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Can self-managed superannuation fund trustees earn the equity risk premium?

The equity risk premium

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Peter J. Phillips

*School of Accounting, Economics and Finance,
University of Southern Queensland, Toowoomba, Australia*

Michael Baczynski

University of Southern Queensland, Toowoomba, Australia, and

John Teale

University of Sunshine Coast, Sunshine Coast, Australia

Abstract

Purpose – The purpose of this paper is to determine whether self-managed superannuation fund (SMSF) trustees earn: the equity risk premium or any premium to the riskless rate of interest.

Design/methodology/approach – Using a sample of 100 SMSFs, the average annual returns since inception of the funds in the sample are compared with: the average annual equity risk premium since that time and the average yield of Commonwealth Government Securities since that time.

Findings – The investigation reveals: the SMSFs in the sample do not earn the equity risk premium and the SMSFs in the sample did not earn a premium to riskless rate of interest. This leads to the conclusion that the SMSFs have borne risk without commensurate reward.

Research limitations/implications – The trustees' rationale for making particular investment decisions and the consistency of the portfolio structures with the risk profiles of the trustees are two areas that may be fruitfully explored in future research.

Practical implications – For SMSF trustees, a simple portfolio that divides assets between (unmanaged) index funds and risk-free securities on the basis of trustees' risk aversion may generate better results than the existing portfolios. For policy makers, the relatively poor performance of SMSFs implies that the superannuation system as currently structured may not be generating returns that will maximize retirement incomes.

Originality/value – The paper provides the first comparison of SMSF returns with the equity risk premium and the riskless rate of interest measured at appropriate horizons.

Keywords Pension funds, Trustees, Financial risk, Interest rates

Paper type Research paper

Over the long term, equities (or shares) have generated returns of approximately 6 percent in excess of the returns generated by bonds. This is the equity risk premium. Even if future equity returns cannot match those that have been generated historically, there is still a strong case to be made for substantial investments in equities. This is particularly the case for investment vehicles that should have long time horizons, such as self-managed superannuation funds (SMSFs). Investment vehicles with such long-time horizons can bear the short-term fluctuations exhibited by the share market and potentially generate substantial returns in excess of the risk-free rate over the long term. Of course, this depends on the portfolios constructed by the trustees of SMSFs. Poor portfolio construction, including under-diversification or high allocations to cash



assets, will significantly reduce a portfolio's ability to generate returns that match or exceed the equity premium experienced by the broader share market averages. The high-equity risk premium is an enticement for investment in shares. Whether SMSF trustees have been able to earn the equity premium in the period since their funds were inception is examined in this paper.

The equity risk premium – which, in many Western nations, has averaged approximately 6 percent above the riskless rate of interest – has defied explanation by financial economists. In a now-classic article, Mehra and Prescott (1985) reported that the extant models of asset pricing could not explain the magnitude of the difference between the return on shares and the return on bonds. Mehra and Prescott (1985) presented an analysis that revealed that the standard assumptions underlying the application of the consumption-based capital asset pricing model (C-CAPM), with plausible estimates for the relative risk-aversion parameter, are consistent with an equity premium of just 0.35 percent. The equity premium that has characterised US stock returns for over a century is almost 2,000 percent greater than what financial economists would have expected on the basis of the theoretical asset pricing models. The inability of the most sophisticated asset pricing models to explain the historical equity risk premium is one of the great puzzles of modern financial economics.

The challenge that the equity premium presents to economic theorists would hardly be foremost in the thoughts of most trustees of SMSFs but the magnitude of the equity premium is very important for them just the same. For the average SMSF with assets of approximately \$800,000 (Australian Taxation Office, 2008), the (real) 7.5 percent per annum average Australian share market return would lead to a terminal value of almost \$5,000,000 over 25 years for a fully invested portfolio[1]. Even if the equity premium were to fall by half, the average SMSF that is fully invested in Australian equities would have a terminal value of almost \$2,500,000. Whilst these terminal values would be less for a portfolio with partial allocations to cash or fixed interest securities, the overall portfolio returns for a diversified portfolio (with risky and low-risk assets) would still be bolstered by the investment of some of the portfolio in equity securities and would no doubt compare very favourably to a terminal value for a portfolio fully invested in bonds over the same period. Whilst most SMSF portfolios will not be fully invested in equities, the magnitude of the historical equity premium is a strong incentive for at least some allocation to equities[2].

In addition, there continues to be a significant public policy question surrounding the ability for SMSFs to perform well. As highlighted elsewhere (Phillips *et al.*, 2009), the current retirement framework has only operated over a narrow and relatively homogeneous period of the economic cycle, punctuated by the global market downturn of 2007-2008. The development of superannuation schemes in Australia, and more specifically the ability to self-manage those arrangements, has played out against a backdrop of historic levels of return. However, if policy decisions relating to the fairness of superannuation arrangements were made with more optimistic levels of return in mind, then there is the potential that the amount set aside to fund safety-net retirement incomes is under-endowed. Already, there have been reports of an increase in the number of self-funded retirees seeking aged pension support due to the collapse in value of their assets, and it is currently unknown, whether in the midst of other fiscal pressures, the federal government has sufficient reserve within their current scheme to adequately account for increases in demand for pension payments.

From a portfolio management perspective, the problem with recommending that SMSF trustees attempt to take advantage of the high premium available on equity investments *vis-à-vis* investments in cash or bonds is that simply investing in equities in a random or *ad hoc* manner will not guarantee a return that matches that generated by the broader market averages. In fact, there is a possibility that poorly managed portfolios may do considerably worse than the market averages and fail to earn the equity premium (Siegel, 1999). Furthermore, policy makers who consider such returns as actually being captured by any category of superannuation funds (including SMSFs) will almost certainly be over-estimating the premium above the riskless rate of interest that is being generated by these investment vehicles. That being said, SMSFs (or any portfolios with allocations to equity securities) should earn some premium above the riskless rate of interest. Just how much is actually being earned is an important question, the answer to which promises to shed much needed light on the nature and operation of the SMSF industry in Australia. In this paper, this question is analysed by considering the annual returns since inception of a sample of 100 SMSFs.

