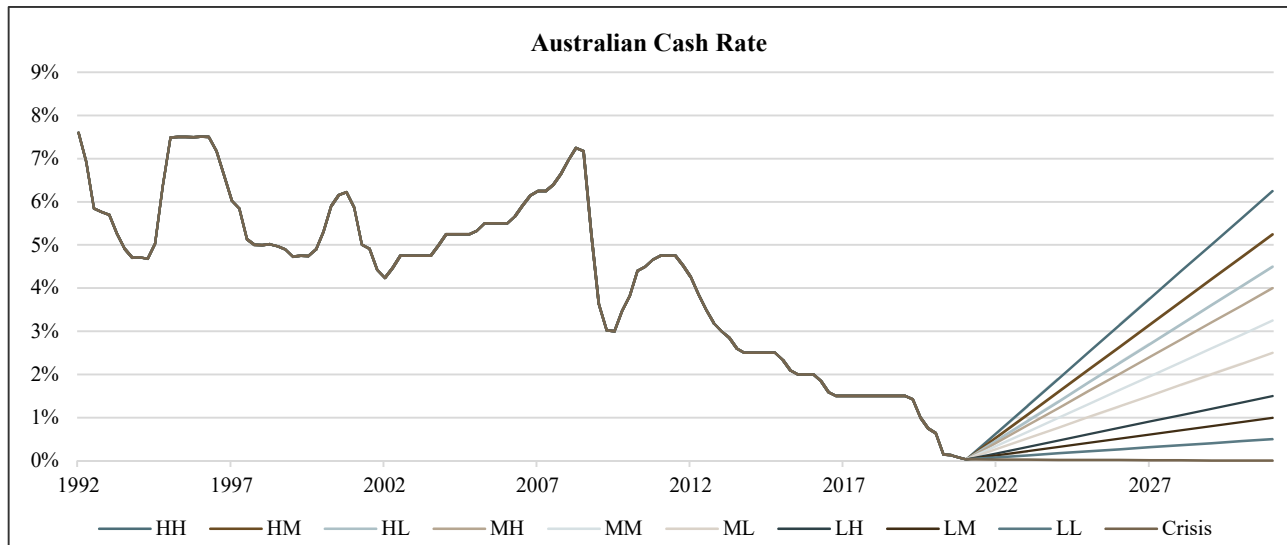
Australian Cash Rate

Note: Each line forecasted from the year 2020 represents one of the 10 scenarios employed in our analysis. The first letter characterises the inflation environment and the second characterises GDP/potential (output gap), with H, M and L standing for High, Medium and Low, respectively. For example, HH denotes High Inflation and High GDP/Potential.

