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Ethical or responsible investing has attracted much attention over the last decade. Financial planners can now advise clients on a broad range of ethical investment products and some financial planning firms have this as their sole activity. Interestingly, the alter ego of ethical investing, sin or vice investing, has attracted far less attention. Recent research shows that 'sinful' investments can generate very strong returns and should certainly not be avoided by investors without a full evaluation of the consequences of excluding these investments from the portfolio. This paper extends these findings into the field of self managed superannuation funds operating within an Australian context. The prevalence of sinful investments within a sample of SMSFs and the returns that may be generated by a portfolio consisting of sinful Australian equities is examined. Analysis reveals that the SMSF investors within the sample do not include very many sin stocks in their portfolios. However, it does not appear as though SMSF trustees are missing an important investment opportunity because the analysis reveals that an equally-weighted portfolio of all vice or sin shares is unlikely to generate superior returns.

Self managed superannuation funds; SMSF; Sin; Vice; Investing

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Peter J Phillips[1]

Abstract

Ethical or responsible investing has attracted much attention over the last decade. Financial planners can now advise clients on a broad range of ethical investment products and some financial planning firms have this as their sole activity. Interestingly, the alter ego of ethical investing, sin or vice investing, has attracted far less attention. Recent research shows that 'sinful' investments can generate very strong returns and should certainly not be avoided by investors without a full evaluation of the consequences of excluding these investments from the portfolio. This paper extends these findings into the field of self managed superannuation funds operating within an Australian context. The prevalence of sinful investments within a sample of SMSFs and the returns that may be generated by a portfolio consisting of sinful Australian equities is examined. Analysis reveals that the SMSF investors within the sample do not include very many sin stocks in their portfolios. However, it does not appear as though SMSF trustees are missing an important investment opportunity because the analysis reveals that an equally-weighted portfolio of all vice or sin shares is unlikely to generate superior returns.

Key Words: Self managed superannuation funds, SMSF, sin, vice, investing.

JEL Classification: G11, G23

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Introduction

Ethical investing—sometimes referred to as responsible investing or socially responsible investing—has been around for a long time. The relatively recent[2] emergence of ethical investing as an investment product specifically designed to be marketed to investors who wish to see their ethics reflected in their investment portfolios has been quite successful. In the United States, estimates have placed the amount of managed capital invested according to ethical principles or guidelines at approximately 10 percent (Heinkel, Kraus & Zechner 2001). In Australia, financial planning professionals can advise on a broad range of ethical investment products. Along with the emergence of these investment products, an increasing amount of formal academic literature has emerged that presents the results of various investigations into the investment performance of ethical investments. A smaller literature emerging alongside these investigations has treated the inverse: the returns generated by 'vice' or 'sin investments'.

There is a distinction between unethical or irresponsible investments and sinful investments. The set of sinful investments is a subset of the set of unethical investments. All investments that are sinful are unethical. All investments that are unethical or irresponsible are not necessarily sinful. Hamilton, Jo and Statman (1993, p.63) list the Social Investment Services' ten selection criteria that might be applied to select companies for inclusion within an ethical investment fund: (1) environmentally sound; (2) secure market segments and good reputations with customers, competitors and employees; (3) produces safe products; (4) has good employee relations; (5) produces products of good quality; (6) good record of equal employment opportunity; (7) uses alternative energy sources; (8) recovers resources; (9) has significant participation in the community; (10) contributes to the control of pollution. Against these criteria any type of business enterprise may potentially be deemed unsuitable for inclusion within an ethical or responsible portfolio. Excluded companies need not necessarily be those involved in vice or sin.

Identifying a company as one whose business involves profiting from vice or sin depends, like the development of any investment screen, on what activities or products one believes to be sinful. Beliefs may differ across investors. For the most part, however, companies involved in vice or sin are those that generate profits from activities that exploit consumers' habit-forming or sin-seeking behaviours (Fabozzi, Ma & Oliphant 2008, p.82). Assessed by society against current moral standards, the business activities of these companies, whilst certainly not illegal, meet with general disapproval (Fabozzi et al. 2008). Business activities that may generally fall into this category include adult services, alcohol and tobacco, some aspects of biotechnology, defence and gaming. Ethical investment as a product emerges because of some perceived relationship between the allocation of capital to particular business enterprises and the character of the investor. Ethical investments reflect positively upon the character of the investor. It is, no doubt, a primary marketing strategy of firms providing ethical investment products to stress, explicitly or implicitly, the existence and importance of the reflection of the investor in his or her investments.