The remainder of this paper is organised as follows. In Section I, the nature of the equity premium puzzle is described and some of the relevant literature is briefly reviewed. Since this topic has been the subject of more than 300 scholarly articles (Siegel, 2005), only a brief description is required. In Section II, the data collected for this investigation is described. In Section III, Australia's equity premium is calculated over various overlapping periods since 1987 in order to facilitate the comparison of the average annual returns generated by the SMSFs since their inception with the average annual equity premium. In Section IV, the average annual returns generated by the SMSFs since inception are compared with the average annual Australian equity risk premium observed in corresponding periods. In Section V, the average annual returns of the SMSFs are compared with the riskless rate of interest in order to determine whether the SMSFs earned any premium above the risk-free rate. Section VI concludes the paper.

I. The equity premium puzzle

In order to provide contextual completeness for this investigation, it is worthwhile presenting a brief overview of the equity premium puzzle, the solution of which has occupied financial economists for almost a quarter-century. Within the context of the standard form of the CAPM ($E(R_i) = r_f + \beta_i(E(R_M) - r_f)$), the investor's utility is assumed to depend only upon his or her expected future wealth and the expected standard deviation of the possible divergence of actual wealth from that which was expected (Sharpe, 1964, p. 428). Since wealth depends on investment returns, it is possible to assume that in assessing an investment, the individual will base his or her assessment on the expected return and expected standard deviation of returns (Sharpe, 1964, p. 428). The individual is assumed to favour additional expected returns and dislike additional standard deviation of actual returns from expected returns (risk). Formally, the individual's utility is a function of expected returns and the standard deviation of returns:

$$U = f(E_R, \sigma_R) \quad (1)$$

where U is the investor's total utility, E_R is the expected return of an investment ($dU/dE_R > 0$) and σ_R is the standard deviation of the possible divergence of actual

returns from expected returns ($dU/d\sigma_R < 0$) (Sharpe, 1964, p. 428). Geometrically, the indifference curves that derive from this particular configuration of the individual's utility are concave-upwards in the expected return-risk plane. One possible specification of the utility function for this type of individual is a quadratic function for expected returns expressed as follows:

$$U = (1 + b)E_R + bE_R^2 - c\sigma_R^2 \quad (2)$$

where E_R and σ_R^2 denote expected return and variance of return, respectively, b is a parameter that adheres to the restriction $-1 < b < 0$ when investors are risk averse and c is a parameter that adheres to the restriction $0 < c < 1$ (Tobin, 1958, p. 76). Alternatively, it is also possible, as Elton *et al.* (2003) have shown, to write a quadratic function directly for wealth:

$$U(W) = W - bW^2 \quad (3)$$

Underlying this theoretical work is the theory of risk aversion. Pratt's (1964) work, produced independently of Kenneth Arrow's similar efforts, sets down the pure theory of risk aversion. Indeed, the Arrow-Pratt measures of absolute and relative risk aversion hold a place of some prominence in the literature:

$$R_A(W) = -\frac{U''(W)}{U'(W)} \quad (4)$$

$$R_R(W) = -W \frac{U''(W)}{U'(W)} \quad (5)$$

In equations (4) and (5), $R_A(W)$ is the Arrow-Pratt measure of absolute risk aversion and $R_R(W)$ is the Arrow-Pratt measure of relative risk aversion. These measures have a very desirable property. The numerical estimates of equations (4) and (5) do not depend upon the units in which the utility is measured. This is a significant advance over the naive measure of risk aversion computed simply by taking the second derivative of the utility of wealth function, $U''(W)$.

Whilst the derivation of these risk aversion measures represented a significant contribution to theoretical financial economics, both the utility function in equation (3) and in the numerators and denominators of equations (4) and (5) are not correctly specified (Siegel, 2005). Wealth is only a proxy for consumption and it is consumption that is of the utmost concern to the individuals whose behaviour is modelled by the equations of financial economics. Once consumption was input into the utility functions, the consumption based C-CAPM are developed. The C-CAPM of Breeden (1979), Lucas (1978) and Grossman and Shiller (1982) is analogous to the standard CAPM in many respects. The similarities are plain and the basic expression is straightforward:

$$R_{it} = \alpha_i + \beta_i C_t + e_{it} \quad (6)$$

Breeden's continuous time asset pricing model is one in which asset betas are measured relative to the aggregate real consumption rate, C_t , rather than relative to the market's returns. In this context, Marshall and Parekh (1999) explain that the

theoretical equity premium that financial economists would expect to observe if the C-CAPM were “true” is:

$$EP' \equiv \frac{-\text{cov}(m_t, r_t^e)}{E(m_t)} \quad (7)$$

where m_t is the C-CAPM stochastic discount factor (SDF) or asset pricing kernel and r_t^e is the excess return on equities (over the riskless rate of interest). Mehra and Prescott (1985) showed that the covariance between the SDF and r_t^e is very low. Equation (7) therefore predicts an equity premium that is very low and, indeed, far lower than that which has been observed empirically in most Western countries during the twentieth century. Only when the coefficient for risk aversion is allowed to be approximately 50 times greater than the highest plausible estimates of around 1.50 can the empirically observed equity premium be reconciled with the C-CAPM. The inability of asset pricing models to explain the magnitude of the equity premium is the source of the equity premium puzzle.

Exactly, why the asset pricing models failed has been the subject of much conjecture. Cochrane (2001, p. 24) offers a number of possible explanations:

- people are far more risk averse than scholars have thought them to be;
- the stock returns over the last half century were the result of good luck rather than equilibrium compensation for risk; or
- there is something “deeply wrong” with the theoretical models that have been produced, including the utility function that has been deployed and the utilisation of aggregate consumption data.

Of course, there are many more explanations extant in the literature, including the first solution proposed by Rietz (1988) and Barro (2006) that purports to solve the puzzle by taking into account infrequently occurring disastrous events. According to Rietz (1988), a large “crash” in output of 25-50 percent occurring with a probability of 1.4-0.4 percent per year generates *ex ante* equity risk premiums roughly consistent with the observed equity premium (although the required risk aversion coefficients are still a little high). Unfortunately, despite its apparent promise, Rietz’s work and all subsequent investigations have failed to resolve the equity premium puzzle to the satisfaction of financial economists.

