The Cost of Being "Good"[1]*

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Abstract

Many investors argue there is no cost to socially responsible investing, because they observe that portfolios constructed from a universe limited by social criteria perform as well or better than portfolios selected from an unrestricted universe. There are three reasons one might observe such an outcome: 1) Excluded securities, on average, underperform those that pass social standards. 2) Socially responsible investors lack skill, or they are unlucky. 3) The observed results reflect sampling error and not the average result one would expect from a larger sample. We assert that unbiased restrictions to an investment universe limit the potential for skilled investors to add value, and we test this assertion by simulating portfolio selection from unrestricted and arbitrarily restricted stock universes. Our results confirm that restricting the opportunity set available to skilled investors impairs performance. We suggest that quantification of this cost may help investors decide whether it is preferable to limit their investment choices or to invest in an unrestricted fashion and deploy the incremental return directly toward amelioration of the targeted social ills.

The Cost of Being "Good"

Socially responsible investing is a complex and controversial topic that raises a variety of fascinating questions. For example, how should we define a socially desirable or undesirable investment? Bio tech firms engaging in stem cell research may be considered socially meritorious by some investors, while others might view them as reprehensible. Does divestment or exclusion meaningfully impact a firm's cost of capital? Does it influence a firm's behavior? Is ownership a more effective instrument for promoting reform than divestment or exclusion? Might one's energy and resources be better spent organizing boycotts of the products and services of firms engaged in socially undesirable activities? Do fiduciaries violate their obligations by substituting social criteria for investment criteria? Are socially undesirable companies more or less likely to

underperform other companies, and by what margin? These are questions worthy of vigorous and honest debate, which we leave for others to undertake.

Instead, we focus narrowly on the following question. What is the opportunity cost of arbitrarily excluding securities from a universe?[2] Although this question may not present the same level of intellectual intrigue as the questions we choose not to address, its answer is indispensable for reaching a reasonable conclusion about socially responsible investing. Suppose we determine that it is costly to reduce the universe of investable securities. Might it make more sense to include these securities, collect the incremental return, and use these funds to influence policy or to offset the deleterious behavior of socially irresponsible companies?

Imagine, for example, that exclusion of tobacco companies reduces expected return by 10 basis points per year. A $1 billion fund would therefore lose $1,000,000 annually by constraining the investable universe to exclude tobacco companies. Instead of abiding by this constraint, one could argue that the fund could do better to invest in tobacco companies and deploy the incremental $1,000,000 return toward promoting polices designed to reduce smoking, or to contribute it to institutions that seek better treatment for smoking-related illnesses. Moreover, eleemosynary institutions could deploy these incremental funds to promote their own philanthropic agenda. Without knowledge of the cost of declaring securities ineligible for investment, we would be unable to evaluate these tradeoffs.

Proponents of socially responsible investing often claim that it is not costly. On the contrary, they point to evidence showing that socially responsible portfolios outperform unrestricted portfolios. We can think of three possible explanations for this observation: 1) Excluded securities perform better than those that pass social standards. 2) Socially responsible investors lack skill, or they are unlucky. 3) The observed results suffer from

[2] By "arbitrarily" we mean for reasons other than investment considerations.

sampling error and do not reflect the average result one should expect from a larger sample.

If investors select socially responsible companies because they expect them to outperform other companies, they are engaging in active management rather than socially responsible investing. We argue that socially responsible investing, by definition, is agnostic about expected performance. If, instead, socially responsible investors outperform socially uninhibited investors because they lack skill or are unlucky, they should invest passively, in which case they will not be harmed by restricting their investment universe. If, as we believe, the observation that socially responsible investors outperform socially uninhibited investors reflects sampling error, investors should use more reliable samples to explore the cost of socially responsible investing.

