



INVESTMENT RISK

Introduction

This paper discusses investment risk for members of a Defined Contribution (DC) superannuation fund. This would include for example 401K plans in the USA, most Australian superannuation funds and many other DC funds globally. This paper uses examples within the Australian DC fund arena (the author's country of residence) however the principles are consistent across all global markets.

The paper challenges the investment industry's traditional use of volatility as a proxy for risk and illustrates the fallacy that this proxy can be used without due consideration of the investor's objectives.

The overwhelming majority of superannuation fund members fall into their fund's default option. Consequently, at the point of retirement many are faced, for the first time with the need to make a choice for their investment option. Clearly investment risk is a major if not the major consideration in making their choice. Unfortunately, the information available for superannuation members to make an informed decision at this crucial time is generally inadequate or even misleading.

At a Sydney conference in 2016, a highly-credentialed panel of investment risk measurement experts from the UK, the USA and Australia were asked the question "is volatility an appropriate measure of risk for a superannuation fund?" Each of the three panel members responded "no". This is of concern given that volatility is and has been used consistently as a proxy for risk by the superannuation industry.

The key to the solution lies in (a) defining "risk" in the context of a superannuation fund member, particularly when approaching or entering draw down phase and (b) recognising that risk and return cannot be viewed independently. The two are inextricably linked and a meaningful measure of risk must also consider any associated risk/return trade off.

This paper argues that (a) superannuation funds and advisers are likely to be increasing "risk" to members by recommending less volatile asset allocations as they approach or enter retirement and (b) the information available to members to make an informed investment choice is at best inadequate and at worst misleading.

Traditional measures of risk

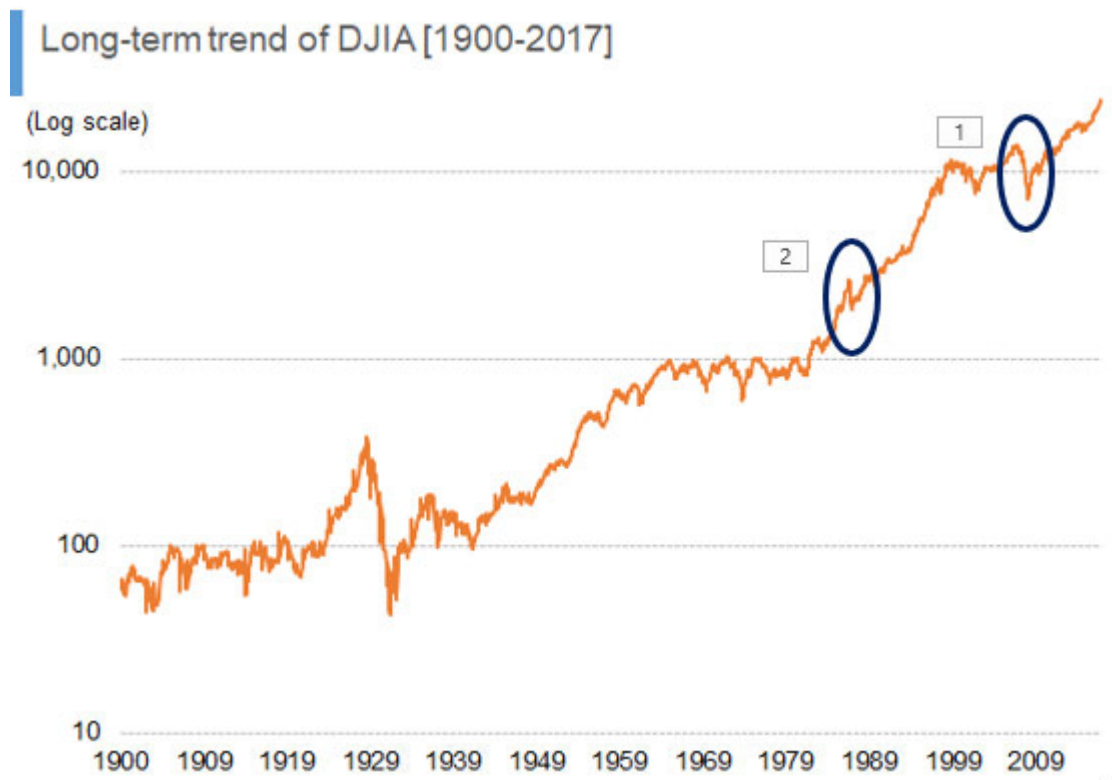
The shortcoming of traditional risk measures is that "risk" is not fully defined in the context of a DC superannuation fund member. Traditional "risk measures" are in fact all measures of short term volatility.