Cochrane’s (2001) second explanation (above) may eventually prove correct. If so, the equity premium that we can expect in the future will be much lower than that which we have experienced over the last century. However, Siegel (2005, p. 70) adds:

The equity premium is a critical number in financial economics. It determines asset allocations, projections of retirement and endowment wealth, and the cost of capital to companies. Economists are still searching for a simple model that can justify the premium in the face of the much lower volatility of the aggregate economic data. Although there are good reasons why the future equity risk premium should be lower than it has been historically, projected compound equity returns of 2-3 percent over bonds will still give ample reward for investors willing to tolerate the short-term risks of stocks.

With approximately \$300 billion in assets under management, SMSFs account for about one-quarter of Australia’s superannuation savings. Even if the equity premium falls by half, the rewards for long-term investment in Australian equities may be substantial.

Compound equity returns of 2-3 percent per annum above the riskless rate of interest may alleviate some of the possible shortfalls that are anticipated in Australia's retirement savings stream and provide a higher standard of living in retirement for those investors who can earn the equity premium over the long term.

In this context, the present investigation has two main parts. First, we determine the magnitude of the returns generated by each of the SMSFs in the sample. The purpose of this is to highlight the difference in absolute magnitude between the returns earned by the SMSFs and the "head-line" equity premium figures that are widely quoted and discussed. Second, unless portfolios are completely risk free – as characterised by $\beta_j = 0$ – they should exhibit a positive premium to the riskless rate of interest. The failure of SMSFs to generate any premium to the riskless rate of interest has significant implications. As mentioned in the introductory section of this paper, the ability of investors to earn the equity premium on either part or all of their portfolios may be impaired by poor portfolio management. Excess volatility of returns that results from inadequate diversification, for example, will generate a terminal value for the portfolio that is lower than a less volatile portfolio even if the arithmetic mean annual returns are the same. Whilst investments in equities have generated high returns above the riskless rate of interest, the possibility remains that investors are unable to replicate the equity premium on either their overall portfolios or the equity component of their portfolios. There is also the possibility that investors are unable to earn any risk premium at all.

II. Data

In Australia, provisions of approximately \$1 billion each week are made for retirement through the nation's superannuation system. The present mandatory superannuation savings system has a relatively short history. The requirement for employers to contribute a minimum percentage of gross income on behalf of employees to a superannuation fund was introduced in the early 1990s, in a bid to widen the coverage of superannuation to more working Australians. Additional contributions may be made voluntarily. Whilst contributions to superannuation are compulsory for all wage earners, individuals are generally free to choose the type of superannuation fund where their savings will be invested. A popular choice is simply to invest in "retail" superannuation funds which are available to all members of the public. That is, an individual does not need to be employed in a particular industry to become a member of a retail fund. However, numerous other options are available.

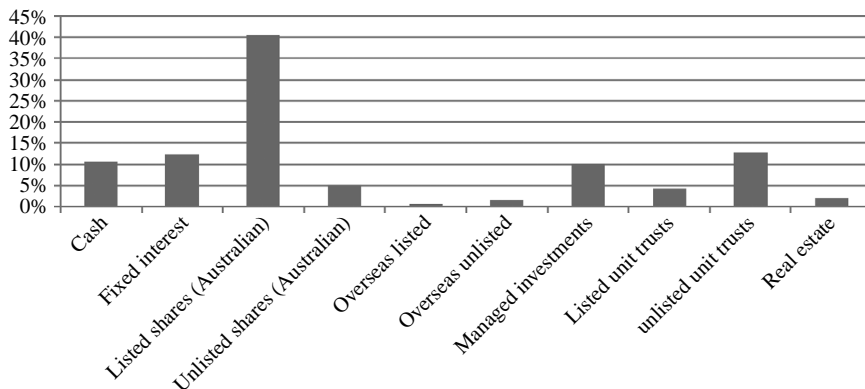
A choice that has been growing in popularity is "self-managed" superannuation. A self-managed superannuation fund is a fund with fewer than five members and may comprise a group of individuals, a couple or a family. All members must also be trustees of the self-managed superannuation fund and as such are responsible for managing the fund's investment portfolio, subject to various government regulations, including the Superannuation Industry (Supervision) Act 1993. The compulsory and voluntary contributions made to the SMSF and are managed by the trustees for the "sole purpose" of providing for their retirement. It is against the law, for instance, to utilise the funds in the SMSF for other than retirement purposes, such as purchase a new car, a painting to hang in one's house or a holiday apartment. The amount of assets invested in SMSFs is \$326 billion, which represents approximately 29 percent of Australia's total superannuation assets (APRA, 2008). There are now more than 400,000 SMSFs.

For this investigation, a sample of 100 SMSF portfolio microstructures was gathered. The data were obtained from a financial services firm operating in one of Australia’s capital cities. The funds in the sample were drawn more or less at random from the total number of SMSFs administered by the financial services firm. Bearing in mind that each SMSF represents the retirement savings of a small group of people up to a maximum of four members, the portfolios are quite large. The average size of each of the 100 portfolios in the sample was \$796,611 as 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 \$200,000. Most of the SMSFs were formed over the last five to 15 years but a few of the funds were established more than 20 years ago. There is nothing unique or special about the SMSFs in the sample that would lead to a conclusion that the SMSFs are not representative of the broader population of self-managed superannuation funds in Australia. Whilst the trustees of the SMSF portfolios may have benefited from financial advice in choosing investments and constructing their portfolios, ultimately the trustees remain responsible for their SMSF.

The SMSF portfolios contained in the sample are reasonably large portfolios containing an asset mix of cash, fixed interest securities, managed funds and domestic and overseas shares. For the most part, the equity investments are confined to domestic Australian companies and fund managers. Some of the funds contain real assets such as art and real estate. The average asset allocations of each of the 100 portfolios are shown in Figure 1.