5.2 Appendix B: Nominal Asset Returns

Asset Class Expected Nominal Returns under 10 Scenarios

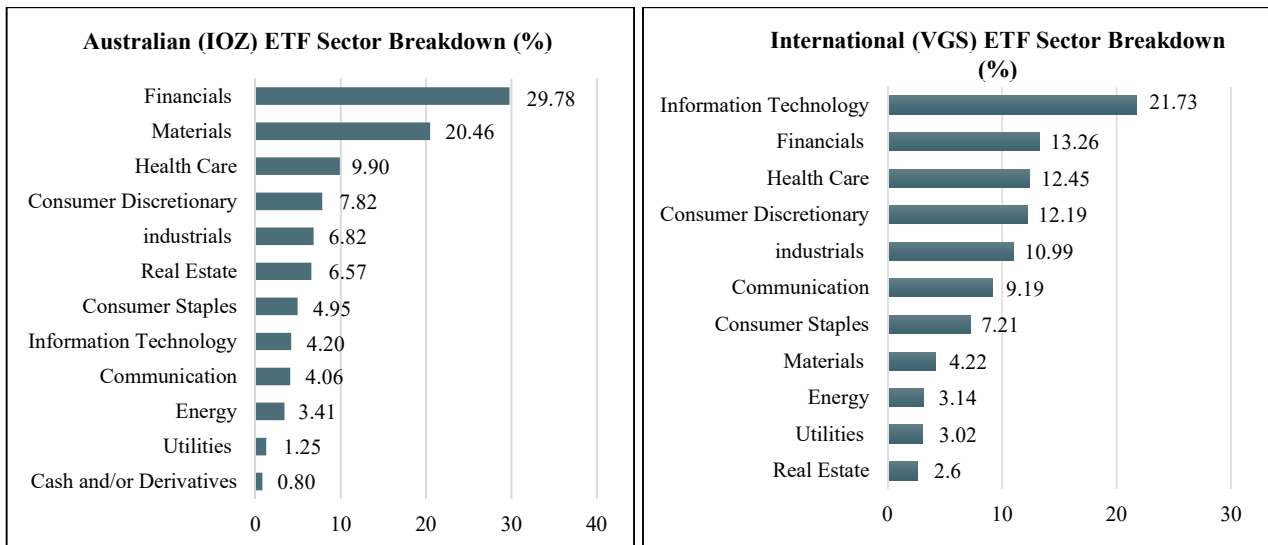|	Scenarios			Year 10 Expected Real Return under 10 Scenarios			
No.	Inflation	Growth / Potential	Probability	Australian Equities	International Equities	Australian Fixed Income	Australian Cash
1	High	High	10%	7.98%	6.93%	1.59%	4.46%
2	High	Medium	8%	5.55%	4.04%	1.39%	3.75%
3	High	Low	6%	1.76%	1.17%	0.74%	3.18%
4	Medium	High	8%	8.45%	7.47%	1.62%	2.85%
5	Medium	Medium	25%	6.08%	4.96%	1.13%	2.39%
6	Medium	Low	11%	4.93%	2.25%	0.90%	1.93%
7	Low	High	4%	9.33%	7.21%	1.70%	1.32%
8	Low	Medium	11%	6.01%	4.13%	1.19%	0.99%
9	Low	Low	13%	2.99%	1.03%	0.88%	0.66%
10	Crisis	Crisis	4%	-3.53%	-4.38%	0.66%	0.28%
Probability-Weighted			**100%**	**5.40%**	**4.01%**	**1.18%**	**2.60%**

5.3 Appendix C: Australian and International ETFs – Sector Breakdown

Australian (IOZ) ETF Sector Breakdown (%)

Sector	%
Financials	29.78
Materials	20.46
Health Care	9.90
Consumer Discretionary	7.82
industrials	6.82
Real Estate	6.57
Consumer Staples	4.95
Information Technology	4.20
Communication	4.06
Energy	3.41
Utilities	1.25
Cash and/or Derivatives	0.80

International (VGS) ETF Sector Breakdown (%)

Sector	%
Information Technology	21.73
Financials	13.26
Health Care	12.45
Consumer Discretionary	12.19
industrials	10.99
Communication	9.19
Consumer Staples	7.21
Materials	4.22
Energy	3.14
Utilities	3.02
Real Estate	2.6