The purpose of this paper is to (1) investigate the prevalence of sin stocks within a sample of SMSFs; and (2) investigate the risk adjusted performance of sin stocks in Australia. This paper is organised as follows. In Section II, a survey of the literature is presented. In Section III, the data, method and analysis are described and the results presented. The vice or sin shares listed on the Australian Stock Exchange are identified and their returns are analysed. Various portfolio combinations are examined and the risk-adjusted

[2] For example, the sample of funds investigated by Statman (2000) only contained nine funds established before 1990.

performance of the individual securities and the portfolios are assessed. Whilst the very best performing vice or sin shares could be combined into a portfolio that generates risk-adjusted returns superior to those generated by the broader market averages, such a portfolio relies on outstanding stock selection. An equally-weighted portfolio of all vice or sin shares is unlikely to generate returns superior to those generated by the overall share market. Section IV summarises the main results and concludes the paper.

The Literature

Approximately 10 percent of funds under management in the United States are invested according to ethical guidelines (Heinkel et al. 2001). This is more than two trillion dollars (Statman 2000). Although the allocation of capital according to ethical principles has probably characterised the actions of some investors for a very long time, the ethical mutual fund industry has a much shorter history of approximately three decades (Shank, Manullang & Hill 2005). The formal tracking of the investment performance of socially responsible companies was initiated in 1990 with the establishment of the Domini Social Index (Statman 2000). The index serves as a benchmark for fund managers that invest according to ethical principles. The relative performance of indices constituted with socially responsible companies *vis-à-vis* the broader market indices has formed the basis of much of the empirical research into the profitability of ethical investing. Within the theoretical framework provided by modern portfolio theory, numerous investigations have assessed the performance of socially responsible companies and professionally managed portfolios dedicated to the allocation of investable funds according to some set of ethical principles.

The comparison of ethical indices with broader market indices has revealed the performance of the ethical indices to be very similar to that of the broader market averages. For example, the Domini Social Index performed just as well as the S&P 500 during the 1990s. The DSI had slightly higher raw returns than the S&P 500 but slightly lower risk-adjusted returns. The difference between the two indices' performance was not statistically significant (Statman 2000). This result has been supported by a number of similar studies (Grossman & Sharpe 1986; Guerard 1997; Kurtz & DiBartolomeo 1996; Sauer 1997; Statman 2006)[3]. For those firms marketing ethical financial services products, these findings are of considerable importance. Investors who invest ethically still want to generate returns that are at least comparable with the returns available from 'unscreened' investments. Krumsiek (1997) found that 80 percent of investors would not invest unless the criterion of comparable performance was met. When considered at an 'index versus index' level, this does appear to be the case.

The performance of ethical managed investments products also appears to be comparable with more orthodox managed investments. Theoretically, there is reason to expect that socially responsible portfolios may do worse than standard portfolios because of the restrictions placed on diversification by the ethical screens. Alternatively, socially responsible portfolios might be expected to generate lower returns because the risks associated with investing in socially responsible businesses are lower. There might be less risk of litigation, for example. Both of these factors, along with many others that could be posited, do not appear to manifest themselves in a manner that is significant enough to skew returns one way or the other[4]. Ethical managed investment products perform in a way that is

[3] Also see a related paper by Teoh, Welch and Wazzan (1999).