It is clear from Figure 1 that the SMSFs in the sample are heavily weighted towards cash, (Australian) shares and managed investments. The interesting feature is the high allocation to managed investments. One rationale for initiating a SMSF is to obtain more control over the investment strategy and execution and avoid the fees associated with managed investments products. In light of this, the allocation of more than one-fifth of the portfolios (on average) to managed investments is quite curious. However, it is possible that the SMSF trustees use these investment vehicles to access markets that are not easily targeted with direct investments.

The high allocations to cash and fixed interest securities would appear to suggest that the trustees are reasonably risk averse – approximately, 20 percent of the overall



Note: Sample of 100 portfolios

Figure 1. SMSF average asset allocations

portfolios are allocated to these asset classes. However, a conservative investment strategy would not normally have an allocation of 50 percent of the overall portfolio to equity securities and, in most cases, the SMSFs in the sample are characterised by such an allocation. Figure 2 shows the allocations to listed Australian shares of all SMSFs in the sample.

The portfolios exhibit a dichotomy that is difficult to reconcile with the asset allocations associated with standard investment strategies. Rather than a consistently applied strategy, the SMSF trustees simply split their portfolios into either cash or Australian shares. The result is a portfolio that is neither consistently conservative nor consistently aggressive (to any degree). Whilst this problem may be traced to poor portfolio management, it is more likely that poorly constructed investment strategy documents are the source of this dichotomous (and *ad hoc*) portfolio construction. Permissible asset allocations must be set very wide. This permits a level of flexibility but will, in the absence of disciplined portfolio management, result in unstructured portfolios.

In light of these compositions of the SMSF portfolios, it would be surprising if the SMSFs in the sample are able generate returns that match or exceed the premium above the riskless rate of interest exhibited by the broader market averages. As Siegel (1999) has suggested, problems with portfolio construction may lead to returns that fall short of those experienced by the share market in general. However, whilst Siegel (1999) suggests that poorly diversified portfolios with a lower expected return than the market combined with transactions costs will prevent investors from matching the equity premium, the magnitude of the differential between the equity premium and what investors actually earn is only able to be determined by an investigation of individual portfolios. The SMSF portfolio data obtained for this investigation provide a unique opportunity to determine whether a group of investors has been able to earn the equity premium and, perhaps more importantly, whether they have been able to earn

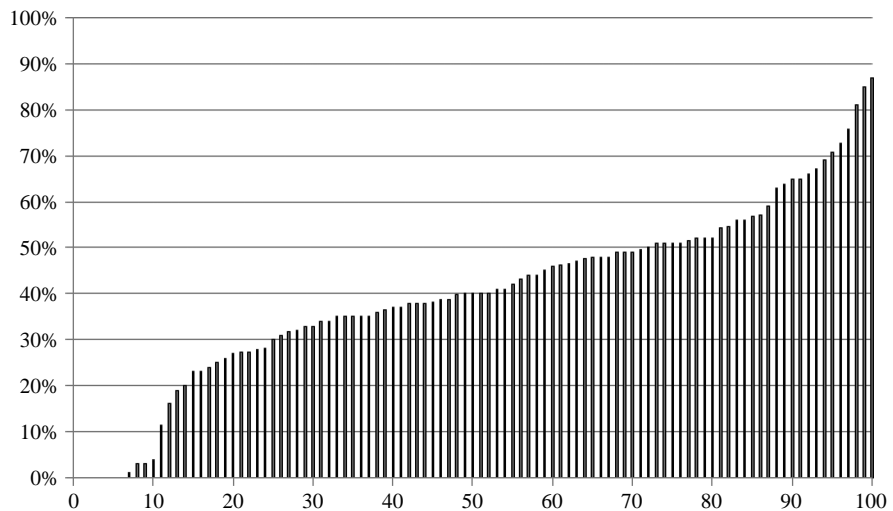


Figure 2.
SMSF allocations to listed
Australian shares

Note: All 100 portfolios

any premium to the risk-free rate at all. In the following section, the average annual returns since inception of the SMSFs in the sample are compared with the average annual equity premiums over the same time periods.

III. The equity risk premium in Australia

The equity risk premium is measured by determining the difference between the rate of return on stocks and the riskless rate of interest. In practice, the yield on either short- or long-term government securities is deployed as a proxy for the risk-free rate of return. Because both equity returns and bond yields are reported in nominal terms, this approach avoids the necessity of adjusting the figures for inflation (Brailsford *et al.*, 2008). Like most Western countries, Australian shares returned a large equity risk premium throughout the twentieth century. With real rates of return on government bonds averaging a little over 1 percent per annum and real rates of return on government bills averaging a little less than 1 percent per annum, Australia's 7.5 percent per annum real stock returns generated an equity risk premium of approximately 6 percent each year during the period 1900-2003 (Siegel, 2005, p. 64).

The equity premium figure of approximately 6 percent appears to be quite stable across a number of different empirical studies. Siegel's (2005) estimate of 6 percent for the Australian equity premium is confirmed by Brailsford *et al.* (2008) who found that Australian shares returned a premium of 6.20 percent per annum over bonds for the period 1883-2005 and 6.30 percent over bonds for the period 1958-2005. Given that there are a number of estimation problems that can affect the result of the analysis, this is also close to Officer's (1989) result of 7.90 percent for the period 1883-1987 and Dimson *et al.* (2002) result of 7.50 percent over the period 1900-2000. However, Jorion and Goetzmann (1999) computed a considerably lower value – just 1.58 percent – for the real return generated by Australian equities over the course of the twentieth century. The estimation of the equity premium can be quite contentious and this should be borne in mind when calculating the premium or discussing results.

Whilst debate continues on a number of issues surrounding the measurement of the equity premium, it is clear that the long run average Australian equity risk premium of 6 percent per annum conceals the extraordinary volatility that the equity risk premium has exhibited from year to year over the past two decades. Since 1987, the Australian equity risk premium has averaged 4 percent per annum. This is much lower than the historical average but the time series has been far from stable. On the contrary, the equity premium has exhibited 14 percent annual standard deviation during the 20 year period-2007. The equity premium in Australia over the last two decades has ranged from a low of – 31 percent during 1990 to a high of approximately 28 percent in 1993. Interestingly, the equity premium has exhibited a tendency to retreat substantially and register negative annual values following periods where it has reached high points of 20 percent or more in any given year.

