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Abstract

In this paper, we examine the bear market performance of self managed superannuation funds (SMSFs). Previous studies have highlighted some problems with the portfolio construction of SMSFs. This provides a rationale for examining the performance of SMSFs during the recent bear market. Based on data from two independent samples of a total of 141 self managed superannuation funds, two archetype SMSF portfolios are constructed in order to generate insights into the average performance of the funds in the samples. The performance of these funds is compared with (1) the unmanaged market index; and (2) the average returns generated by retail (balanced) superannuation funds. Interestingly, whilst the SMSFs have generated negative returns and problems with the portfolio construction remain, the relative performance of the overall portfolios vis-à-vis the market index and professionally managed funds is reasonably favourable. However, the equity portions of the SMSF portfolios suffer from under-diversification and could be more efficiently constructed.

Keywords

Self managed superannuation funds; performance; market index; retail superannuation funds



SELF MANAGED SUPERANNUATION FUNDS AND THE BEAR MARKET OF 2007–2008

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ABSTRACT

In this paper, we examine the bear market performance of self managed superannuation funds (SMSFs). Previous studies have highlighted some problems with the portfolio construction of SMSFs. This provides a rationale for examining the performance of SMSFs during the recent bear market. Based on data from two independent samples of a total of 141 self managed superannuation funds, two archetype SMSF portfolios are constructed in order to generate insights into the average performance of the funds in the samples. The performance of these funds is compared with (1) the unmanaged market index; and (2) the average returns generated by retail (balanced) superannuation funds. Interestingly, whilst the SMSFs have generated negative returns and problems with the portfolio construction remain, the relative performance of the overall portfolios *vis-à-vis* the market index and professionally managed funds is reasonably favourable. However, the equity portions of the SMSF portfolios suffer from under-diversification and could be more efficiently constructed.

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I. INTRODUCTION

When markets experience periods of distress, fissures that would otherwise remain small and localised may widen and spread throughout the financial system. Whilst the credit derivatives markets have received the most attention since the middle of 2007, the nation's superannuation system has not escaped effects that have spread from the seemingly obscure origins of credit derivatives through the global financial markets. Superannuation is a significant component of Australia's financial system, including the self managed superannuation funds where \$300 billion of Australia's retirement savings reside. As the signals deriving from economic data have become increasingly adverse, equity markets in the United States, Europe and Asia experienced negative returns for the first time in five years. The lower than 'usual' retail superannuation fund returns have been widely reported. It is the purpose of this paper to consider the returns that may have been experienced by self managed superannuation funds. Specifically, this paper uses a dataset consisting of two independent SMSF portfolio microstructures samples to provide some insights into the performance of SMSFs during the recent bear market.

The Australian Taxation Office aggregated statistics reveal that, on average, SMSF portfolios allocate 36 percent of investable funds to Australian equities. Even if all other components of the portfolios were held constant—suffering neither losses nor gains—this relatively high exposure to the Australian equity market may have resulted in significant losses. However, the losses (or gains) that might have been experienced by SMSFs cannot be ascertained with any degree of certainty unless researchers examine the returns generated by individual SMSF portfolios. The way that the equity component of a portfolio is constructed can potentially magnify losses experienced in a bear market or, conversely, insulate a portfolio, preventing it from mirroring the losses experienced by the broader market indices. For example, if 36 percent of a portfolio's funds are allocated to just six or seven securities, the potential for significant losses is much higher than would be the case if a diversification strategy had been deployed—ideally spreading the portfolio's funds among 15 to 30 securities.

The analysis of self managed superannuation funds with the traditional tools of modern finance and portfolio theory promises to yield important and interesting results. As



always, SMSF portfolios must be analysed separately from the other ‘outside’ assets held by the SMSF trustees. However, this does not pose any serious problems to the analysis because all portfolio analysis takes place under similar conditions. For example, the analysis of a retail superannuation fund’s portfolio must take place in isolation from the asset holdings of each member of the fund. The covariance ignorance problem identified by Sharpe (1981) and faced by fund managers—who never know the composition of investors’ outside portfolios—is something that researchers also cannot escape. Fortunately, this is a minor problem. Self managed superannuation funds must be constructed for the sole purpose of providing for trustees’ retirement income. They are, by their very nature, a separate component of the trustees’ overall wealth and one that must be managed according to particular rules. The analysis of these portfolios may generate important insights into the management of a very large portion of Australia’s retirement savings.