Methodology

Several years ago two of us engaged in a study to determine the relative importance of asset allocation and security selection.[3] We employed a simulation technique known as bootstrapping to address this question. Bootstrapping is a procedure for generating new samples from an original data set by randomly selecting observations from that data set. It differs from Monte Carlo simulation in that it draws randomly from an empirical sample, whereas Monte Carlo simulation draws randomly from a theoretical distribution.[4]

In that study we used bootstrapping to show that dispersion across portfolios with the same asset mix but different securities was much greater than dispersion across portfolios with the same securities but different asset mixes. In other words, contrary to accepted wisdom, security selection is more important than asset allocation. This result occurs largely because investors have many more securities than asset classes to choose from. Now, if that is the case, could we apply the same bootstrapping methodology to

[3] See, for example, Kritzman, Mark, and Sébastien. Page. "The Hierarchy of Investment Choice." *The Journal of Portfolio Management*. Summer 2003.
[4] For more about simulation, see Kritzman, Mark. "Remembrance of Things to Come." *Economics and Portfolio Strategy*. April 15, 2002

measure the cost of excluding securities from a universe, since dispersion is related to the quantity of investment choices?

To simulate the cost of socially responsible investing, we use the Standard & Poors 500 stock index as our universe of securities. We use the historical constituents of the index to avoid survivorship bias. Here is how we conduct the simulation.

1. Starting in 1991, we randomly select an annual return of one of the 500 securities, taking into account its relative capitalization within the index.[5]
2. We then insert the return back into the original sample so that it has the same probability of being selected again.
3. Next we randomly select another return, again taking into account its relative capitalization within the index.
4. We proceed to select returns randomly until we have selected a portfolio of 100 securities whose weightings are influenced by their relative capitalizations.
5. We calculate the total return of the portfolio.
6. We then repeat steps one through five 5,000 times.
7. We rank the 5,000 portfolios by performance and record the 5th, 25th, 75th, and 95th percentile returns, netting out the median return. This simulation provides the dispersion in returns associated with random security selection, assuming the investor is free to choose among all of the securities in the index.
8. Next we perform the same simulation to determine the dispersion associated with random security selection, but instead we select securities from arbitrarily restricted universes. We use a random number generator to exclude socially undesirable securities. We have no knowledge or view of the social merits of the excluded securities. We seek only to determine the impact on dispersion of arbitrarily restricting a universe of securities. We examine three restricted universes by removing 10%, 20%, and 30% of the securities. In all cases,

[5] If a particular security represents 2% of the index, for example, we are twice as likely to select it than a security representing only 1% of the universe.

though, we build portfolios of 100 securities. *We do not reduce the size of the selected portfolios, only the opportunity set from which we choose the securities.*

9. We then repeat steps one through eight 200 times to minimize the likelihood that the excluded securities are biased by capitalization, industry affiliation, or other attributes, and we average the results to measure the performance dispersion of portfolios chosen from the unrestricted and restricted universes.[6]
10. We repeat the process for each year through 2007 and compute the average percentile returns across the 17 years.

Our experiment requires massive computing power. We select 100 security returns with replacement 5,000 times from each of the universes. Then we perform the entire process 200 more times to eliminate potential biases in the excluded securities. We perform this simulation 17 times for the years 1991 through 2007. All in all, we simulate 6.8 billion investment choices. The entire process takes a full day to run using Matlab on a high-performing computer.

Results

Table 1 shows the dispersion around the median return averaged across the 17 years for 100-stock portfolios randomly chosen from the unrestricted and restricted universes.

Exhibit 1: Average Dispersion Around Median Return
(100 stocks, 1991 through 2007)

	Fraction Removed from Universe			
Percentile	0%	10%	20%	30%
5th	5.93	5.81	5.74	5.65
25th	2.40	2.30	2.24	2.16
75th	-2.34	-2.22	-2.15	-2.07
95th	-5.50	-5.38	-5.31	-5.23

[6] We repeat the process 200 times for the unrestricted universe as well to ensure comparability with the unrestricted universes.

Exhibit 1 demonstrates that dispersion in performance shrinks when securities are arbitrarily removed from an investment universe. Based on these simulations, for example, we should expect a top-quartile investor to outperform the median investor by 2.40% per year if she chooses securities from the unrestricted universe. If the universe is arbitrarily reduced by 10%, however, we should expect her to outperform the median investor by only 2.30%. Further reductions in the eligible universe result in still smaller outperformance. A 5th-percentile investor suffers slightly greater give up in outperformance when denied access to the full universe. We should expect her to outperform the median investor by 5.93% when uninhibited by social criteria, but only by 5.81% when she is denied access to 10% of the universe.