The data collected from the sample of SMSFs allowed us to compute the average annual return generated by the funds since their inception. Since the SMSFs have different inception dates at various points in time over the past two decades, it is necessary to compute the equity risk premium in Australia over various time horizons in order to facilitate the comparison of the average annual returns of the SMSFs for the period since their inception with the equity risk premium generated by Australian stocks over the corresponding periods. This was accomplished using returns data

generated from the Australian Stock Exchange's All Ordinaries Accumulation (Total Return) Index in conjunction with the average yield on ten year Australian Commonwealth Government bonds. The average annual risk premium over the ten year bond yield that has been generated by Australian equities was calculated over a number of different (overlapping) horizons for the period 1987-2006. The results are displayed in Table I.

The average annual equity risk premium during this 20-year period was 2 percent lower than the longer term equity risk premium revealed by Siegel's (2005) calculations and approximately 2.3 percent lower than Brailsford *et al.*'s (2008) long-term calculations. The longer term premiums computed by Siegel (2005) and Brailsford *et al.* (2008) were 6 and 6.3 percent per annum above the risk-free rate, respectively. In the past two decades, the average annual premium on equities over the bond yield has been a lower 4 percent. However, it must be noted that the 20 year average from 1987 to 2006 is diminished by approximately one-half by the large negative equity risk premiums experienced during 1987, 1990 and 1992. These periods of negative equity risk premiums correspond, of course, to the years in which Australia experienced the 1987 stock market crash and the difficult economic times of the early 1990s. Having computed the equity risk premium at these time horizons, it is possible to determine whether the SMSF portfolios have earned the equity risk premium over the period since their inception.

IV. SMSF returns *vis-à-vis* the equity risk premium

The first step in the analysis is to determine the magnitude of the premium above the riskless rate of interest earned by the SMSF portfolios *vis-à-vis* the equity premium

	%
1987-2006	3.98
1988-2006	4.55
1989-2006	4.47
1990-2006	4.52
1991-2006	6.75
1992-2006	5.88
1993-2006	7.11
1994-2006	5.48
1995-2006	7.36
1996-2006	7.08
1997-2006	7.22
1998-2006	7.43
1999-2006	7.94
2000-2006	7.29
2001-2006	8.67
2002-2006	9.38
2003-2006	15.20
2004-2006	16.95
2005-2006	15.86
2006	17.27

Table I.
Average annual
Australian equity risk
premium

Note: Various periods 1987-2006

generated by the broader Australian stock market averages. This number is important for both financial economists and policy makers to know because the equity premium on Australian stocks in aggregate – something of a “headline figure” – may be somewhat different from the premium above the riskless rate of interest that is generated by individual SMSF portfolios. Since the SMSF portfolios tend to allocate funds between cash and Australian shares (at least for the most part), the SMSF portfolio expected returns may be represented as follows:

$$E(R_P) = x_1(r_f) + x_2(E(R_M)) \tag{8}$$

where x_1 is the percentage of investable funds allocated to the risk-free security, r_f and x_2 is the percentage of investable funds allocated to the Australian share market. The share market has an expected return of $E(R_M)$. The equity premium generated by the share market will be equal to $E(R_M) - r_f$. At the very least, therefore, the SMSFs should be expected to earn a premium above the riskless rate of interest given that the portfolios, for the most part, contain at least some risky assets. Whilst the question of any premium to the riskless rate of interest is left to a later section, close inspection of each individual SMSF reveals that most of the funds have generated positive returns since their inception.

As shown in Figure 3, the SMSFs in the sample have, in general, generated positive returns average annual returns. Only eight of 100 funds in the sample have generated negative returns since inception; that is, they have a lower portfolio value than they started with. Given that the trustees of SMSFs are likely to be relatively unsophisticated investors and probably are not skilled in the technical aspects of portfolio management and investment selection, the fact that the majority of the portfolios have generated positive average annual returns since inception is encouraging. However, the question of interest to this investigation is the magnitude of the returns above the riskless rate of interest. This question is addressed by:

- comparing the returns of the SMSF portfolios with the equity risk premium generated by the broader Australian stock market averages measured at the appropriate horizon; and

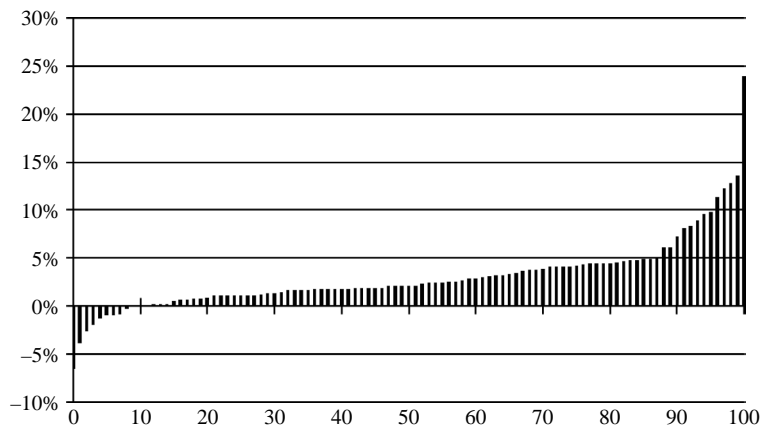


Figure 3.
SMSF average annual
returns since inception
($n = 100$)

- comparing the returns of the equity portions – rather than the whole portfolios (of the SMSF portfolios), with the equity risk premium measured at the appropriate horizon.

The purpose of comparing the whole-of-portfolio returns of the SMSFs with the equity risk premium generated by the broader Australian stock market averages (measured at the appropriate horizon) is to determine the magnitude of the SMSF portfolio returns, relative to the premium above the riskless rate of interest that characterised Australian stocks over comparative time horizons. Figure 4 shows that the sample of SMSFs has, on average, not generated returns that match or exceed the equity risk premium. Indeed, the SMSFs have generated returns that fall short of Australia's equity risk premium by an average of 6 percent per annum[3]. However, a small number of the SMSFs generated an average annual return equal to or in excess of the equity risk premium.