5.4 Appendix D: Tech Sector Impacts on Australian and International Inputs

IE PE including/excluding FAAMGs & Tesla

— IE PE including FAAMGs & Tesla
— IE PE excluding FAAMGs & Tesla

IE ROE including/excluding FAAMGs & Tesla

— IE ROE including FAAMGs & Tesla
— IE ROE excluding FAAMGs & Tesla
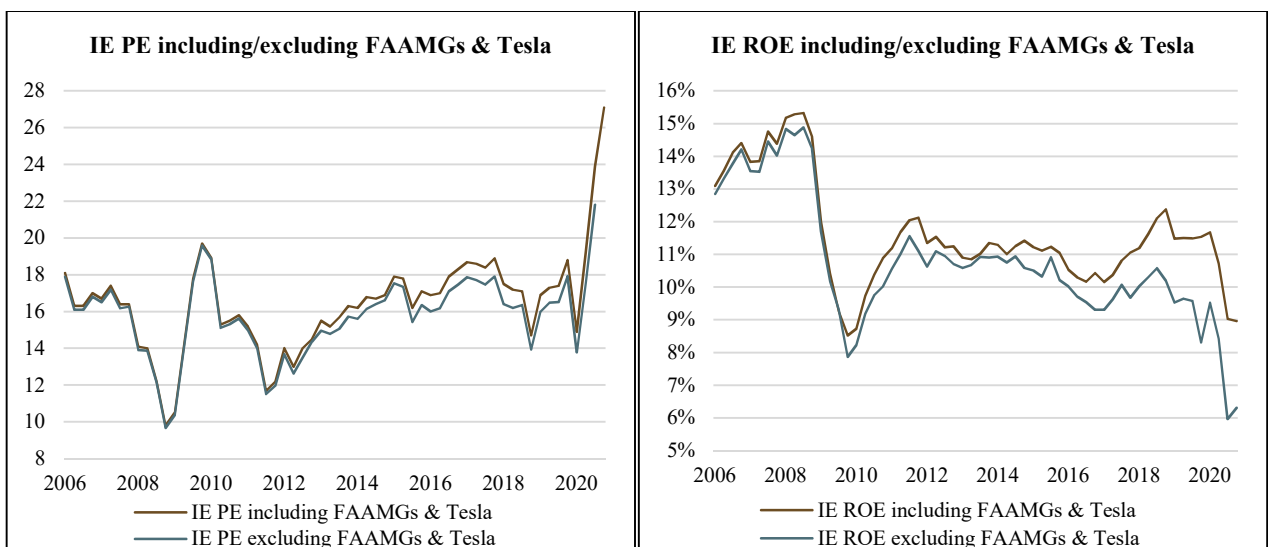
5.5   Appendix E: Australian and International Equity Inputs Historical Trends
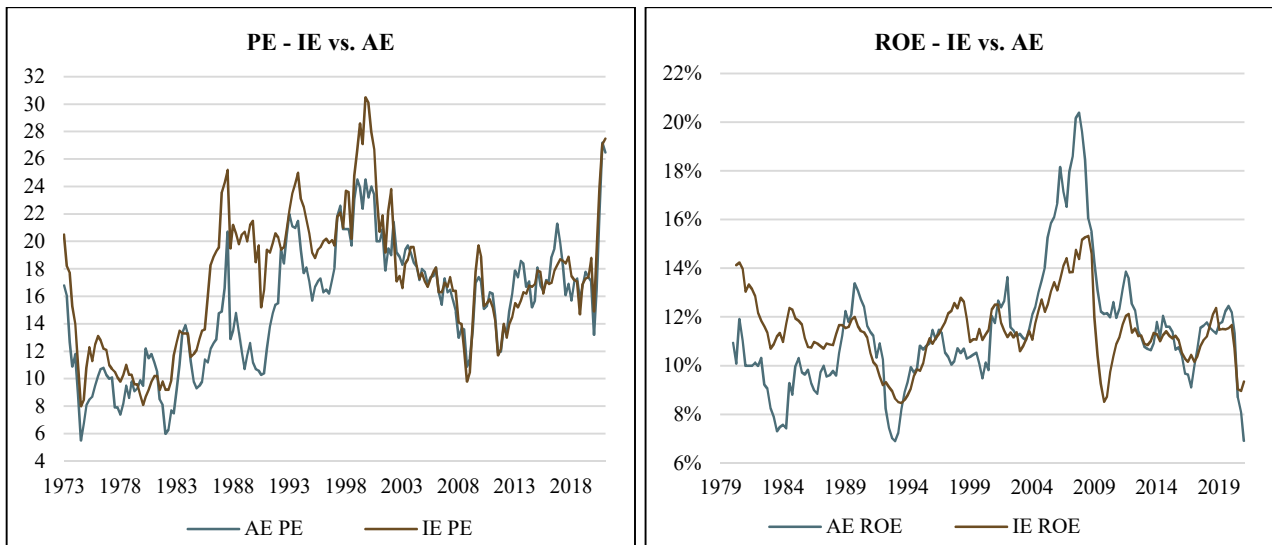
5.6   Appendix F: Detailed Portfolio Weights

Portfolio Weights – Detailed Breakdown

Asset Weights	Reference Portfolio	Target Portfolio	Over (Under) Weight
GROWTH ASSETS			
Active Australian Equities Portfolio	50%	50%	-
Australian Equities in AA Portfolio	10%	10%	-
Total Australian Equities	**60%**	**60%**	**-**
International Equities, Hedged	10%	10%	-
International Equities, Unhedged	10%	10%	-
Total International Equities	**20%**	**20%**	**-**
Total Growth Assets	**80%**	**80%**	**-**
DEFENSIVE ASSETS			
Australian Fixed Income	15%	7.5%	-7.5%
Australian Cash	5%	12.5%	+7.5%
Total Defensive Assets	**20%**	**20%**	**-**
TOTAL	**100%**	**100%**	