There is a certain urgency with which this task must be undertaken. SMSFs are the fastest growing category of superannuation funds in the Australian superannuation system. Whilst the figures are oft-cited, more than one-quarter or \$300 billion of Australia’s retirement savings resides in self managed superannuation funds. There are more than 370,000 SMSFs and more than 700,000 Australians are members of SMSFs (Australian Taxation Office 2008). Since 1999, the number of SMSFs has increased by more than 100 percent. During most of the time that has elapsed since the beginning of the twenty-first century (and for a considerable period before that), market conditions have been remarkably favourable. However, since the middle of 2007, market conditions have neither been as calm as they had been previously nor characterised by the very high returns that were experienced by investors in most of the past ten years. The durability of the self managed superannuation system has not been tested under extended periods of poor market performance and researchers must gather and present as much information as possible to guide SMSF policy makers and regulators in these times of difficult market conditions. For instance, recent comments by former Prime Minister Paul Keating related to the level of superannuation contributions need to be viewed in the light of the medium and long term risk to average retirement incomes brought about by a combination of market turbulence and the value of funds managed by non-professionals.



In this paper, the bear market performance of the portfolios of two independent samples—one consisting of 100 portfolios and the other consisting of 41 portfolios—of SMSFs are examined to determine how well these funds have performed *vis-à-vis* the market index in difficult market conditions. For many of the SMSFs, the recent bear market is the first period of poor market conditions that these funds have experienced. It has been difficult for any portfolio managers to generate positive returns in the 2007 to 2008 period. However, SMSFs deserve particular attention and this not only because of the large proportion of Australia's retirement savings that they represent. Problems with the diversification of SMSFs have already been identified in the economics literature (see Phillips, Cathcart and Teale 2007). Additionally, questions must be raised about the risk management practices deployed (or available to be deployed) by SMSF trustees. Whilst these portfolio management problems do not come to light when markets are experiencing year after year of positive returns, the losses that may be experienced in down markets by under-diversified and poorly managed portfolios may be much greater than the losses exhibited by the broader market indices.

In light of the considerable (and entirely justified) fears that might be held for the bear market performance of SMSFs, the results generated by the analysis presented in this paper are quite surprising. Two archetype SMSF portfolios which represent the average portfolio structures and reflect the average risk and return characteristics of the funds in the two independent samples generated negative returns during the recent bear market. However, as these SMSFs have a very high allocation in cash (or fixed interest securities), the portfolios performed better than the All Ordinaries (Accumulation) Index. When compared with the returns generated on an average balanced retail superannuation fund over the same period, the archetype portfolio representing the 41-portfolio sample performed better than the professionally managed retail funds whilst the archetype portfolio representing the 100-portfolio sample performed a few percentage points worse than the professionals' average return. Whilst there are problems with the portfolio construction of the SMSFs (including under-diversification), the tendency for the portfolios to hold a large percentage of investable funds in cash has proved to be a stabilising factor during the recent bear market.

This paper is organised as follows. In Section II, the data are described and the methodology that is deployed is outlined. The data consist of two independent samples of self



managed superannuation funds. In the context of self managed superannuation fund research, the sample size available for this investigation is quite significant. The methodology is based on a solid foundation of modern finance and portfolio theory. The portfolios are analysed using traditional portfolio mathematics. In Section III, the results of the analysis are presented. The returns generated by the self managed superannuation funds during the recent bear market are calculated. In Section IV, the results of the analysis are discussed. The returns generated by the self managed superannuation funds during the 2007 to 2008 financial year are compared to the returns generated by the broader market indices and the average retail superannuation fund. Section V concludes the paper.

II. DATA AND METHODOLOGY

The data gathered for this investigation consists of two independent samples of SMSF portfolio microstructures. 100 of the SMSF microstructures were obtained from a large financial planning and superannuation administration firm based in one of Australia's capital cities. The other 41 SMSF microstructures were obtained from an accounting and financial services firm based in one of Australia's regional centres. The 100 SMSFs whose portfolio structures constitute the first part of the sample were drawn more or less at random from the total number of SMSFs administered by the financial planning and superannuation administration firm. The other 41 SMSFs represent a complete sub-population of just over 100 SMSFs overseen by the accounting and financial services firm. These 41 SMSFs are those funds overseen by the accounting and financial service firm that contain a mixture of assets directly managed by the trustees and are *not* 'shells' established merely to hold particular assets such as commercial property.