For a member of a DC superannuation fund, their risk is far better defined as ***"the probability of running out of money during retirement"***. This may have little or no correlation with short term market volatility.

Why has the superannuation industry adopted the risk measures it so commonly uses?

Market volatility is easy to measure, and the investment industry has universally embraced volatility as a proxy for risk over decades. Perhaps surprisingly, this appears to have been done without appropriately defining risk in the context of the asset owner’s objectives.

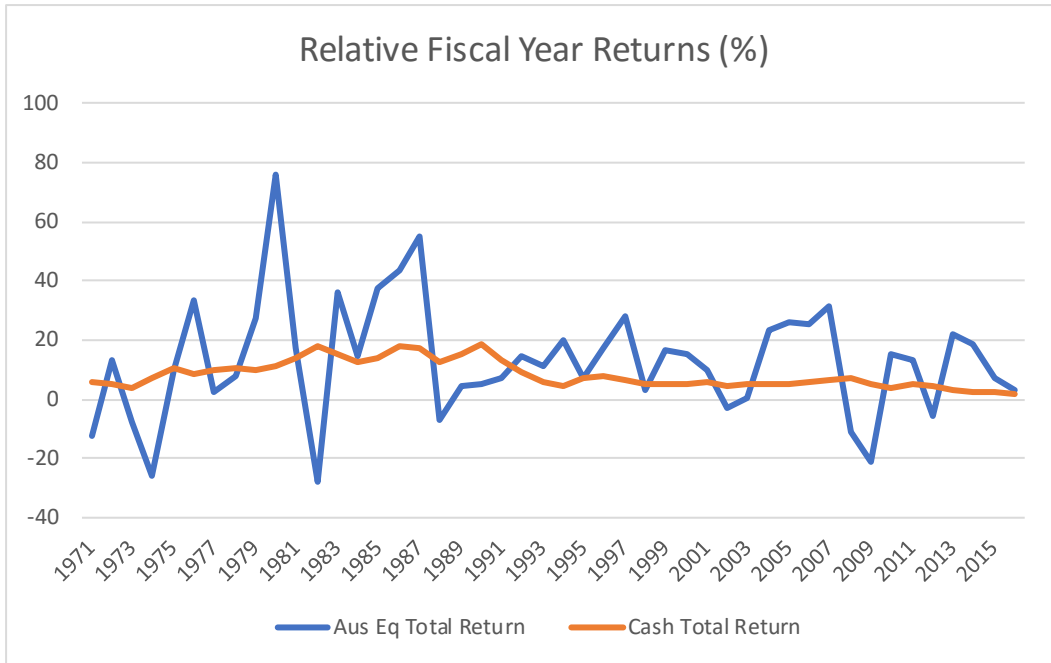
Investment managers are traditionally focussed on short term investment horizons (consistent with their incentive bonuses) and have not been consistently incentivised to think in the context of the investment horizon exceeding half a century within which superannuation fund members operate. The chart below highlights the materiality of short term market volatility in the context of a superannuation fund’s long horizon investment time frame.



The highlighted points on the chart show the impact of the two most significant market events of the last 75 years i.e. the recession from 2007 (1) and the stock market crash of 1987 (2). Clearly over an investment time frame of decades these market shocks have had little material impact on investment outcomes.