[4] In a similar way, socially responsible investing as a 'movement' that aims to restrict capital flows to unethical business enterprises and increase their cost of capital does not have the critical mass necessary to achieve such

not statistically significantly different from regular managed investment products (Bauer, Otten & Rad 2006; Cortez, Silva & Areal 2009; Hamilton, Jo & Statman 1993; Kreander et al. 2005; Luther, Matatko & Corner 1992; Reyes & Grieb 1998; Statman 2000). This finding is important for investors, especially if they are characterised in the manner suggested theoretically by Beal, Goyen and Phillips (2005) (also see Minor 2007). If economic agents receive a non-monetary increment to their utility from investing ethically, comparable financial performance probably places investors who genuinely wish to see their ethics reflected in their investments at a higher level of utility than if they had invested in regular investment products.

Standing in contradistinction to ethical investments is vice or sin investments. These are not simply companies that are excluded or fail to be included in portfolios constructed via an ethical screen. Rather, these are companies that are engaged in business enterprises that are not generally approved of when assessed against current moral standards. There is no definitive categorisation of vice or sin companies just as there is no definitive categorisation of socially responsible companies. Quite simply, "One person's taboo is another person's sacred cow" (Gasparino & Tam 1998). Most ethical funds exclude tobacco, gaming, weapons or defence and alcohol producers from their portfolios (Statman 2000). Investigators of returns to vice or sin usually add adult service providers, companies involved in some forms of biotechnology (stem cell researchers and genetic engineers, for example) and, on occasion, fast food companies to this list (see Ahrens 2004; Fabozzi et al. 2008; Shank et al. 2005). The number of studies that have investigated returns generated by vice or sin portfolios is very small and the results are mixed. Shank et al. (2005) found no excess returns to sin (and, incidentally, no excess returns to ethical investment). Recent research by Fabozzi et al. (2008), however, revealed substantial returns to vice or sin stocks significantly outperforming common benchmarks. The flip-side of the same coin was examined by Hong and Kacperczyk (2009). Vice or sin companies appear to have a higher cost of capital.

Vice or sin shares (or stocks) might be expected to generate higher returns for a number of reasons. Not surprisingly, these explanations all relate to increased risks associated with vice or sin shares. First, fewer investors willing to invest in vice or sin shares reduces the sharing of risk among shareholders (Heinkel et al. 2001). Second, less tracking by analysts and ownership by institutions increases illiquidity and bid-ask spreads (Hong & Kacperczyk 2009). Third, increased risk of litigation (or changing regulations) or controversy and adverse press coverage affecting a vice or sin company's business operations (Fabozzi et al. 2008). For example, in Australia the regulations imposed on adult phone services by the Telecommunications Bill 1999 significantly impacted this aspect of the adult service business. Fourth, an explanation not related to enhanced risk is the fact that sin industries have high barriers to entry. Virtual monopolists in some lines of business, vice or sin companies generate higher (monopoly) profits (Fabozzi et al. 2008). The purpose of this paper is to determine whether a sample of SMSF trustees have incorporated sin stocks into their portfolios and whether any extra risk-adjusted returns could be obtained by doing so.

Data and Method

Three sets of data are required for this investigation: (1) a sample of SMSFs in order to assess the 'sinfulness' of the portfolio microstructures of these entities; (2) a selection of Australian vice or sin shares; and (3) the historical returns generated by these vice or sin shares. The second of these data sets must be detailed first. In order to select the vice or sin shares, the

an objective (Heinkel et al. 2001; Teoh et al 1999). Only within small individual industries does this appear plausible (see Hong & Kacperczyk 2009).

screening process followed by Fabozzi et al. (2008) is applied. For the most part this should lead to little in the way of controversy. Adult services, alcohol, defence, gaming and tobacco are classified as vice or sin industries by Fabozzi et al. (2008). As mentioned previously, most of these types of companies will be excluded by most ethical screens. Possibly the only contentious area is the classification of certain elements of the biotechnology industry as vice or sin. This might be contentious because such a classification seems to be more 'secular' than the classification of the other industries, whose classification as vice or sin is more obvious. The Fabozzi et al. (2008) screen is applied but it might be noted right now that the investigation of 'secular' and 'non-secular' aspects of security screens is an open research program and differences across societies, even two Western societies, may make for an interesting investigation.