The independent nature of the two samples adds a degree of rigor to the analysis. An important feature that derives from this independence must be mentioned. Whilst both samples are self managed superannuation funds for which the trustees remain ultimately responsible, the SMSFs in the 100-portfolio sample are administered by professional superannuation fund administrators—though this does not mean that the portfolios have been professionally managed independently of the trustees. As such, access to financial planning and portfolio management advice may be more readily available to the trustees of these funds. The SMSFs in the 100-portfolio sample also, on average, have a higher net worth than the

funds in the 41-portfolio sample. There is a possibility that the higher net worth trustees may be better equipped with the resources—for example, access to financial services and information—necessary to effectively manage their retirement savings. Access to two independent samples of SMSFs permits the investigation of the relative performance of the funds in these two samples and provides the unique opportunity to determine how well two different groups of investors have fared during the worst bear market in a quarter-century.

Although the dataset consists of two independent samples of SMSFs, all of the SMSF portfolios within the samples are reasonably large portfolios containing a broadly similar asset mix of cash, fixed interest securities, managed funds and domestic and overseas shares. Some of the funds contain real assets such as real estate. Bearing in mind that each SMSF represents the retirement savings of a small group of people, the portfolios are quite large. The average size of each of the 100 portfolios in the first part of the sample was \$796611 at June 30 2007. The largest portfolios have a value of just over \$4 million whilst the smallest portfolios have a value of just under \$200000. Most of the SMSFs were formed sometime over the last five to fifteen years but a few of the funds were initiated more than twenty years ago. The average size of the 41 portfolios in the second part of the sample was approximately \$400000 at June 30 2004. Most of the SMSFs were formed sometime over the last ten years. Taken together, the data available for this investigation consists of 141 SMSFs with an average size of approximately a half-million dollars.

Table 1 Self Managed Superannuation Funds: Summary of Portfolio Structure

Asset Class	Mean % (100 Portfolios)	Mean % (41 Portfolios)
Cash	11	22
Fixed Interest	13	2
Listed Shares	40	47
Unlisted Shares	5	< 1
Overseas Listed Shares	1	< 1
Overseas Unlisted Shares	2	0
Managed Investments	10	5
Listed Unit Trusts	4	14
Unlisted Unit Trusts	12	0
Real Estate	2	10
Total	100	100



Notes: The asset categories are self-explanatory. For the '41 Portfolios' there was no distinction made between listed and unlisted unit trusts in the portfolio structure summaries obtained for this research. Hence, it could very well be the case that the allocation between listed and unlisted unit trusts diverges less between the two parts of the sample than the figures in the table appear to show.

For the most part, the portfolios consist of cash (or cash securities) and shares. More than 60 percent of the portfolios' investable funds are invested in these two classes of securities. In fact, the proportion invested in cash and shares is actually much higher. A further 20 percent of the portfolios' funds are invested in managed investments or unit trusts. Apart from some investment in property trusts, the investment allocation to managed investments and unit trusts represents (indirect) investment in cash and shares. When these indirect investments are taken into account, approximately 80 percent of the SMSF portfolios' funds are found to be allocated to cash and shares. The proportions in cash and shares are broadly similar to the weightings that would be associated with a 'moderately conservative' investment strategy. However, a financial planner's moderately conservative asset allocation scheme would normally allocate some of the equity portion of the portfolio to overseas shares. The SMSF trustees tend to exhibit considerable 'home-bias'. The equity portions of the SMSF portfolios are concentrated in shares of Australian companies with little allocation to overseas investments.

One of the main advantages of the data available for this investigation is that it permits us to examine the microstructure characteristics of SMSFs that are obscured in the aggregate data generated by the Australian Taxation Office. It is interesting to compare the asset allocations of the two samples presented in Table 1 above with the aggregate asset allocations reported by the Australian Taxation Office. Table 2 below presents the allocation differentials between each of the samples and the aggregate asset allocations reported by the ATO. In general, the portfolios in the sample display similar asset allocations to the aggregate of all SMSFs reported by the ATO. However, the aggregated data reported by the ATO tend to understate the allocations to particular asset classes exhibited by the SMSFs in the sample. The SMSFs in the sample have higher allocations to cash and higher allocations to listed shares (Australian equities). The portfolios in the sample are, therefore, more concentrated than the aggregate data would have led us to expect. Furthermore, it is important to recognise that both the aggregate asset allocations and the summary portfolio data for the portfolios in the sample do not provide any indication of the extent of diversification exhibited by the portfolios *within* each asset class.

Table 2 Asset Allocation Differentials: SMSFs *vis-a-vis* the Aggregate

Asset Class	ATO SMSF Aggregate	Mean % (100 Portfolios)		Mean % (41 Portfolios)	
		minus ATO aggregate	SMSF	minus ATO aggregate	SMSF
Cash and Fixed Interest	20		4		4
Listed Shares	36		4		11
Unlisted Shares	2		3		- 1
Overseas Listed Shares	< 1		1		0
Overseas Unlisted Shares	< 1		2		0
Managed Investments	7		3		- 2
Listed Unit Trusts	12		- 8		2
Unlisted Unit Trusts	10		2		- 10
Real Estate	11		- 9		- 1
Total	100				

Notes: Australian Taxation Office aggregates reported in the Australian Taxation Office's *Self Managed Superannuation Fund Statistical Report* (2008).