5.7   Appendix G: Macro Driver Assumptions and Inputs

Inflation Paths

Scenario	Historical Level (1992-present)	Historical Probability (1992-present)	Forecast Level	Forecast Probability
High	6.1%	23.0%	4.5%	36%
Medium	3.0%	53.1%	2.5%	46%
Low	1.6%	23.9%	1.0%	14%
Crisis			0.00%	4%

GDP/Potential Paths

Scenario	Historical Level (1992-present)	Historical Probability (1992-present)	Forecast Level	Forecast Probability
High	1.017	24.8%	1.015	36%
Medium	1.002	50.4%	0.995	46%
Low	0.989	24.8%	0.980	14%
Crisis			0.935	4%

Forecasted Scenario Probabilities

Scenario / State		GDP/Potential			
		High *1.015*	**Medium** *0.995*	**Low** *0.980*	**Crisis** *0.935*
Inflation	**High** *4.5%*	11%	13%	12%	
	Medium *2.5%*	9%	25%	12%	
	Low *1%*	4%	6%	4%	
	Crisis *0%*				4%

Historical Scenario Probabilities (1992-present)

Scenario / State		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%

Australia - Historical Inflation vs. Output Gap (1970 – present)

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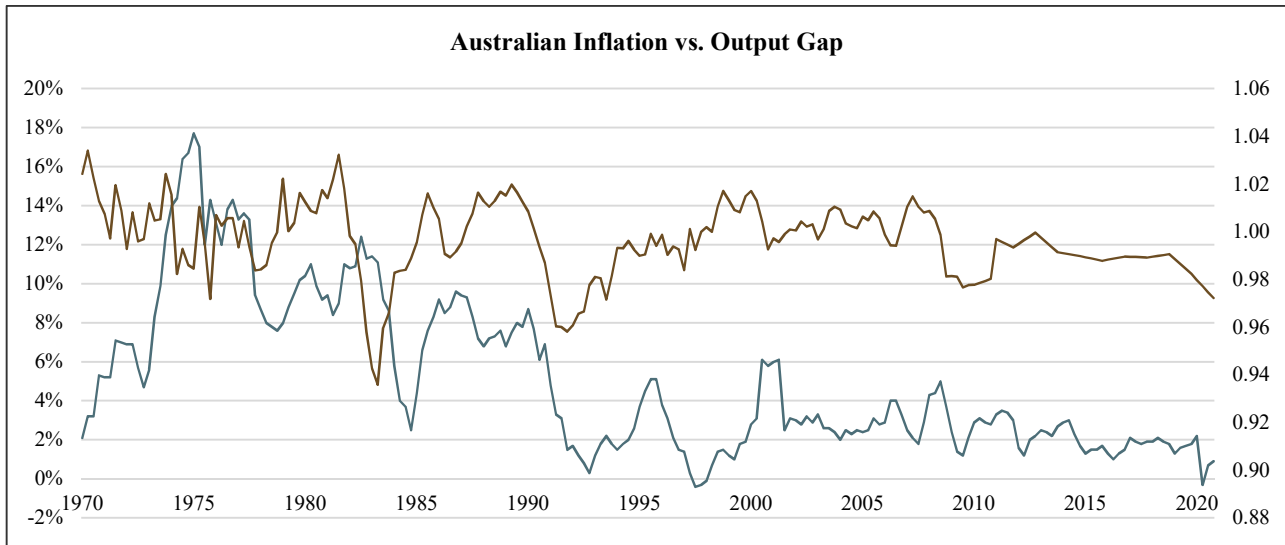
Note: This chart shows the history for Australian inflation and output gap (GDP/Potential) commencing in 1970, when data for some asset class inputs becomes available. Inflation data is sourced from the Reserve Bank of Australia, and output gap data is sourced from the Organisation for Economic Co-operation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