Australian Vice

To determine the total 'universe' of vice shares in Australia, the Australian Stock Exchange listings were screened for companies that list their main business activities as: (1) adult services; (2) alcohol; (3) defence; (4) gaming; (5) tobacco; and (6) biotechnology. This is practically equivalent to a search by GICs and GICs sub-classification. This process generated a universe of 45 potential vice or sin shares. Within most of these categories, the classification of the companies involved as vice or sin is very straightforward (as mentioned in the introduction to this section). Leaving aside 'tobacco' for which there are no listed companies, the companies that may be classified as vice or sin shares within the categories of adult services, alcohol, defence and gaming are presented in Table One. For the most part, these companies are unambiguously involved in these four vice or sin industries and the only debate is the broader one that does not concern us here over whether these lines of business should be placed in the vice or sin categories. Such a debate can never be decided once and for all because it is a matter of belief, not fact (Statman 2000).

Table 1
Vice or Sin: Adult Services, Defence, Gaming and Alcohol

ADULT SERVICES	DEFENCE	GAMING	ALCOHOL
ADULTSHOP.COM	ELECTRO OPTIC SYS.HDG.	AINSWORTH GAME TECH.	AUSTRALIAN VINTAGE
PLANET PLATINUM	METAL STORM	ARISTOCRAT LEISURE	AWH
	XTEK	CENTREBET INTERNATIONAL	BRAND NEW VINTAGE
	ADACEL TECHNOLOGIES	CROWN	CHEVIOT BRIDGE
	IATIA	EBET	DROMANA ESTATE
	LONGREACH GROUP	NATIONAL LEIS.& GMG.	EMPIRE BEER GROUP
		SKY CITY ENTM.	FOSTER'S GROUP
		SINO STRATEGIC INTL.	GAGE ROADS BREWING
		TABCORP HOLDINGS	LITTLE WORLD BEVS.
		TATTS GROUP	PRINCE HILL WINES
			PUBLIC HOLDINGS AUS.

There are 16 companies that designate 'biotechnology' as their main business activity. Fabozzi *et al*. (2008, p.88) provide a list of activities that characterise the biotechnology firms included in their vice or sin portfolios. These activities include tissue engineering, gene therapy, animal testing, genetic testing, nanotechnology research for the treatment of STDs and stem cell research. However, rather than attempt to sub-classify the activities of biotechnology as vice or sin or otherwise, each of the 16 companies that list their main business as biotechnology are included in the sample. Depending on an individual's beliefs about the nature of the activities in which each company is involved, a company's inclusion in this list of vice or sin shares may be viewed as appropriate or inappropriate. Once more, however, this is the problem that characterises the application of any ethical screen. This problem, together with the difficulty of determining, even from annual reports and business summaries, the exact nature of all of the activities of these biotechnology companies means that it is advisable to simply include in the vice or sin classification all 16 companies that list biotechnology as their main line of business.

Table 2
Vice or Sin: Biotechnology (Main Business)

BIOTECHNOLOGY	
AGENIX	HEALTHLINX
BIODIEM	HEXIMA
BENITEC	MESOBLAST
BIOTECH CAPITAL	PROBIOMICS
CARDIA BIOPLASTICS	PRIMA BIOMED
CELLESTIS	PSIVIDA CDI.
FLUOROTECHNICS	STARPHARMA HDG.
GENETIC TECHNOLOGIES	GENESIS RESH.& DEV.

The prevalence of these 45 companies in the portfolios of a sample of SMSFs forms the basis for one of the contributions of this paper: an analysis of the prevalence of sin stocks in a sample of SMSFs. Whilst the Australian Taxation Office publishes aggregated data for SMSFs in Australia, the analysis of the constituents of SMSF portfolios requires access to individual portfolio microstructure data. For this study, two independent samples of SMSFs are analysed. Totalling more than 100 individual funds from two independent sources (that is, two separate and unrelated financial services firms), the sample of SMSFs provides a glimpse into the portfolios chosen by SMSF trustees and permits the assessment of the sinfulness of a sample of SMSFs. Given what is known about SMSF portfolios (see Phillips 2007; 2009; Phillips, Baczynski & Teale 2009a, 2009b; Phillips, Cathcart & Teale 2007), very 'saintly' portfolios are to be expected, at least for the most part. The reason is that SMSF trustees appear to invest in larger, more well-known companies and many of the vice or sin companies do not meet these prescriptions. Indeed, the median market capitalisation at the end of March 2010 for the 45 sin stocks listed above is just $15 million. The mean market capitalisation is $586 million only because six of the companies have billion-dollar market values. However, the size and relative obscurity of some of these companies also means that SMSFs might find opportunities in being more sinful.