This evidence suggests that socially responsible investing reduces dispersion in investment results, which is bad for skilled investors because they have less opportunity to outperform. Socially responsible investing helps unlucky investors, however, by denying them access to the full range of opportunities with which to do harm.[7]

Exhibit 2 presents the cost of socially responsible investing as the annual give-up in performance that a top-quartile and 5th-percentile investor would suffer assuming a $1 billion dollar portfolio and 10%, 20%, and 30% reductions in the size of the universe. A top-quartile investor, for example, would sacrifice $971,988 in a given year by foregoing the opportunity to invest in 10% of the universe, while a 5th-percentile investor would give up $1,134,629.

Exhibit 2: The Cost of Socially Responsible Investing for Top Performers

	Percent Restricted		
	10%	20%	30%
Top Quartile	971,981	1,565,518	2,323,801
5th Percentile	1,134,629	1,856,330	2,749,297

[7] Notice that we acknowledge the existence of only skilled and unlucky investors, and not the other way around.

You may not think of these costs as especially high, but they add up when incurred year after year over extended horizons, which is easy to demonstrate. We know that a 5th-percentile investor adds 5.93% to median performance. Assuming returns across the 5,000 portfolios are normally distributed, the 5th percentile return is 1.645 standard deviations above median outperformance of 0%. Therefore, the standard deviation equals about 3.6% (5.93 ÷1.645). Now we can estimate the annualized outperformance of a 5th-percentile investor over any horizon by dividing the standard deviation of 3.6% by the square root of the length of the horizon and multiplying this value by 1.645. Over a five-year horizon, for example, annualized 5th-percentile outperformance equals 2.65% (3.6 ÷ √5 x 1.645). We then perform the same calculations to estimate 5th-percentile outperformance assuming investment in the restricted universe, which equals 2.60%. Next we add these incremental returns to our estimate of the Standard & Poor's return. Suppose we estimate the Standard & Poors return at 9.0%. We should therefore expect a 5th-pecentile investor using the unrestricted universe to generate an 11.65% annualized return. If this investor instead invests in a 10% restricted universe, we should expect an 11.60% annualized return. An unrestricted $1 billion portfolio should therefore grow to $1,734,972,040 over five years given 5th-percentile performance. With the same skill level applied to the 10% restricted universe, we should expect its ending value to equal $1,731,033,111 for a difference of $3,938,929. Exhibit 3 shows these costs for different horizons assuming both top-quartile and 5th-percentile performance. It reveals that a top-quartile investor starting out with a $1 billion portfolio will likely give up more than $24 million over a 20-year horizon by investing in a socially responsible manner, whereas a 5th-percentile investor will likely sacrifice nearly $33 million.

We withhold judgment as to whether these costs are justifiable or even significant. We simply report them as amounts that, in the absence of restrictions, these investors could capture and deploy directly toward amelioration of the very social ills targeted by socially responsible investors.

Exhibit 3: Cumulative Costs with 10% Restricted Initial Portfolio Value: $1Billion		
Horizon	Top Quartile	5th Percentile
5	3,187,846	3,938,929
10	7,096,124	9,071,554
20	24,485,650	32,750,882

Exhibit 4 contains the year-by-year details of our analysis. We show results for a universe in which only 5% of the securities are excluded, as well as restrictions of 10%, 20% and 30%. Across all years, exclusion of securities from the initial universe of the 500 Standard & Poors stocks results in less dispersion of performance. Given the pervasiveness of these spreads across time, it is difficult to argue that socially responsible investing is without cost to skilled investors, although some may not consider these costs very large.