Market volatility may be a useful proxy for risk over the short-term periods of a few months or even a few years, but it is not useful for the long-term investment horizons (60-70 years) of superannuation fund members.

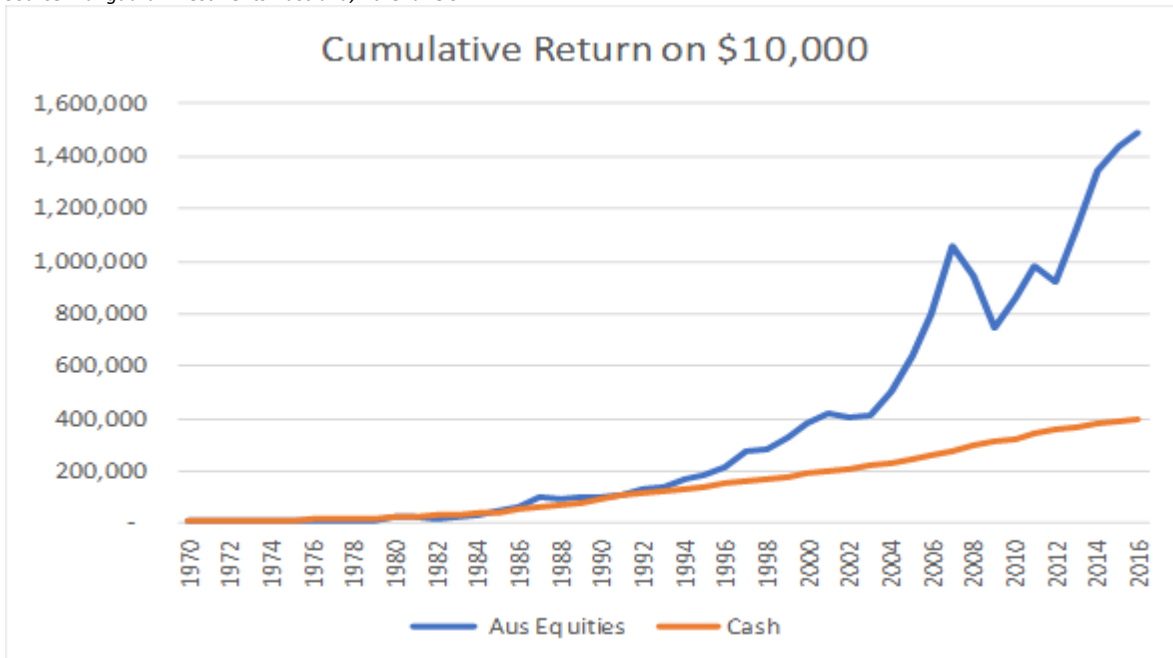
The following two charts based on Australian markets (and equally applicable to global markets) illustrate the difference between market volatility and “***the risk of running out of money in retirement***”.



Source: Vanguard Investments Australia, Athena IOC

The chart above shows the annual fiscal year returns over the 46-year period between 1971 and 2016. Cash consistently returns between +1% and +19%. Equities produce a far wider range of returns between -25% and +78%. By any of the risk measures traditionally adopted by the superannuation industry, Equities appears to be a far “riskier” option than Cash.

Source: Vanguard Investments Australia, Athena IOC



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The second chart above shows the cumulative returns of \$10,000 invested in Equities and Cash over the same 46-year period. Coincidentally 46 years is exactly the time a fund member entering the

work force at the age of 21 and retiring at 67 would have funds invested in the accumulation phase of superannuation fund.

Clearly investing in the lower volatility asset class over the long term is by far the riskier option if the risk is ***“running out of money in retirement”***. Some would argue that “sequencing risk” is at its greatest as the superannuation member approaches retirement as the member would have a far greater amount invested towards the end of the 46-year period than at the beginning.