SMSFs and Sin Stocks

SMSF portfolios are not characterised by a prevalence of sin stocks. To reach this conclusion, a sample of 140 SMSF portfolios was examined to determine the prevalence in the portfolios of the 45 vice or sin shares listed in the previous section. In addition to these 45 companies, the portfolios were examined for any other examples of adult services, defence, gaming, alcohol and biotechnology companies that might not have been included in our list. The sample of SMSFs was drawn at random from the list of SMSFs administered by two independent organisations (that is, two separate and unrelated financial services firms). The samples likely provide a very good cross-section of investors and there is certainly no reason to expect that the portfolios are biased in any particular direction. Despite being drawn from two independent samples, the structures of the portfolios are quite similar and tend to reflect

Table 3
Vice or Sin: Number of SMSFs Holding Each Share

ADULT SERVICES		**DEFENCE**		**GAMING**		**ALCOHOL**		**BIOTECHNOLOGY**	
ADULTSHOP.COM	1	ELECTRO OPTIC SYS.HDG.	0	AINSWORTH GAME TECH.	0	AUSTRALIAN VINTAGE	0	AGENIX	1
PLANET PLATINUM	0	METAL STORM	1	ARISTOCRAT LEISURE	5	AWH	0	BIODIEM	0
		PTB GROUP	0	CENTREBET INTERNATIONAL	0	BRAND NEW VINTAGE	0	BENITEC	0
		XTEK	0	CROWN		CHEVIOT BRIDGE	0	BIOTECH CAPITAL	0
		ADACEL TECHNOLOGIES	0	EBET	0	DROMANA ESTATE	0	CARDIA BIOPLASTICS	0
		IATIA	0	NATIONAL LEIS.& GMG.	0	EMPIRE BEER GROUP	0	CELLESTIS	1
		LONGREACH GROUP	0	SKY CITY ENTM. (ASX)	0	FOSTER'S GROUP	27	FLUOROTECHNICS	0
		MATRIX CMPS.& ENGR.	0	SINO STRATEGIC INTL.	0	GAGE ROADS BREWING	0	GENESIS RESH.& DEV.(ASX)	0
				TABCORP HOLDINGS	44	LITTLE WORLD BEVS.	0	GENETIC TECHNOLOGIES	0
				TATTS GROUP	14	PRINCE HILL WINES	0	HEALTHLINX	0
						PUBLIC HOLDINGS AUS.	0	HEXIMA	0
								MESOBLAST	0
								PROBIOMICS	0
								PRIMA BIOMED	0
								PSIVIDA CDI.	0
								STARPHARMA HDG.	0

the aggregate asset allocation weightings revealed in the Australian Taxation Office's aggregated data. Across the many hundreds of investments included within the 140 SMSF portfolios, only eight (8) of the vice or sin companies are represented in the portfolios.

Only the well-known gaming companies and alcohol producers are represented in any significant number of SMSF portfolios. Almost all of the other vice or sin shares are not represented at all or are represented in a very small number of portfolios. Of course, this does not necessarily mean that SMSF trustees have avoided investing in vice or sin. It is much more likely that SMSF trustees did not even consider the smaller or less well-known companies that make up most of the selection of vice or sin shares in the Australian market. Having established that SMSFs are not characterised by a prevalence of sin stocks, the most important question that remains to be answered is whether a sinful SMSF portfolio containing only vice or sin shares within its equity component may generate strong risk-adjusted returns for SMSF trustees. In the following sub-section, the returns of vice or sin shares are investigated. Forming the best-performing vice or sin shares into a portfolio that is constructed in a manner that mirrors the structure of a typical SMSF portfolio's equity component, the risk-adjusted returns that may be generated by vice or sin for Australia's SMSF trustees are assessed.