Exhibit 4: Year-by-Year Dispersion Around Median of Portfolios Selected from Unrestricted and Restricted Universes

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Mean
Unrestricted																		
5th	7.48	6.45	5.51	3.98	4.98	4.39	5.73	7.26	10.10	7.87	6.15	4.73	7.42	4.75	4.53	3.75	5.66	5.93
25th	3.00	2.50	2.23	1.58	2.04	1.84	2.35	2.88	4.04	3.21	2.49	1.97	3.00	1.88	1.84	1.57	2.32	2.40
75th	-2.95	-2.25	-2.12	-1.59	-1.97	-1.78	-2.33	-2.87	-3.81	-3.21	-2.48	-1.99	-2.79	-1.87	-1.83	-1.56	-2.31	-2.34
95th	-6.95	-5.17	-4.89	-3.66	-4.82	-4.29	-5.53	-6.74	-8.88	-7.70	-5.92	-4.79	-6.49	-4.31	-4.34	-3.59	-5.40	-5.50
5% Restricted																		
5th	7.45	6.42	5.44	3.92	4.90	4.38	5.71	7.19	10.02	7.83	6.05	4.65	7.39	4.65	4.44	3.69	5.59	5.87
25th	2.98	2.42	2.16	1.57	1.99	1.77	2.32	2.87	3.94	3.18	2.45	1.93	2.91	1.86	1.81	1.49	2.27	2.35
75th	-2.88	-2.22	-2.07	-1.52	-1.96	-1.75	-2.29	-2.80	-3.76	-3.15	-2.42	-1.94	-2.72	-1.79	-1.77	-1.47	-2.23	-2.28
95th	-6.88	-5.10	-4.87	-3.62	-4.76	-4.23	-5.52	-6.69	-8.81	-7.61	-5.84	-4.75	-6.41	-4.28	-4.29	-3.57	-5.39	-5.45
10% Restricted																		
5th	7.35	6.33	5.43	3.88	4.84	4.35	5.67	7.13	9.98	7.75	6.02	4.63	7.38	4.58	4.34	3.60	5.55	5.81
25th	2.93	2.38	2.06	1.55	1.93	1.69	2.24	2.83	3.87	3.17	2.43	1.88	2.89	1.83	1.73	1.44	2.20	2.30
75th	-2.84	-2.20	-2.01	-1.46	-1.90	-1.71	-2.22	-2.74	-3.69	-3.15	-2.38	-1.88	-2.63	-1.73	-1.70	-1.38	-2.21	-2.22
95th	-6.83	-5.03	-4.82	-3.54	-4.69	-4.14	-5.44	-6.65	-8.78	-7.57	-5.75	-4.66	-6.37	-4.20	-4.20	-3.53	-5.33	-5.38
20% Restricted																		
5th	7.32	6.28	5.38	3.76	4.76	4.23	5.53	7.09	9.94	7.67	5.95	4.57	7.35	4.53	4.22	3.55	5.45	5.74
25th	2.92	2.28	2.05	1.53	1.91	1.66	2.23	2.70	3.77	3.14	2.29	1.87	2.87	1.70	1.69	1.38	2.06	2.24
75th	-2.82	-2.16	-1.99	-1.39	-1.86	-1.60	-2.09	-2.72	-3.56	-3.03	-2.29	-1.76	-2.51	-1.73	-1.55	-1.29	-2.13	-2.15
95th	-6.70	-4.88	-4.78	-3.50	-4.66	-4.12	-5.43	-6.55	-8.68	-7.55	-5.72	-4.52	-6.24	-4.06	-4.11	-3.45	-5.27	-5.31
30% Restricted																		
5th	7.31	6.21	5.34	3.65	4.66	4.08	5.47	6.96	9.89	7.66	5.84	4.44	7.26	4.42	4.16	3.42	5.31	5.65
25th	2.85	2.27	2.03	1.42	1.90	1.53	2.08	2.60	3.73	3.02	2.24	1.73	2.79	1.65	1.61	1.29	2.01	2.16
75th	-2.74	-2.11	-1.85	-1.26	-1.78	-1.57	-2.05	-2.62	-3.49	-2.90	-2.22	-1.69	-2.41	-1.72	-1.46	-1.27	-1.98	-2.07
95th	-6.60	-4.81	-4.74	-3.49	-4.55	-3.99	-5.35	-6.47	-8.68	-7.48	-5.66	-4.40	-6.14	-3.92	-4.01	-3.39	-5.22	-5.23