History tells us over this 46-year period that we should expect negative returns for Global equities approximately 5 times in every 20 years. It follows that the chance of a positive year is three times greater than the chance of a negative year. If money is moved out of growth assets when the member’s balance is approaching its highest, the member is likely to forego a significant increase in their final balance at the end of their accumulation phase.

Whilst the sequence of returns i.e. sequencing risk is important, it can be a risk that is materially over exaggerated in the context of a superannuation fund member approaching or commencing retirement.

As any investment performance analyst will know, the sequence of returns over any number of periods is irrelevant to the outcome if there are no material cash flows over the period.

The end of the accumulation phase is not a magical point in time where the superannuation balance suddenly dematerialises, is converted 100% into an annuity or is stuffed under a mattress. The funds from the point of retirement are usually drawn down over a period of around a quarter of a century in very small increments. Even in draw down phase the bulk of a member’s money remains invested in the market over a very long term which significantly mitigates sequencing risk.

Whilst this paper uses only two asset classes to illustrate the points, the principles apply to any asset class or combination of asset classes. Whilst the use of sophisticated modelling tools to perform scenario analysis can provide some useful information, the fundamental issue remains that reduced volatility almost certainly results in reduced returns which results in increased risk (assuming risk is defined as ***running out of money in retirement***).

How to develop a practical and meaningful measure of the real risk facing the superannuation fund member in retirement

To develop a model, assumptions need to be made about key data elements. The sources used in this analysis have been obtained from the Australian superannuation market which is the fourth largest in the world (behind the USA, UK and Japan).

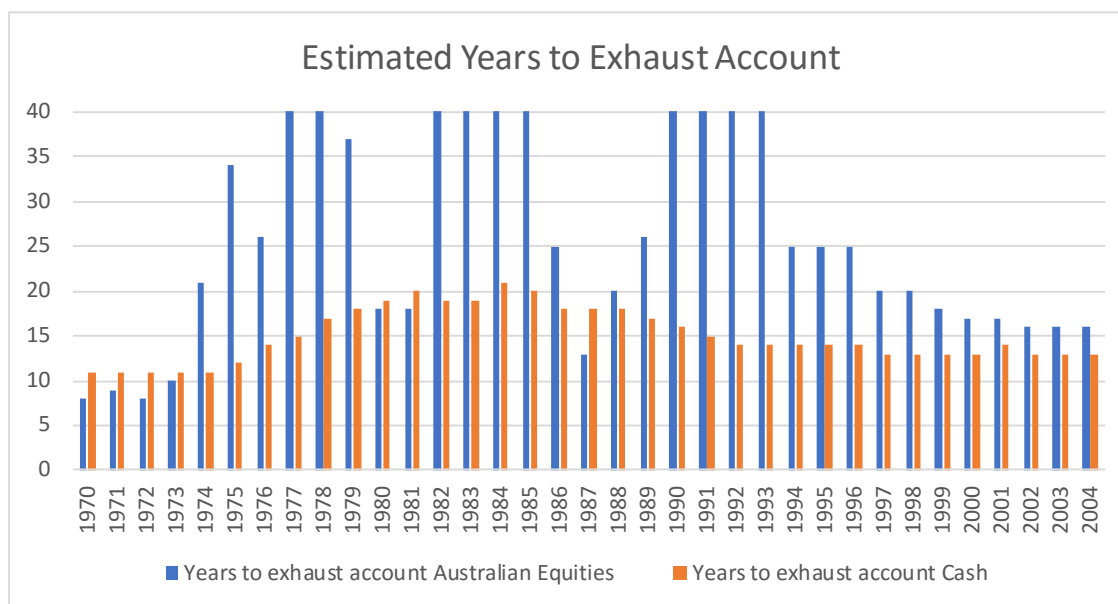
1. The member’s balance at commencement of superannuation phase. In the following analysis the assumption has been based on Association of Superannuation Funds of Australia (ASFA)’s Published Retirement Standard for a comfortable lifestyle for a couple
2. Annual withdrawals to meet living expenses. Again, from ASFA’s Retirement Standard for a comfortable lifestyle for a couple
3. Investment market returns. Actual market returns for the 46-fiscal year period from July 1970 to June 2016 have been adopted
4. Inflation per the Australian Bureau of Statistics web site over the same 46-year period