Diversification plays a critically important role in portfolio management. The risk of a portfolio—measured in modern portfolio theory by the variance of total returns—consists of the variance attributable to firm specific factors (non-systematic risk) and the (systematic) variance attributable to the macro-economy—for which the variance in the returns of a broad market index is used as a proxy. A portfolio that is poorly diversified will bear too much firm specific risk and, consequently, will be exposed to risks specific to particular firms and industries. Through diversification, firm specific risk can be entirely eliminated and the portfolio will only bear the risk associated with its correlation with the condition of macroeconomic system. Because firm specific risk can be diversified away there should be no risk premium attached to such risk and no reward to investors who bear it. Utility maximising investors will construct fully diversified portfolios that exhibit a relationship to the macroeconomy—measured by the portfolio's beta—that is in accordance with their level of risk aversion. A higher beta will be associated with higher portfolio returns and *vice versa*.



To obtain a fully diversified portfolio that eliminates firm specific risk, the portfolio must contain between 15 and 30 securities (see Evans and Archer (1968) and Campbell, Lettau, Malkiel and Xu (2001)). Portfolios containing considerably less securities will not only be exposed to firm specific risks but will bear a risk that is not rewarded in equilibrium. On occasions, it must be said, under-diversified portfolios will earn very high returns. If the few securities in which the portfolio is invested perform well, the portfolio will benefit from a kind of leveraging effect that derives from concentrating all of the funds in a few places. Like all leveraged positions, the magnification in returns that may be experienced when the share market is advancing or when particular shares and industry categories in which the portfolio is concentrated are performing well will work in reverse when share market conditions weaken and share prices begin to decline. This can be especially troublesome if the particular shares and industry categories in which the portfolio is concentrated suffer more than proportionally *vis-à-vis* the market as a whole.

Self managed superannuation funds are particularly vulnerable to diminutions in their value of this kind. Previous research has shown self managed superannuation funds to be both under-diversified (Phillips et al. 2007) and concentrated in popular, well-known shares (Phillips 2007). This has resulted in a reasonably heavy allocation to banking shares and mining shares, which are the traditional 'blue-chips' in the Australian market. With small absolute numbers of securities in their portfolios and high concentration in particular shares or industry groups, SMSFs are particularly vulnerable to the magnification of losses when market conditions become unfavourable. In the face of these risks, SMSFs have little recourse to risk management tools. This is because SMSF trustees are either unaware of the existence of such tools or because the relevant legislation does not permit SMSFs to utilise derivative securities such as futures and exchange traded options. The result is, by and large, an unhedged long position in a small number of shares in a small number of sectors.

Having experienced in the last year or so a substantial decline in the major market indices, it is both timely and relevant to investigate the bear-market performance of self managed superannuation funds. This is accomplished in this paper by the application of the following methodology. From the two independent samples of self managed superannuation funds, two archetype portfolios are formed. These portfolios contain the investments that are

most prominent and reflect the asset allocations and level of diversification exhibited by SMSFs in the samples. This approach avoids the need to undertake extensive calculations for all 141 portfolios and provides an indication of average risk and return whilst also providing a snapshot of the average portfolio structure (including constituent shares). Nothing is lost by taking this approach because within each sample the portfolios display similar levels of diversification and have many other characteristics in common. This includes a focus on domestic (Australian) shares and a particular preference for well-known companies. Deviations from the return and risk characteristics of the archetype portfolios may be considered to be peripheral in nature.

The archetype portfolios are analysed using the standard tools of modern (Markowitz) portfolio theory. This approach focuses on the return and risk (variance or standard deviation of returns) that characterises the portfolios. The return for a portfolio of securities is simply the weighted average of the returns on each of the individual securities in the portfolio:

$$R_p = \sum_{i=1}^n x_i (R_i) \quad (1)$$

Where x_i is the proportion of the total portfolio invested in security i . Whilst the calculation of portfolio returns is relatively straightforward, the calculation of portfolio risk is more complicated. Because the variations in the returns of securities in the portfolio may dampen or reinforce each other, both the variance of the individual securities and the covariance of each security with the other securities in the portfolio must be taken into account:

$$\begin{aligned} \sigma_p^2 &= \sum_{i=1}^n \sum_{j=1}^n x_i x_j \rho_{ij} \sigma_i \sigma_j \\ &= \sum_{i=1}^n x_i^2 \sigma_i^2 + \sum_{\substack{i=1 \\ i \neq j}}^n \sum_{j=1}^n x_i x_j \rho_{ij} \sigma_i \sigma_j \end{aligned} \quad (2)$$