VICE OR SIN RETURNS IN AUSTRALIA

The 45 companies listed above represent the average Australian SMSF trustee's easiest entrée into the industry of vice or sin. Whether they have been avoided deliberately or by circumstance (lack of awareness, for example) by Australian SMSF trustees, these companies may represent an opportunity to enhance SMSF returns. The review of the literature covered the small number of studies that have investigated sin stock returns. While the evidence is mixed, some investigators (especially Fabozzi *et al.* (2008)) have reported very high returns to vice or sin. Given this finding and the very low number of vice or sin shares included within Australian SMSFs, an inquiry into the risk-adjusted returns that may be generated by a portfolio of vice or sin shares will provide an answer to an important question for SMSF trustees: Does sin pay? Within the theoretical framework provided by modern portfolio theory, this section contains an analysis of the risk-adjusted returns to vice or sin in Australia and the risk-adjusted returns that may be generated by an equity component of a portfolio that is constructed in a manner that mirrors the equity component of a typical SMSF portfolio[5]. The main difference, of course, will be its sinfulness.

The method deployed here is essentially the same as that deployed by Fabozzi et al. (2008). The historical performance of each of the 45 vice or sin shares is computed (monthly and annual share returns and standard deviations) for the period March 2000 to March 2010. Excess returns are assessed by comparing the returns generated by each company with a return generated by the Australian All Ordinaries Index over the same period. Like the shares analysed by Fabozzi et al. (2008), the shares in the sample analysed here have different listing dates within the ten periods of analysis. For these shares, the excess returns above the benchmark All Ordinaries return are compared with the All Ordinaries Index for an identical period [6]. If, for example, a company commenced listing in 2005, its performance against the

[5] According to Phillips (2007), SMSF trustees invest in average of 12 Australian companies.

[6] The All Ordinaries Index is the appropriate benchmark to use for this analysis. It is tempting to use an 'ethical index' but that, of course, would be misguided. We are interested in the performance of sin stocks, not ethical stocks. Of course, the All Ordinaries Index captures the risk-reward ratio effectively in any case.