This finding should not be interpreted as a severe indictment of SMSF performance. Rather, the finding should be considered as an indication of the performance of SMSFs *vis-à-vis* the “headline figures” that denote the performance of the stock markets in aggregate. It is inappropriate, for instance, for financial economists, policy makers and regulators to undertake policy analysis and evaluation and the development of regulatory frameworks without relevant information concerning the performance of individual SMSF portfolios, relative to broader market averages. The equity risk premium generated by Australian stocks in aggregate may over-shadow the returns that characterise individual portfolios. Our finding highlights that the premium above the riskless rate of interest generated by Australian stocks in aggregate is not a performance statistic that reflects the premium above the riskless rate of interest generated by SMSFs, at least not within the context of the sample of SMSFs considered here.

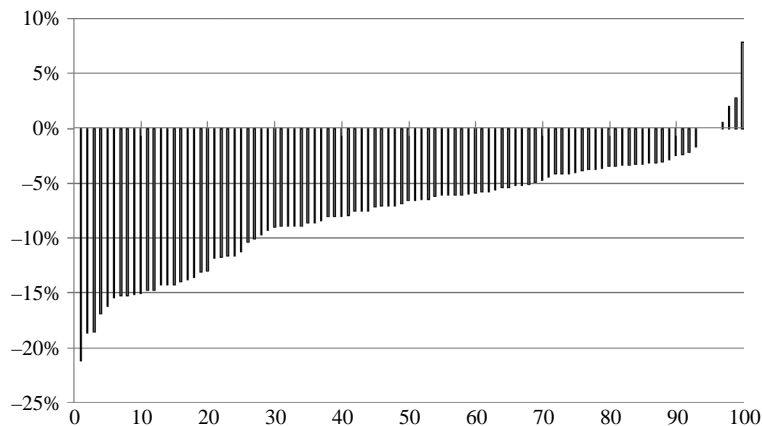
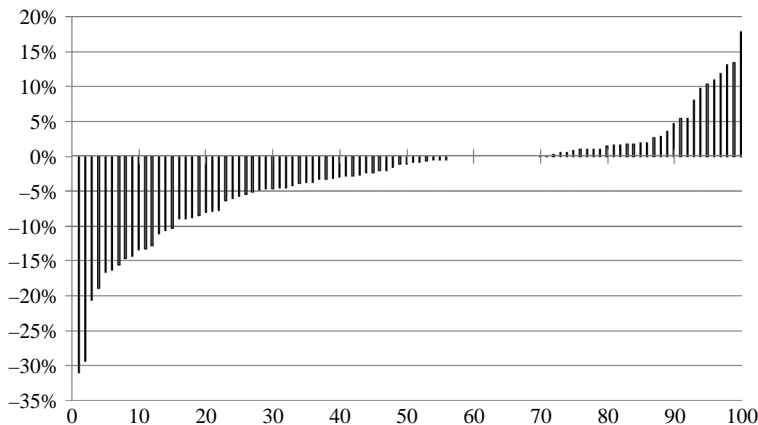


Figure 4.
Annual SMSF return
minus the equity risk
premium ($n = 100$)

Notes: This figure shows the average annual SMSF return minus the average annual risk premium measured over the period since each SMSF's inception. Positive values are recorded for SMSFs that earn a return in excess of the equity risk premium. The fact that most observations lay below the horizontal axis indicates that most of the SMSFs did not earn returns that matched or exceeded the equity risk premium

The second step in the analysis is to determine whether the SMSFs have generated returns on the equity components of the portfolios that match or exceed the premium to the riskless rate of interest generated by Australian stocks in aggregate. Since the portfolios have large allocations to cash and fixed interest securities, the returns generated by the equity components of the SMSF portfolios will tend to be the main engine that drives the returns on the overall portfolios. It is, therefore, important to know just how the returns on this critical component of the portfolios compare with the premium to the riskless rate interest generated by Australian stocks. When the returns generated on the equity components of the funds are compared with the equity premium measured over the appropriate horizon, as shown in Figure 5, it is revealed that 29 percent of the SMSFs in the sample generated returns on the equity components of their portfolios that match or exceed the Australian equity premium. On average, the equity components of the SMSFs generated returns that fall short of the equity premium generated by Australian equities by just 3 percent. This compares favourably to the 6 percent shortfall detected when considering the overall portfolios.

The engine that drives the returns of the SMSF portfolios – the equity components of the portfolios – does not appear to be malfunctioning. On the contrary, the premium above the riskless rate of interest that this “growth engine” generates is sometimes much higher than that generated by the Australian stock market in aggregate. However, it is important to recognise that the equity components of individual portfolios do not necessarily generate returns that match the premium above the riskless rate of interest that is generated by the broader Australian stock market averages. Again, the headline figure is shown to be a misleading indicator of the performance that likely typifies individual portfolios. For example, when forecasting SMSF members’ retirement incomes, it is important to understand that the returns on



Notes: This figure shows each SMSF's average annual equity component return minus the Australian equity risk premium measured over the corresponding period since the inception of the SMSF. This part of the analysis was only undertaken on the first part of the sample. The computational burden of undertaking the analysis on all of the SMSFs was too great given the number of data points involved

Figure 5.
SMSF Equity component returns minus the Australian equity premium ($n = 100$)

the overall portfolios are unlikely to match the much-discussed equity risk premium on Australian stocks in aggregate, and although the equity components of SMSF portfolios apparently perform well, they do not perform so well as to drive the entire portfolios' returns towards those that characterise the stock market in aggregate.