Comparative Statics

Our results pertain specifically to 100-stock portfolios selected from the Standard & Poors 500 universe. How might these results differ if we selected more concentrated portfolios – say 50-stock portfolios, for example? Exhibit 5 shows the dispersion of unrestricted and restricted 50-stock portfolios selected from the Standard & Poors universe, using the same bootstrapping methodology as applied to the 100-stock portfolios.

Exhibit 5: Average Dispersion Around Median Return
(50 stocks, 1991 through 2007)

	Fraction Removed from Universe			
Percentile	0%	10%	20%	30%
5th	8.44	8.29	8.20	8.09
25th	3.34	3.18	3.10	3.02
75th	-3.19	-3.03	-2.93	-2.82
95th	-7.59	-7.45	-7.36	-7.26

As one might suspect, these more concentrated 50-stock portfolios exhibit greater cross sectional dispersion. The top-quartile 50-stock portfolio selected from the unrestricted universe, for example, produced a 3.34% incremental return compared to a 2.40% incremental return for the comparable 100-stock portfolio. What may not seem as intuitive, though, is that the cost of restricting access to the universe also rises as the portfolios become more concentrated. Top-quartile investors selecting 50-stock portfolios suffer a 16 basis point dilution in performance when 10% of the universe is off limits, compared to 10 basis points for top-quartile investors constructing 100-stock portfolios.

One may also wonder how features of the universe affect the cost of socially responsible investing. For this study we have access only to the Standard & Poors 500 universe. We conjecture, however, that costs would be higher for investors selecting portfolios from larger universes or universes comprising more volatile securities. In essence, cross sectional dispersion presents opportunity for skilled investors. By limiting access to a more disperse universe, one that is larger or more volatile, skilled investors should suffer greater dilution than when they are restricted from investing in a less

disperse universe. A simple thought experiment may help to explain why dispersion leads to higher costs for socially responsible investing.

Let's define a skilled investor as someone who is twice as likely to select a security with a return one standard deviation above the mean than a security with a return one standard deviation below the mean. Because socially responsible investing ignores expected return, both securities are equally likely to be excluded from a universe.[8] If in a given universe a one-standard deviation return is 5% above or below the mean, the cost of exclusion to a skilled investor equals 5%. If in another universe a one-standard deviation return is 10% away from the mean, the cost of exclusion is 10%.

Summary

- Although socially responsible investing raises many fascinating and sometimes imponderable questions, simulation provides a convenient framework for analyzing at least one important feature: its cost to skilled investors.
- We use a bootstrapping simulation to construct thousands of 100-stock portfolios from unrestricted and restricted universes of securities, and we measure the cross-sectional dispersion of the portfolios selected from these universes.
- Our simulations show that a 10% reduction in the number of available securities from the Standard & Poors 500 universe reduces top quartile outperformance by 10 basis points per year on average from 1991 through 2007.
- A top-quartile investor starting with a $1 billion portfolio would likely sacrifice about $1,000,000 in a typical year by randomly excluding 10% of the stocks in the Standard & Poors 500 universe.
- Cumulatively over a 20-year horizon, we should expect a top-quartile investor to sacrifice more than $24 million of potential outperformance as a consequence of socially responsible investing, and this penalty would rise to nearly $33 million for a 5th-percentile investor.

[8] This would be true unless one believes that the returns of excluded securities are biased up or down.

- Unlucky investors, by contrast, benefit by foregoing access to the full opportunity set of securities.
- Our evidence also shows that socially responsible investing imposes an even greater cost on skilled investors who select more concentrated portfolios, and we conjecture that costs rise for skilled investors who select portfolios from universes with greater cross sectional dispersion, such as larger and more volatile universes.
- We respectfully suggest that investors consider these costs when evaluating the merits of excluding securities from an investment universe.