Once the return and risk of the portfolios has been calculated, a number of comparisons can be made: (1) the relative performance of the portfolios *vis-à-vis* the unmanaged ASX All

Ordinaries Index; (2) the performance of the portfolios *vis-à-vis* the average returns generated by retail superannuation funds over the same period; and (3) the risk-adjusted performance of the equity components of the portfolios *vis-à-vis* the unmanaged ASX All Ordinaries Index. Poor performance of SMSF portfolios (and other portfolios) must be expected in a bear market. However, the particular portfolio management problems that may be expected to characterise SMSFs have the potential to exacerbate bear market losses. The extent to which this potential has been borne out in the recent experience of SMSFs is ascertained in the following section.

III. ANALYSIS

The analysis undertaken in this section reveals the return and risk characteristics of two self managed superannuation funds that are archetypes of the funds in the samples. This provides some important insights into the performance of typical—from the point of view of the samples—self managed superannuation funds. Monthly returns data for each of the components of the portfolios is used as the foundation for the calculations. Between the middle of 2007 and the middle of 2008, the broader Australian stock market indices suffered declines of approximately 20 percent. Investors holding the All Ordinaries Index experienced a negative total return (including dividends) of approximately 13 percent during this period. Whilst it may be expected that the self managed superannuation funds have been unable to resist these broad market movements, only an analysis based on data concerning the actual portfolio structures of self managed superannuation funds can shed any light on the performance of SMSFs. The data available for this investigation provide a unique opportunity to examine the structure and performance of SMSF portfolios.

The archetype portfolios for each of the two samples are characterised by a focus on Australian shares and, in particular, shares in well-known companies. For the 100-portfolio sample, the archetype equity portfolio is characterised by investments in 18 different companies. On average, 40 percent of the portfolio is allocated to equity securities (see Table 1 above). Within this allocation, the weightings assigned to each security are usually very similar. Approximately 5.50 percent of the equity portfolio (or 2.25 percent of the overall portfolio) is allocated to each security. For the 41-portfolio sample, the archetype equity portfolio is characterised by investments in 12 different companies. Within this allocation, the



weightings assigned to each security are also very similar (within and across the portfolios). Approximately 8.00 percent of the equity portfolio (or 4.00 percent of the overall portfolio) is allocated to each security. Having determined the composition of the largest asset class contained in the portfolios, this information can be combined with the other characteristics identified above (Table 1) to generate two archetype portfolios.

Table 3 Archetype Portfolio One: The 100-Portfolio Sample

Investment	Weighting (%)	Value 01/07/07	Value 01/07/08
Cash and Fixed Interest	24.00	\$96,000	\$102,429
Managed Investments and Unit Trusts	26.00	\$207,118	\$193,862.44
Real Estate and Miscellaneous	8.50	\$67,712	\$67,712
City Pacific	2.25	\$17,924	\$5,751
AMP	2.25	\$17,924	\$13,016
APN Property Group	2.25	\$17,924	\$4,836
BHP	2.25	\$17,924	\$23,344
Indigo Pacific Capital	2.25	\$17,924	\$11,372
Mariner Pipeline Trust	2.25	\$17,924	\$17,155
Telstra	2.25	\$17,924	\$18,705
ANZ	2.25	\$17,924	\$11,943
Goldlink Income Plus	2.25	\$17,924	\$12,921
Suncorp	2.25	\$17,924	\$12,800
Westpac	2.25	\$17,924	\$15,136
Transurban Group	2.25	\$17,924	\$12,023
Invocare	2.25	\$17,924	\$20,242
QBE	2.25	\$17,924	\$13,790
Tabcorp Holdings	2.25	\$17,924	\$12,861
NAB	2.25	\$17,924	\$13,054
St George Bank	2.25	\$17,924	\$14,951
Wesfarmers	2.25	\$17,924	\$15,970

Notes: Cash allocation is the weight multiplied by the average portfolio value. A constant return on cash investments of 6.50 percent p.a. compounded monthly is assumed to prevail throughout 2007 to 2008. Managed funds and unit trusts are assumed to generate the average return on a balanced Australian equities portfolio. Real estate and miscellaneous investments are assumed to end the year at the same value as they started the year. Mostly, changes in value are not recorded each year or they are off-market valuations.