Assumptions

1. Balance at commencement of superannuation = AUD 640,000 at 1 July

2. Annual withdrawal = AUD 59,808 at mid-year, indexed annually with CPI
3. Australian equities annual earnings = Australian Stock Exchange All Ordinaries total return index
4. Cash annual earnings = Bloomberg Australian Bank Bill Index
5. Period covered = 1970 – 2016 (46 years)

The chart below shows the estimated years to exhaust the member's account if we assume a commencement of superannuation drawdown from 1 July 1970, 1971, 1972 etc. up to 2004.



The chart shows that for a member who retires in market conditions prevailing from 1970 it would take around 11 years to exhaust their account if they were fully invested in Cash and around 8 years if fully invested in Equities. For a member commencing retirement in market conditions prevailing in 1975 Cash is estimated to last for 12 years and Equities for 34 years etc. etc.

Overall it is estimated that Equities would outlast Cash 80% of the time and of course Cash would outlast Australian Equities 20% of the time.

If risk is defined as ***“running out of money during retirement”***, clearly Equities is far less risky even though it is undoubtedly the more volatile asset class.

Alternative risk measures compared

Traditional Risk Measures

Investment Option	Std Deviation	Max Drawdown (%)	No of Negative Years in 20
Australian Equities	12.0	40.0	6
Cash	1.0	0.0	0
Conservative	3.1	10.6	1
Balanced	6.3	24.2	3
Aggressive	8.8	34.7	4
<i>Example only</i>			

The above table provides information about the relative volatility of different investment options. But what meaningful information does it convey to a member or an adviser at the point of rolling into pension phase? There is nothing in this information that provides any guidance as to whether the member's account will last through their retirement, i.e. nothing to provide any information as to the relative real risk of the investment options. ***The risk of running out of money in retirement.***

Retirement Risk Measure

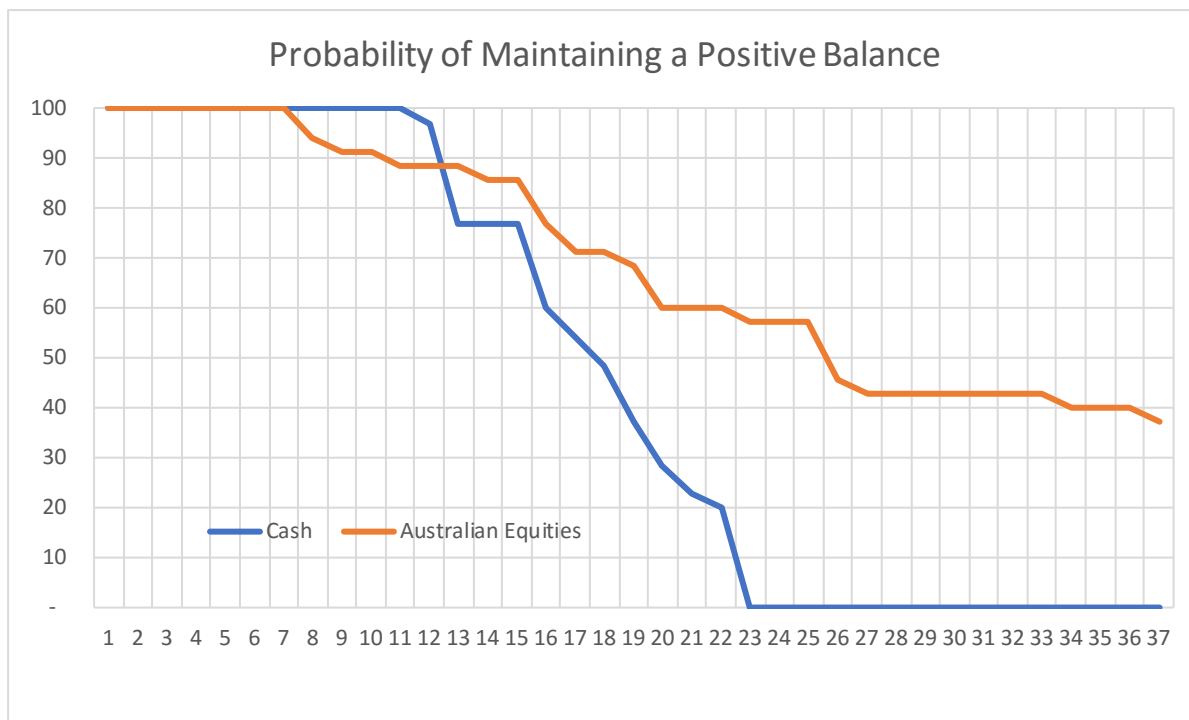
In this example a risk measure entitled the Retirement Risk Measure is introduced. Assuming start balance of \$640,000, annual withdrawals of \$59,808 and actual historical market returns and CPI movements.