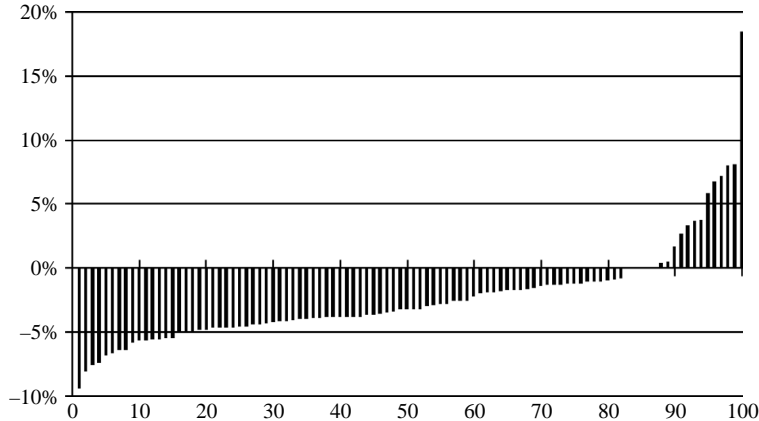
V. Did the SMSF's earn any equity premium?

Whilst it is important to determine the magnitude of SMSFs' premium to the riskless rate of interest *vis-à-vis* the premium generated by Australian stocks in aggregate, few unexpected conclusions may be drawn regarding the actual performance and management of SMSFs. Relatively, of course, the performance is not good. Even on a risk-adjusted basis, the performance is unlikely to compare favourably with the unmanaged stock market indices (Phillips *et al.*, 2007, 2009). Given that the portfolios are not fully invested in Australian equities, the premium generated by the broader Australian stock market averages is not expected to be matched by SMSFs. However, given that the SMSFs have, on average, some allocation to Australian equity securities (and other risky assets) it is expected that they will generate at least some premium to the riskless rate of interest. Failure to do so would be evidence of poor portfolio management and evidence that SMSF trustees' investment decisions detract value from the portfolios.

Having established that the SMSFs have not, on average, matched the observed equity premium on Australian stocks, it is logical to also investigate whether the SMSFs earned any return in excess of the riskless rate of interest. As mentioned in the previous section, because the SMSFs contain some risky assets it should be expected that they have earned at least some premium above the riskless rate of interest. Whether or not the SMSFs in the sample have earned any risk premium at all is easily determined. By comparing the average annual return generated by each SMSF with the average interest rate on Australian Commonwealth Government ten-year bonds measured over the relevant time horizon, it is a straightforward matter to determine the magnitude of the premium to the riskless rate of interest that these portfolios have generated. For completeness, both the returns on the overall portfolios and the returns on the equity components of the portfolios are compared with the relevant riskless rate of interest.

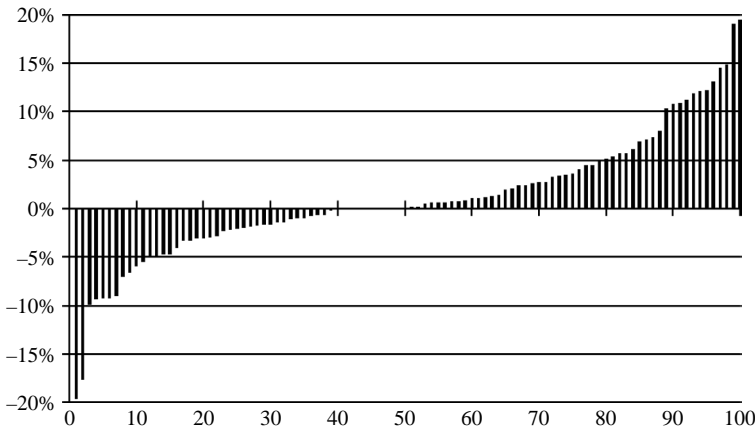
Figure 6 shows that in comparing the average annual returns generated on the overall portfolios with the average interest rate on Australian Commonwealth Government ten-year bonds during corresponding periods, most of the SMSFs did not earn a premium to the riskless rate of interest. Rather, on average, the SMSF portfolios earned returns that fell short of the riskless rate of interest by 2 percent per annum, and only 13 percent of the SMSFs earned returns in excess of the riskless rate of interest. This result is significant in that it indicates inferior security selection by the SMSF trustees in that their selections result in negative value. The inability of the SMSF portfolios to, on average, earn a risk premium is surprising given that almost all of the portfolios contain at least some risky assets. This result is probably explained by poor portfolio management (Phillips *et al.*, 2007) and the absence of an adequately documented investment strategy to guide the construction and management of the SMSFs' investment portfolios.

As shown in Figure 7, when the average annual returns since the inception of each SMSF that have been generated on the equity components of the 100 portfolios in the



Notes: This figure shows the average annual SMSF returns minus the average riskless rate of interest that prevailed during the corresponding period since the inception of the SMSF. Positive values indicate average annual returns on the overall portfolios in excess of the riskless rate of interest. This analysis was undertaken on all of the SMSFs in the sample

Figure 6.
SMSF returns minus the riskless rate of interest ($n = 100$)



Notes: This figure shows the average annual returns generated by the equity components of each SMSF portfolio minus the average riskless rate of interest that prevailed during the corresponding period since the inception of the SMSF. Positive values indicate average annual returns on the equity components of the portfolios in excess of the riskless rate of interest. This analysis was undertaken on the SMSFs in the first part of the sample

Figure 7.
SMSF Equity component returns minus the riskless interest rate ($n = 100$)

sample are compared with the riskless rate of interest, the results are more favourable. A much larger number of portfolios earned a premium to the riskless interest rate when the equity components of the portfolios are considered in isolation, and, on average, the SMSFs earned a small premium above the riskless rate of interest on the equity components of the portfolios. This premium was much lower than that which has been

experienced by the broader Australian share market. On average, the equity portions of the SMSF portfolios earned a premium to the riskless rate of interest of 1 percent per annum during the lifetime of the portfolios. Although the significance of this finding can only be confirmed through further empirical analysis, it is interesting to note that the average equity premium earned by the SMSFs on the equity portions of the portfolios found here is, coincidentally or otherwise, much closer to Mehra and Prescott (1985) estimate of 0.35 percent than the equity premium generated on Australian shares in aggregate.