For the most part, both samples of SMSF portfolios are characterised by investments in well-known companies. Not surprisingly, it is also clear that some of the investments in the two samples overlap. Investments in ANZ, BHP, Suncorp and Wesfarmers are contained in both samples' archetype portfolios. Another characteristic that is worth mentioning is the relative dominance of the banking sector. In the 100-portfolio sample 7 out of 18 equity securities—approximately 40 percent—derive from the banking and insurance sector. In the 41-portfolio sample 2 out 12 equity securities—approximately 17 percent—derive from the



banking sector. Investors, in all likelihood attracted by the strong earnings generated by Australian banks as well as their high profile within the Australian investment landscape over the last decade, have allocated reasonably high portions of their SMSF portfolios to banking shares. Of course, these shares have fallen on hard times during the recent bear market with most generating negative returns in excess of those generated by the broader market indices.

Table Four Archetype Portfolio Two: The 41-Portfolio Sample

Investment	Weighting (%)	Value 01/07/07	Value 01/07/08
Cash and Fixed Interest	24.00	\$96,000	\$102,429
Managed Investments and Unit Trusts	19.00	\$76,000	\$71,136
Real Estate and Miscellaneous	10.00	\$40,000	\$40,000
AGL	3.90	\$15,600	\$15,528
ANZ	3.90	\$15,600	\$11,133
APN News and Media	3.90	\$15,600	\$10,026
BHP	3.90	\$15,600	\$20,317
Commonwealth Office	3.90	\$15,600	\$12,847
CSL	3.90	\$15,600	\$18,844
Fosters Group	3.90	\$15,600	\$13,287
Paperlinx	3.90	\$15,600	\$8,157
Suncorp	3.90	\$15,600	\$11,140
Telstra	3.90	\$15,600	\$16,279
Wesfarmers	3.90	\$15,600	\$13,899
Woolworths	3.90	\$15,600	\$14,584

Notes: Cash allocation is the weight multiplied by the average portfolio value. A constant return on cash investments of 6.50 percent p.a. compounded monthly is assumed to prevail throughout 2007 to 2008. Managed funds and unit trusts are assumed to generate the average return on a balanced Australian equities portfolio. Real estate and miscellaneous investments are assumed to end the year at the same value as they started the year. Mostly, changes in value are not recorded each year or they are off-market valuations.

The risk and return of the SMSF portfolios during the bear market of 2007 to 2008 may be described as follows. Not surprisingly, the equity components of the portfolios did suffer reasonably significant losses. The archetype portfolio for the 100-portfolio sample suffered declines of approximately 9.01 percent for the equity portion of the portfolio. The archetype portfolio for the 41-portfolio sample suffered declines of approximately 5.30 percent for the equity portion of the portfolio. Interestingly, the archetype portfolio for the 41-portfolio sample performed better. Though this portfolio has fewer shares, there is a lower allocation to the banking and insurance sector. The archetype portfolio for the 100-portfolio sample has, as mentioned previously, reasonably high exposure to this sector. During the recent bear market, shares in financial services companies have suffered substantial declines.



Fortunately the (directly invested) equity portion of the SMSF portfolios accounts for less than half of the overall portfolios. The next most significant asset classes are managed funds (and unit trusts) and cash (or cash securities). On average, the managed fund component of the SMSFs in both of the independent samples is characterised by investments in six different products, with some of the SMSFs having investments in more than ten different managed investments products. Research indicates that approximately six different funds are sufficient to reduce the variability of terminal wealth quite significantly. However, investing in multiple funds risks underperforming the benchmark index (see Fant and O'Neal (1999) and Louton and Saraoglu (2006)). In order to be conservative and fair in assessing the performance of this component of the archetype portfolios, it is assumed that this portion of the portfolios earned the average return generated by balanced funds² during the same period. This is approximately negative 6.40 percent (Macnamara 2008). Under this scenario, the managed funds component of the two archetype portfolios contributed negative returns to the overall portfolios of between 1.20 percent (for the 41-portfolio sample) and 1.70 percent (for the 100-portfolio sample).

The negative returns generated by the equity portions of the portfolios and the managed investments portions are partially offset by the steady returns that can be expected to have been generated by the cash portions of the portfolios. Again, a conservative and fair estimate of the returns generated on this portion of the portfolios may be considered to an average 6.50 percent compounded monthly (or an annual return of approximately 6.70 percent). Cash investments may be estimated to have contributed positive returns to the overall portfolios of approximately 1.60 percent. Because, as mentioned previously, the real estate investments and miscellaneous investments do not have market valuations, these investment classes were assumed to end the year at the same value at which they started. Once the returns on the equity portfolios, the managed investment portfolios and the cash and fixed interest portfolios have been computed it is possible to determine that the returns generated by the archetype SMSF portfolios during the recent bear market are (negative) 5.00 percent for the 41-portfolio sample and (negative) 9.10 percent for the 100-portfolio sample.