Table 4
Monthly Excess Returns (Above the Market) and Monthly Treynor Ratios

Share	Excess Return $(R_i - R_M)$	Treynor Ratio $\frac{R_i - R_f}{\beta_i}$	Market's Treynor Ratio $\frac{R_M - R_f}{\beta_M}$
ADULTSHOP.COM	-0.015662373	-0.008018892	0.003032996
PLANET PLATINUM	-0.00885	-0.01641	0.005758
ELECTRO OPTIC SYS.HDG.	0.064003444	0.003148253	0.049263469
METAL STORM	-0.001636253	0.003032996	0.02184909
PTB	-0.032553657	-0.00283712	0.284536481
XTEK	0.005440771	0.001396321	0.00386645
ADACEL TECHNOLOGIES	-0.011575717	0.003032996	-0.005844089
IATIA	0.003258098	0.003562486	0.004147592
LONGREACH GROUP	-0.02348092	**0.003032996**	-0.016556807
AINSWORTH GAME TECH.	-0.00981	-0.0064385	0.00345146
ARISTOCRAT LEISURE	0.008635	**0.008679911**	0.003032996
CENTREBET INT'L	0.00001752	-0.001624515	-0.000508395
CROWN	0.001889	**-0.005420724**	-0.010721324
EBET	-0.01271	-0.010689962	0.003032996
NATIONAL LEIS.& GMG.	-0.0372	-0.01948561	0.000435684
SKY CITY ENTM.	0.011288225	**0.021311181**	0.003032996
SINO STRATEGIC INTL.	0.037584965	**0.021084883**	0.003032996
TABCORP HOLDINGS	-0.000905998	**0.004896036**	0.003032996
TATTS GROUP	-0.002657633	-0.006107494	0.001927583
AUSTRALIAN VINTAGE	-0.010599397	-0.00641	0.003033
AWH	-0.012794487	-0.01795	0.003033
BRAND NEW VINTAGE	-0.02804507	**0.046469**	0.003033
CHEVIOT BRIDGE	-0.01020542	-0.00508	0.003033
DROMANA ESTATE	-0.01727117	-0.47481	0.003274
EMPIRE BEER GROUP	-0.018090147	-0.0494	-0.004658
FOSTER'S GROUP	-0.000805494	**0.010299**	0.003033
GAGE ROADS BREWING	0.05288267	**0.055792**	-0.00396
LITTLE WORLD BEVS.	0.009074247	**0.031965**	0.00058
PRINCE HILL WINES	-0.038540018	-0.0321	0.003033
PUBLIC HOLDINGS AUS.	0.003781669	**0.748158**	0.003033
AGENIX	-0.012732943	-0.008963	0.003032996
BIODIEM	-0.00979581	-0.003432	0.005059508
BENITEC	0.013445447	**0.0143051**	0.003032996
BIOTECH CAPITAL	-0.006528638	-0.002911	0.00301288
CARDIA BIOPLASTICS	0.002713995	0.0027278	0.003032996
CELLESTIS	0.029768055	**0.0346822**	0.003412349
FLUOROTECHNICS	-0.04476432	-0.205252	0.001789812
GENESIS RESH.& DEV.	-0.032952235	-0.081184	0.003148253
GENETIC TECHNOLOGIES	0.019414926	**0.0160832**	0.003032996
HEALTHLINX	0.034207714	**0.0267824**	0.005285387
HEXIMA	-0.002197515	-0.004903	-0.008149939
MESOBLAST	0.02575259	**0.0329558**	0.002650338
PROBIOMICS	-0.01577483	-0.006553	0.003560661
PRIMA BIOMED	0.031625302	**0.0120971**	0.003032996
PSIVIDA CDI.	0.045616326	**0.0188694**	-0.002807701
STARPHARMA HDG.	0.002466385	**0.0033661**	0.003148253

benchmark is assessed against the returns generated by the All Ordinaries for the period 2005 to 2010 (not 2000 to 2010). The analysis extends beyond that presented by Fabozzi et al. (2008). For each company, Treynor ratios are computed to assess risk-adjusted performance. The shares with the highest Treynor ratios form the choice set for a sinful SMSF portfolio.

The Treynor ratio is a traditional measurement of risk-adjusted performance. Unlike the Sharpe ratio, the Treynor ratio is appropriate to use for assessing the risk-adjusted performance of both individual securities and portfolios (Strong 2006, p.488). Of the 45 companies in the sample, 18 (40 percent) have Treynor ratios in excess of the market's Treynor ratio for the same period. On average, the monthly returns generated by vice or sin companies in Australia fall short of the monthly returns generated by the broader market average by 0.04 percent. An equally-weighted portfolio of all vice or sin shares would not generate returns in excess of those generated by the broader market averages. Most of the vice or sin companies have *not* generated excess risk-adjusted returns that are superior to the total risk-adjusted returns generated by the Australian All Ordinaries Index. However, there are still a sufficient number of companies that have demonstrated superior risk-adjusted performance to construct an equity component for a SMSF portfolio that consists solely of well-performing vice or sin shares. If SMSF trustees invested in vice or sin in roughly the same manner that they currently appear to invest in regular companies, the result would be an equity portfolio that consists of approximately 12 vice or sin companies. What remains is to determine whether this sinfulness would pay.

Two time periods are considered: (1) the period 2000 to 2010; (2) and the period 2009 to 2010[7]. For the former, only those shares from the 18 superior risk-adjusted performers that were listed on the ASX for the entire period are considered. This entails removing from consideration Crown, Brand New Vintage, Gage, Little World, Cellestis, Healthlinx, Psivida and Starpharma. All 45 shares were listed during 2009 and historical data is available to ensure the consideration of all shares for selection in a 2009-2010 SMSF sin stock portfolio. For each of these time periods, the following procedure was applied: (1) computation of the returns and standard deviation generated by an equally-weighted portfolio of all 18 shares and an equally-weighted portfolio of the 12 best risk-adjusted performers; (2) comparison of the risk-adjusted performance (Sharpe ratios) of both equally-weighted portfolios with the broader market averages. This approach places the vice or sin shares in the very best position to perform well. The best-performing vice or sin shares may generate high returns. An equally-weighted portfolio of all of the vice or sin shares will not outperform the broader market averages.