Option	Probability of Maintaining Positive Account Balance (%)		
	Over 7 Years	Over 15 Years	Over 25 Years
Australian Equities	100	84	53
Cash	100	41	0

It could be argued that the above table provides significant information to assist the member in choosing an appropriate investment option for their retirement. It addresses the key question "***what is the risk of running out of money in retirement?***" This or a similar table could be included in its generic form in any Product Description Statement.

The above information is capable of measurement for any member investment choice option.

The table above can be further enhanced to produce information in chart form providing more detailed and member specific information. Such a chart is shown below.



In this example we can see that, given the same assumptions as noted in the table above, an investment in Cash has a 100% probability of lasting for 11 years whilst an investment in Equities provides only an 88% chance of lasting the same length of time.

Conversely an investment in Cash provides around a 25% probability of lasting 20 years against a 60% probability for Australian Equities. Interestingly, cash provides a 0% probability of lasting 25 years compared with a 55% chance for Australian Equities.

This chart can be made interactive for Financial Planners and superannuation fund members to test various scenarios of start balances and annual drawdowns. It could of course also incorporate any investment choice options available to the member. Such information would enable the member to make an informed choice re their preferred risk mitigation strategy based on their expectations of longevity. Such a choice could be revisited on an annual or other periodic basis to assess the optimum strategy going forward. For example, choosing a less volatile option if the prevailing account balance could support the required withdrawals at the desired level of risk.

Concluding thoughts

The relative risk of different asset classes or investment choice options can vary dramatically over different time horizons. It appears that this fact has not been fully appreciated by all superannuation funds or advisers and certainly not by their members.

The analysis in this paper poses the following questions which could merit further research

- Does a less volatile investment strategy provide a misleading illusion of safety and lower real risk to superannuation fund members?
- Can that illusion of safety/lower risk result in (potentially significantly) less money in retirement? i.e. higher risk!
- Are many in the industry just confused about the difference between risk and market volatility in the context of superannuation funds' long horizon investment?

- Are superannuation funds really acting in the best interests of members by
 - a) Describing less volatile options as less “risky”?
 - b) Moving member into less volatile asset classes as they approach or enter retirement?

It’s all about the definition of “risk”

This paper asserts that risk to a member of a superannuation fund is not market volatility. Risk is **“running out of money in retirement”**. Paradoxically by adopting an inappropriate definition of risk, superannuation funds are promoting less volatile investment strategies as reducing risk when in fact they are increasing risk! This should be of great concern to the superannuation fund industry.