² Balanced funds are the most common type of superannuation funds. They are characterised by a focus on maintaining the weightings of the investment classes within the portfolios by buying more securities in classes that have declined and vice versa. Typical weightings are: 30 percent cash and fixed interest, 9 percent property and 61 percent Australian and overseas shares.



IV. DISCUSSION OF RESULTS

Previous studies have identified a lack of diversification in self managed superannuation fund portfolios. This provided the rationale for considering the performance of SMSFs during a period of market distress. By constructing two archetype portfolios, the performance of typical—from the point of view of the two samples—SMSF portfolios can be ascertained. The advantage of this approach is that a snapshot of the performance of a typical fund in the sample is obtained whilst avoiding the computational burden associated with Markowitz portfolio calculations. The results obtained from the analysis presented in the previous section provide an insight into the bear market performance of self managed superannuation funds. Significantly, the performance of the SMSFs during the recent bear market was not particularly poor *vis-à-vis* the broader market indices. The SMSFs benefit during a bear market from the high allocation to cash that characterises the portfolios. Whilst this may act as a ‘drag’ on the portfolios at times, it helps to insulate the portfolios from equity market downturns.

The archetype portfolio for the 100-portfolio sample generated lower returns during the 2007 to 2008 bear market than the archetype portfolio for the 41-portfolio sample. The most obvious reason for this is the concentration of the equity portion of the first archetype portfolio in the banking and insurance sector. Unfortunately for these investors, the recent bear market has coincided with credit market troubles that have resulted in a more than proportional decline in banking shares during the 2007 to 2008 period. Of course, this is a diversification problem that can be avoided by the careful selection of securities from different industrial sectors. Again, despite the significant declines experienced by the banking shares contained in the first archetype portfolio, the large allocation to cash has prevented the overall portfolio from bearing the full extent of the losses that would have been experienced had a larger portion of the investable funds been allocated to equities. During a bear market, the high cash allocation that appears to characterise SMSFs works to the advantage of the SMSF trustees.

Indeed, the SMSF portfolios have not fared worse than the average retail superannuation fund managed by professional managers (for substantial fees). As mentioned earlier, the average balanced fund lost approximately 6.40 percent for the 2007 to 2008

financial year. Other retail funds with more aggressive portfolios suffered much more significant declines. The archetype portfolios formed from the SMSFs in the two independent samples suffered losses of 9.10 percent and 5.00 percent. After accounting for fees that normally would accrue on a retail superannuation fund investment, the bear market SMSF returns appear relatively impressive. Of course, the archetype portfolios do obscure some of the idiosyncrasies of the individual portfolios in the sample and there is no question that some of the portfolios would have generated quite significant losses during the recent bear market. However, on average, the 141 SMSFs in the sample would have generated returns very similar to the archetype portfolios and have performed well *vis-à-vis* the professionally managed retail superannuation funds. This is due, once more, to the high cash allocation that has insulated the SMSF portfolios against losses.

The bear market performance of the SMSF portfolios has, on average, not been as poor as might have been feared. In fact, the high allocation that SMSF portfolios have in cash may mean that SMSFs perform (relatively) better in bear markets than in bull markets. This having been said, the portfolios are still characterised by under-diversification. Higher returns with lower levels of risk may be possible through more efficient portfolio management, particularly of the equity portions of the portfolios. Remembering that the archetype portfolios represent the average portfolio—with some having performed better and some worse than the archetypes—the relative performance of the archetype portfolios *vis-à-vis* the unmanaged ASX All Ordinaries (Accumulation) Index may be measured by computing the portfolios' Sharpe ratios. The Sharpe ratio is a risk-adjusted performance measure that considers the premium above the riskless rate of interest generated by the portfolios and the risk (standard deviation of returns) that was borne in generating the return.

Taken independently of the overall portfolios, the relative performance of the equity portions of the portfolios produces mixed results. The archetype portfolio for the 100-portfolio sample does not compare favourably (on a risk-adjusted basis) with the unmanaged ASX All Ordinaries (Accumulation) Index. Surprisingly, the much smaller portfolios performed better. The archetype portfolio for the 41-portfolio sample has a higher Sharpe ratio than the unmanaged market index. Once more, this is a product of the high allocation to cash and, more importantly, a relatively low exposure to the banking and financial services

sector. Whilst the archetype portfolio for the 41-portfolio sample is still quite under-diversified and will bear a reasonable portion of non-systematic risk, the portfolio exhibits a spread across industrial sectors and avoids concentration in a particular industry. In this sense, the 41-portfolio sample exhibits better portfolio construction. However, both samples of portfolios may still benefit from more efficient portfolio management.

