THE UNIVERSITY OF MELBOURNE

Fund Manager Risk and Return Projections: Are they realistic?

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Background

Australian superannuation (pension) funds offering a “MySuper” default fund are required to:

Provide public information on

1. Expected returns - 10 year target real returns to members
2. Risk – Expected number of negative annual nominal returns for members over 20 years
3. Portfolio allocation – benchmark portfolio percentage composition over 9 asset classes
4. Portfolio allocation “flexibility” – upper and lower bounds for allocation percentages

Research Questions

1. Are risk and expected return disclosures consistent (positive relationship across funds)?
2. Does mandated form of disclosures make sense?
3. Can expected long term asset class returns be derived? If so are they realistic?

Background

Quarterly reporting since 2013

Around 80 funds with non-life-cycle strategy (another 40 with life-cycle strategies, not considered here)

Reported risk and return figures are for “average” member ($50,000 balance)

To convert to pre-tax nominal portfolio returns (μ) need to allow for

- tax (use average tax rate over recent years)
- anticipated inflation (use mid point of RBA target range)
- operating costs (adjust for fees charged and costs incurred)

To convert risk measure to standard deviation equivalent:

- find σ which, assuming Normal Distribution and μ calculated, gives same probability of negative returns as that reported

Average Benchmark Asset Class Allocations

Asset Class[a]	Average benchmark allocation[b]
Cash (cash)	5.4
Fixed Income (fi)	18.1
Australian listed equity (ae)	26.0
International Listed equity (oe)	26.1
Unlisted equity (ue)	4.9
Property (prop)	9.4
Infrastructure (infra)	6.9
Commodities (comm)	0.6
Other (oth)	10.6

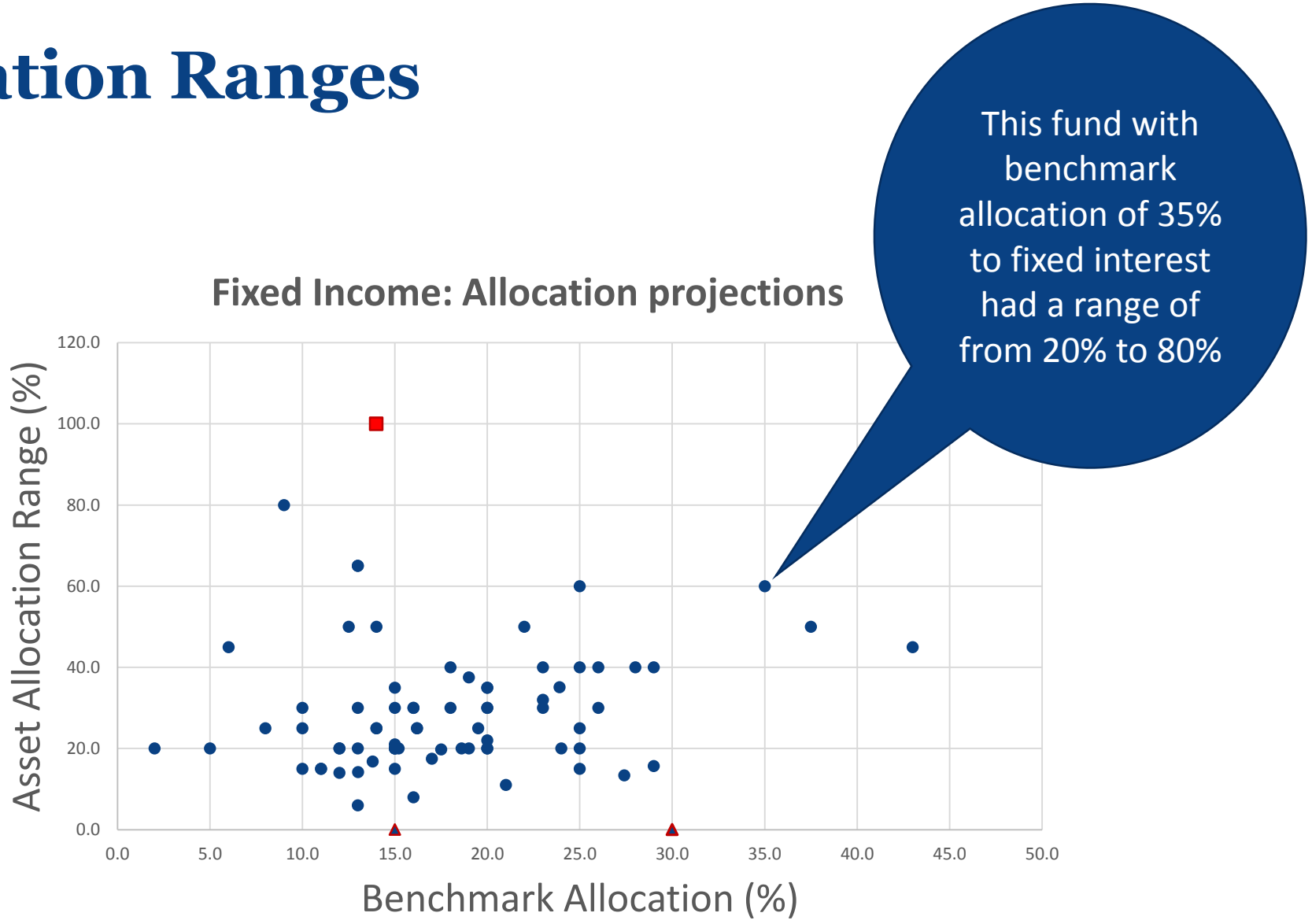
(a) Labels used in subsequent empirical analysis shown in brackets).