For the period beginning in December 2008 and ending in March 2010, the equally-weighted portfolio of all 18 superior risk-adjusted performers generated an average monthly return of 7.5 percent and monthly standard deviation of 10.12 percent. The Sharpe ratio of the equally-weighted portfolio, $\frac{R_i - R_f}{\sigma_i}$, was 0.71. The average monthly total return for the Australian share market for the same period was approximately 2.3 percent with 5.65 percent standard deviation. The Sharpe ratio for the share market for the same period was 0.35. On a risk-adjusted basis, a portfolio of the 18 best performing vice or sin shares for the period 2000 to 2010 outperformed the broader market averages during 2009. An equally-weighted portfolio of the best 12 performers generated slightly higher monthly returns of 8.8 percent with a standard deviation of 13.35 percent. The Sharpe ratio for this portfolio was 0.63. This still outperforms the broader market but the diminished diversification from reducing the number of shares in the portfolio negatively affects the risk-adjusted returns. A sinful SMSF

[7] These time periods were chosen for two straightforward reasons: (1) 2000 to 2010 is the most recent full decade; and (2) 2009 to 2010 is the most recent full year.

equity portfolio that outperformed the market on a risk-adjusted basis could have been constructed for 2009. However, this relies on an implicit strategy of picking the best historical risk-adjusted performers.

For the period beginning in March 2000 and ending in March 2010, the equally-weighted portfolio of the 10 best risk-adjusted sin stock performers listed on the ASX for the entire period generated average monthly returns of 1.75 percent with standard deviation of 10.85 percent. The Sharpe ratio for this portfolio is 0.12 compared with the market's Sharpe ratio of 0.072. Once more, the best of the vice or sin shares generated superior risk-adjusted performance. Of course, this would rely on SMSF trustees picking a sin portfolio of consisting of the 'winners':- Longreach, Aristocrat, Sky City, Sino, Tabcorp, Fosters, Public Holdings, Benitec, Genetic Tech and Prima and holding the portfolio for the ten-year period to 2010. Not only would the precise and successful share picking that this portfolio would require be unusual for a professional investor to arrange but the knowledge of the smaller companies such as Benitec, Genetic Tech and Prima would be most unexpected for a non-professional. Whilst high-performing vice or sin portfolios can be constructed, such portfolios require successful stock picking and knowledge of quite obscure corporations. SMSF trustees do not invest in vice or sin but even if they decided to do so, a portfolio covering all 45 vice shares would be unlikely to generate risk-adjusted returns superior to those produced by a well-diversified non-vice portfolio. Sin can pay but it does not pay easily.

Conclusions

SMSFs are not characterised by a prevalence of sin stocks. It is unlikely that investing solely in Australian vice or sin would generate returns in excess of those that could be generated by a well-diversified portfolio. There are only 45 vice companies listed on the Australian Stock Exchange. This includes a number of biotechnology companies that many individuals would not consider to be sin stocks. Most of these companies do not generate returns in excess of those generated by the broader market averages and, when assessed on a risk-adjusted basis, most do not produce returns that outperform the overall market. An equally-weighted portfolio of all vice companies is unlikely to generate returns superior to the market averages. Only by selecting the very best risk-adjusted performers could portfolios be constructed (for the periods 2000 to 2010 and 2009 to 2010) that outperformed the market on a risk-adjusted basis. It is unlikely that SMSF trustees would be in a position to demonstrate such prescient stock selection and, furthermore, because many of the companies are quite obscure, it is unlikely that SMSF trustees would be aware of them. Sin stocks can reward outstanding stock selection but SMSF investors are probably best advised to maintain a well-diversified orthodox portfolio.

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