Table Five Bear Market Self Managed Superannuation Returns: Equity Portfolios

	Return July 1 2007 to July 1 2008	Annualised Standard Deviation	Sharpe Ratio $r = \frac{\bar{r}_p - \bar{r}_f}{\sigma_p}$
Archetype (Equity) Portfolio (100 Portfolio Sample)	- 22.52%	22.13%	- 1.31
Archetype (Equity) Portfolio (41 Portfolio Sample)	- 11.294%	17.49%	- 1.028
ASX All Ordinaries Accumulation Index	- 13.13%	18.35%	- 1.0804

Table 5 shows the returns generated by an equal weighted portfolio of the shares listed in Tables 3 and 4. If these returns are multiplied by the weights assigned to the equity portions of the portfolios by the SMSF trustees, the contribution to the overall portfolio returns of the equity portions is ascertained (see above). The figures in Table 5 show that, analysed independently of the overall archetype portfolios, the equity components of the archetype portfolio for the 100-portfolio sample has not performed well on a risk adjusted basis *vis-à-vis* the unmanaged ASX All Ordinaries Index. This indicates that the equity portions of the SMSF portfolios in this part of the sample are not efficiently constructed. Given that they would appear to contain either too few securities or too much concentration in particular sectors to exhibit full diversification, it is entirely possible that the equity portions of the portfolios, and consequently the overall portfolios, may generate higher returns with less (or at least no higher) risk through better equity portfolio design.



V. CONCLUSION

Previous studies provide much reason to believe that the bear market performance of SMSFs may be very poor. However, the analysis presented in this paper has found the average (from the point of view of the samples available) SMSF has not performed much worse—and in some cases performed better—than the average (balanced) retail superannuation fund. The reason for this is the insulation afforded to the portfolios by the high allocation to cash. Whilst potentially sub-optimal, this has served to protect the portfolios from the worst of the bear market losses. This being said, there is still room for improvement. When analysed in isolation from the remainder of the portfolios, the equity portions of the portfolios are found to be under-diversified and, as a consequence, the average portfolio representing the larger part of the overall sample underperformed the unmanaged market index on a risk adjusted basis. More efficient management of this portion of the overall portfolios could contribute positively to the performance of the SMSF portfolios. When one considers the long-term nature of the savings invested in SMSFs, even a small increment in return amounts to a considerable sum when compounding over a number of years is taken into account.

Another factor that needs to be addressed is the broader policy framework under which superannuation more generally, and SMSFs specifically, operate. It is self-evident that superannuation affects all workers and their dependents due to its central placement in plans to provide a steady post-work income. However, the difficulty presented by a market focus on superannuation as a source of finance is that it can obscure this core connection as the retirement horizon for many individuals often lies far beyond a specific period of market instability or downturn. For instance, individuals who are currently self-funded retirees or those who plan to be soon may well have viewed the events of the past 12 months with some trepidation, while those further away from this stage in their lives may well feel less distressed by recent events. The consequence of this is that some of the more fundamental questions such as the amount of superannuation contributed over the lifetime of an individual, and indeed the level of regulation and assistance for both managed and self managed approached to retirement incomes. By extension, not only is there a need to ask if the amounts set aside in superannuation are enough to counter the pitfalls of a bear market, but whether the proportions of funds invested in equities and cash by SMSFs may have specific consequences for the levels of investment finance available in Australian markets.



In light of recent comments by the former Prime Minister (and architect of Australia's superannuation system) Paul Keating, it may be important to revisit the notions of adequacy in a systematic way: Specifically, whether the nine percent contribution is adequate to provide both Australian-based equity and comfort in retirement (Salusinszky 2008). For instance, Love (2008) argues that such a move could create up to \$500 billion in additional savings within Australia. However, this must still be weighed against the risk present in the current management on SMSFs. As demonstrated in this paper, the insulation afforded by the representative SMSFs could be argued to be more luck than planning, particularly given the contemporarily high interest rates available, and a predisposition towards high levels of cash and term deposits held within the portfolios. This risk is certainly not mitigated by current policy approaches to SMSFs that tend towards the administrative rather than engaging with a notion of duty-of-care on the part of regulatory authorities. While this will be the focus of a subsequent paper, it is still important to note at this point in time.

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