(b) The figures for ae, oe and ue are allocations for the 63 funds which provide such information (rather than simply an aggregate figure for all equity (e)). The average of the 15 funds reporting only total equity is 47.5, noticeably below the total of 57 per cent for the other funds reporting the components

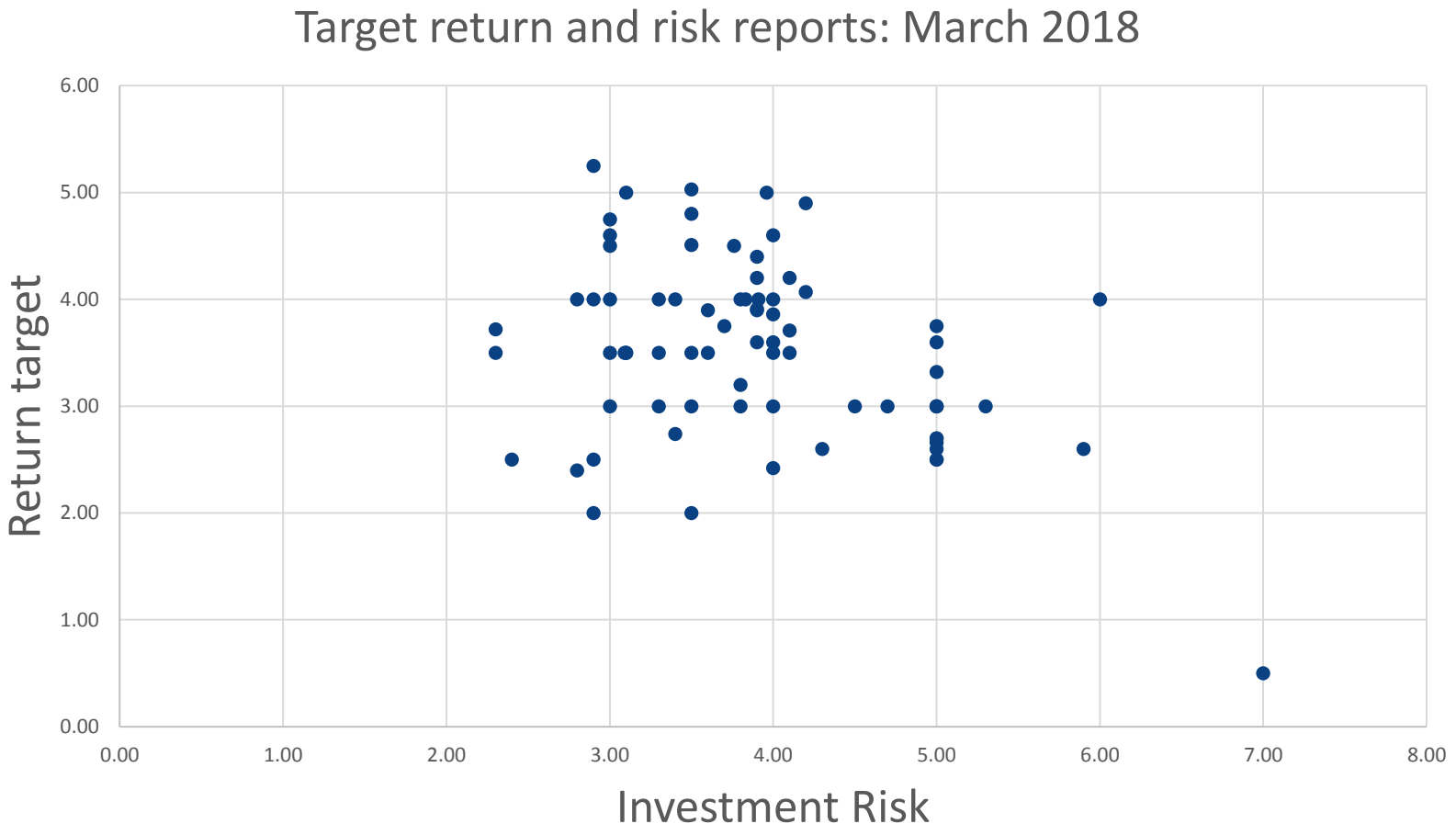
Asset Allocation Ranges

Reported asset allocation ranges potentially useful for identifying active versus passive strategies and view on ability to create “alpha”.