On balance, risky SMSF portfolios would be expected to generate returns above the riskless rate of interest, and the failure of the sample funds to do so indicates that far from being superior security selectors, SMSF trustees are making choices that detract from the performance of their portfolios. A purely risk-free portfolio containing Australian Government securities would, in the majority of cases, generate returns in excess of those generated by the risky SMSFs. On a risk-adjusted basis, these SMSF trustees are overseeing and are responsible for a real diminution in the value of their retirement assets. All the costs involved with setting up and running these funds have hardly been worth the effort. Finding that the SMSFs have not generated returns in excess of the riskless rate of interest leads to the conclusion that the risks borne by SMSF trustees have not delivered the expected returns.

VI. Discussion and conclusions

The analysis presented in this paper generated three main results:

- (1) the sample of SMSFs generated a much lower premium to the riskless rate of interest than the aggregate Australian share market;
- (2) even when considered in isolation, the equity portions of the portfolios earned only a very small premium to the riskless rate of interest; and importantly
- (3) the SMSF portfolios did not earn a premium to the riskless rate of interest, even though the portfolios contain risky assets.

This latter result has implications for policymakers and is indicative of poor portfolio management. The findings show that although most of the portfolios generated positive returns since inception, the returns are far below those generated by the Australian share market, and below the yield of Australian Commonwealth Government ten-year bonds. In retrospect, higher returns could have been generated by simply allocating some portion of each portfolio to a managed bond fund or cash management trust and an index fund that mirrors the Australian share market in a proportion consistent with trustees' risk preferences.

Constructing an investment portfolio for SMSFs, like most portfolios, is a complex task. In essence, the portfolios are combinations of securities with risk and return characteristics that must be carefully managed in order to generate returns that are commensurate with the risk being borne. When returns are not commensurate with risks being borne, the difficult exercise of forming and managing a portfolio has, it might be said, hardly been worthwhile. This is particularly the case when a much more straightforward approach would have generated higher returns. It is one of the main results of modern finance theory that investors should simply divide their portfolios between the risk-free asset and the market portfolio. In light of the returns generated by the sample SMSF portfolios examined in this study, this simple approach appears

all the more attractive. Simply allocate a portion to the riskless security and a portion of the portfolio to a fund that mirrors the Australian share market. For most of the last three decades, such an approach would have generated returns far in excess of those that were generated by the SMSFs.

Since the SMSFs contain risky assets, at least some premium to the riskless rate of interest should be expected. Poor diversification could be one possible reason for the failure of the funds to generate returns in excess of the riskless rate of interest. However, the portfolios of the SMSF sample appear to comprise sufficiently different securities to be considered as adequately diversified. It is more likely that poor portfolio construction – poor security selection and perhaps over-diversification, especially in managed investments – is the source of the low returns. This is difficult to rectify without first considering the appropriateness of the fund's investment strategy. The fact that such wide-ranging allocations such as 20 percent cash and 40 percent shares are permissible under the investment policy statements suggests a problem with the construction of the plan which the managers (in this case trustees) follow in their day-to-day management of the SMSFs. Investigation of this issue would form the basis for an interesting research program, focussing on trustees' rationale that informs their portfolio construction and management decisions. Furthermore, it would be instructive to know more about the knowledge set of SMSF managers and the amount of time they spend engaged in SMSF-related activities.

In bringing this paper to a close, it is worthwhile returning to the discussion on the equity risk premium. Asset pricing continues to present numerous challenges. Even though the "classical" period of asset pricing theory has long since receded, the reconciliation of the theoretical work undertaken during the 1970s and 1980s with "stylised facts" may yet take a generation or more of solid endeavour on the part of financial economists (Campbell, 2000). The premium of aggregate stock returns above the riskless rate of interest is difficult to reconcile with the C-CAPM unless one is willing to accept an implausibly high value for the risk-aversion parameter. However, as Siegel (1999) conjectured, there is a very strong possibility that investors may not actually earn the equity premium on their portfolios. The results of this investigation, though not based on a sufficiently large sample to permit the generalisation of the findings to all investors, provide some support for this conjecture.

The results generated during this investigation are somewhat concerning but they are by no means surprising or perplexing. SMSF portfolios have been shown to be poorly constructed (Phillips *et al.*, 2007). Portfolio management, relying on Markowitz diversification and portfolio programming, is a complex task and may be beyond the capabilities of unsophisticated investors. Even if this were not the case, it is not unreasonable to suggest that very few SMSF trustees would have been educated on the mechanics of portfolio management. Whilst naïve diversification is possible and may have been attempted by most investors, this method of portfolio construction may not be effective if it ignores the correlation structure of the returns on the securities in the portfolio. The low-excess returns generated by the SMSFs are probably due to poor portfolio management, including low diversification, the inclusion of too many managed investments in the portfolios and high weightings in low return-low risk assets such as cash in bank accounts.

The high-historical equity premium provides encouragement to investors seeking to build their wealth over the long term. However, the recommendation that SMSFs be

heavily invested in Australian shares must be considered in light of the actual ability of SMSF trustees to manage a portfolio in such a manner as to extract some or the entire available premium. The failure of the risky SMSFs to generate returns in excess of the riskless rate of interest is evidence that SMSF trustees do not possess the ability to select securities that generate returns in excess of the returns that would have been expected given the risks involved. Rather than attempt to implement any active portfolio management strategy, SMSF investors seeking to benefit from any premium that may characterise Australian shares in the future are likely to perform better than the average SMSF trustee by taking a very simple approach and dividing their assets between the risk-free security and the market portfolio (an index fund). Those who are uncomfortable with such an approach might consider whether the right choice for them is to start-up a SMSFs.

Notes

1. Of course, the terminal value could be less even if the average return is 7.5 percent per annum. Increased volatility will decrease the terminal value.
2. The average SMSF invests 36 percent of the overall portfolio in Australian shares (ATO, 2008).
3. Whilst the SMSF returns may be partially or wholly after tax, allowing for taxation effects does not change the conclusions presented in this section (or other sections) of this paper. Allowing for taxation would reduce the shortfall from 6 to 5.1 percent.

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Corresponding author

Peter J. Phillips can be contacted at: phillips@usq.edu.au