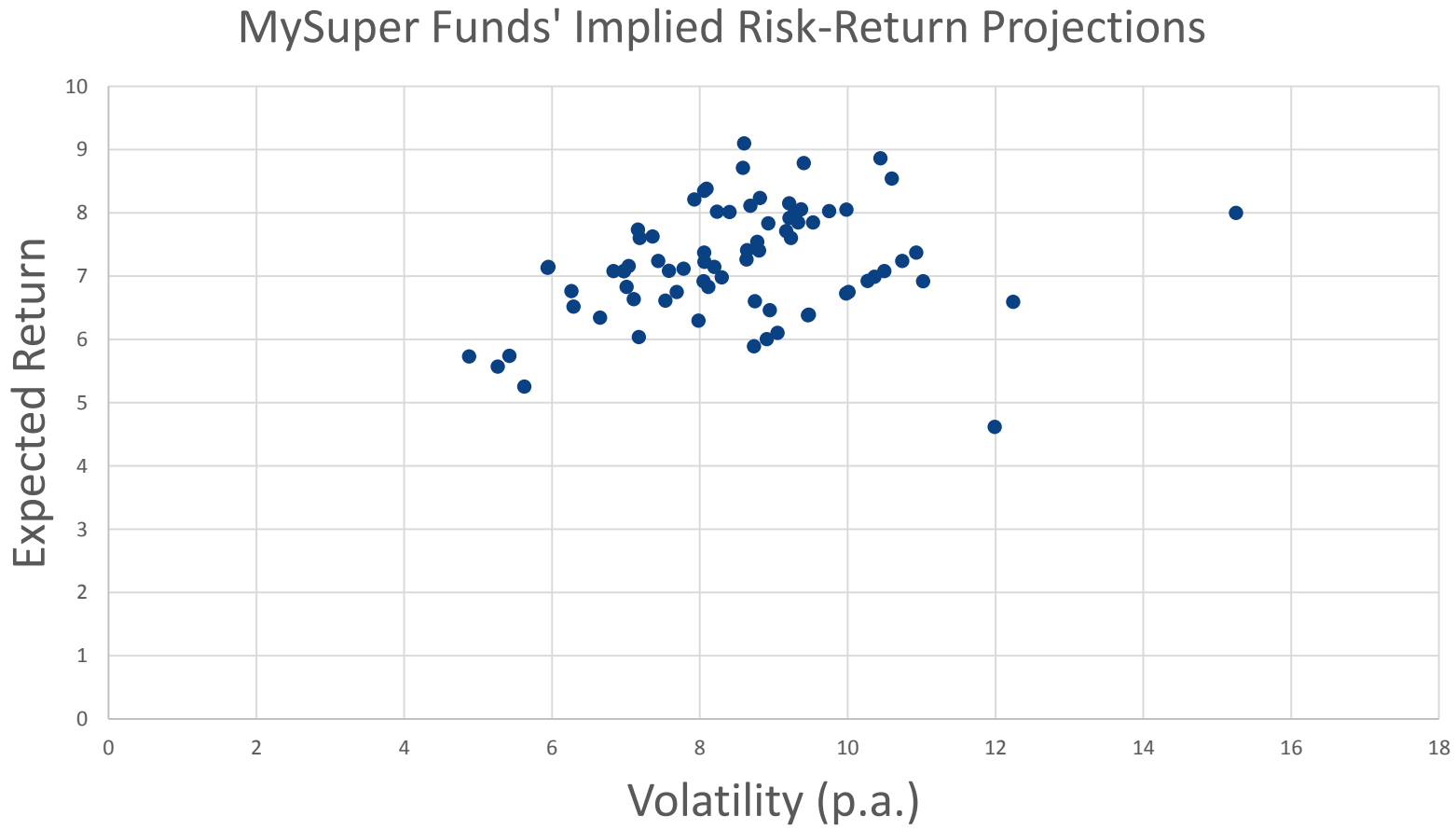
In practice – useless.



Reported Risk and Return: A Negative Relationship!!



Using conventional metrics: a positive risk-return relationship



Deriving Expected Asset Class Returns

Portfolio return for fund (i) is weighted average of expected asset class (j) returns

$$r_{pi} = \sum_{j=1}^{N} r_{ji} \cdot w_{ji}$$

Individual fund expectations differ from average

$$r_{ji} = R_j + e_{ji}$$

$$r_{pi} = \sum_{j=1}^{N} R_j \cdot w_{ji} + u_i$$

where $u_i = \sum_{j=1}^{N} e_{ji} \cdot w_{ji}$.

Instrumental Variables Estimation

Leads to a regression equation for expected portfolio return (ygross) where explanators are portfolio weights and regression coefficients are expected returns

$$\boldsymbol{ygross_i = \beta_1 cash_i + \beta_2 FI_i + \beta_3 ae_i + \beta_4 oe_i + \beta_5 ue_i + \beta_6 e_i + \beta_7 prop_i + \beta_8 infra_i + \beta_9 comm_i + \beta_{10} oth_i + u_i}$$

BUT

Error term correlated with explanators (by construction) - OLS biased

Construct Instrumental Variables – for each fund (i) find fund (k) which has most similar asset allocation defined as below, and use its asset allocation instead

$$ssd_{k,i} = \sum_{j=1}^{N} (w_{jk} - w_{ji})^2$$

Correlation of IV and original variables OK for main asset classes (but less so for some others – further work needed)

Results

Coefficients intuitively plausible as expected asset class returns

Equity risk premium around 4.5-5%

Liquidity (?) premium for unlisted equity and infrastructure

Commodities estimate best ignored – few non-zero observations

ygross	Instrumental Variables		OLS	
Regressors	Coef.	Std. Err.	Coef.	Std. Err.
cash	**0.037**	0.089	0.048	0.027
fi	**0.041**	0.022	0.036	0.014
ae	**0.085**	0.027	0.086	0.013
ie	**0.089**	0.028	0.089	0.017
ue	**0.168**	0.121	0.132	0.026
prop	**0.032**	0.051	0.045	0.028
infra	**0.124**	0.086	0.127	0.028
comm	**0.490**	3.087	-0.028	0.254
oth	**0.060**	0.017	0.059	0.012
Root MSE	0.754		0.765	
R-squared	NA		0.991	

Comparison with historical returns & survey expectations

- Estimates have large standard errors
- Estimates not inconsistent with historical experience
  - recent low interest rate environment may explain lower fixed interest & cash estimates
- Notably: no change in target real portfolio returns over 6 year period even though real interest rates have declined by over 100 basis points.

	Russell-ASX (20 years to 2017)[a]	Rice-Warner 10 year expectations[c]	Prod. Comm. (2008-17)[e]	Estimates
Cash (cash)	4.6	3.31	4.05	3.99
Fixed Interest (fi)				4.22
Australian Bonds	5.9	3.76	6.43	
Global Bonds (hedged)	7.	4	7.08	
Australian listed equity (ae)	8.8	7.62	3.84	8.44
Overseas listed equity (oe)			5.37	8.40
Global shares (hedged)	7.4	6.91		
Global shares (unhedged)	5.4	7.01		
Unlisted equity (ue)		9.19	8.01	13.28
Total equity (e): if equity composition not given				7.74
Property (p)			4.40	5.01
Residential investment property	10.2			
Australian listed property	7.2	6.49		
Global listed property (unhedged)	7.4	6.45		
Infrastructure (i)		7.66	7.59	12.55
Commodities (comm)				-1.77
Other (oth)				6.66

Some averaging of asset sub-classes involved in some figures

Tax Complication

- Australia has a dividend imputation tax system – Australian equities have additional tax benefits for Australian super funds
- "Cash" returns used here ignore that tax benefit and portfolio tax adjustment (to get pre tax return from observed post tax return) used average tax rate paid
  - but tax rate of super funds on Australian equities portfolio closer to zero (due to imputation, capital gains)
- Correcting for different tax treatment would lead to higher expected cash return for Aust equity than for foreign equity, despite tax advantages of the former. Anomalous!

(algebra)

Conclusions

- Mandated form of disclosure metrics warrants reconsideration (although may not lead investors into error – and probably considered by very few anyway)!
- Expected asset class returns derived from mandated disclosures generally not unreasonable, but low reliability. Why not require disclosures of those directly – as per US example.
- Disclosure of asset allocation ranges - a waste of time!
- Further examination of behaviour of disclosed targets over time is warranted
- Ultimately, comparison of actual performance against targets could be done – but probably not useful!

Tax complications

Equation estimated is of form (where t_{av} is average tax rate on portfolio, w's are portfolio shares)

$$r_{pre} = \frac{r_{post}}{(1-t_{av})} = \beta_{ae}.w_{ae} + \beta_c.w_c + \cdots .. + u$$

Equivalent to:

$$r_{post} = (1-t_{av})\ \beta_{ae}.w_{ae} + (1-t_{av})\ \beta_c.w_c + \ldots . + u$$

Should use specific tax rates for asset classes (t_{ae}, t_c, etc)

$$r_{post} = (1-t_{ae})\ \beta_{ae}.w_{ae} + (1-t_c)\ \beta_c.w_c + \ldots . + u$$

If $t_{ae} \approx 0$, equivalent to

$$r_{post} = \beta_{ae}.w_{ae} + (1-t_c)\ \beta_c.w_c + \ldots . + u$$

Approach used gives w_{ae} coeff of $(1-t_{av})\ \beta_{ae} < \beta_{ae}$,

ie estimate of implied return on Australian equity biased downwards