

A behavioral asset pricing model with social responsibility factors

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Abstract

We construct a behavioral asset pricing model which extends the four-factor asset pricing model into a six-factor model by adding two social responsibility factors. The first factor is a 'top-bottom' factor (TMB), consisting of the difference between the returns of stocks of companies ranked high and low by criteria such as employee relations and environmental responsibility. The second factor is an 'accepted-shunned' factor (AMS), consisting of the difference between the returns of stocks commonly accepted by socially responsible investors and the returns of stocks commonly shunned by them, such as stocks of producers of tobacco and weapons.

We use this model to analyze the performance of stock indexes and stock mutual funds, both socially responsible and conventional. We also compare the tilts of indexes and funds, based on the model, to tilts based on social responsibility scores of the stocks contained in indexes and mutual funds. We find that, on average, top socially responsible stocks outperform bottom socially stocks and that shunned stocks outperformed accepted stocks.

The correlation between the returns of the TMB and AMS factors is low, -0.08, implying that they capture distinct dimensions of social responsibility. The TMB and AMS social responsibility factors are distinct from the market, small-large, value-growth, and momentum factors as correlations between factor returns are not high. Yet correlations between TMB and AMS factor returns and the returns of the small-large factor are positive, and correlations with the returns of the value-growth factor are negative, indicating that the two social responsibility factors have small-growth tilts.

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A behavioral asset pricing model with social responsibility factors

We construct a behavioral asset pricing model which extends the four-factor asset pricing model into a six-factor model by adding two social responsibility (SR) factors. The first factor is a 'top-bottom' factor (TMB), consisting of the difference between the returns of stocks of companies ranked high and low by MSCI ESG (formerly known as KLD Research and Analytics). We focus on five social responsibility criteria: employee relations, community relations, environmental protection, diversity, and products. In particular, the TMB factor is long top companies and short bottom companies. Top companies are ranked in the top third of companies by at least two criteria and not in the bottom third by any criterion. Bottom companies rank in the bottom third by at least two criteria and not in the top third by any criterion.

The second factor is an 'accepted-shunned' factor (AMS), consisting of the difference between the returns of stocks commonly accepted by socially responsible investors and the returns of stocks commonly shunned by them. Shunned stocks are defined more broadly than 'sin' stocks as stocks of companies in the alcohol, tobacco, gambling, firearms, military, and nuclear industries. Statman and Glushkov (2009) found that the average TMB factor return was positive during 1992-2007, while the average AMS factor return was negative.

We use this model to analyze the performance of stock indexes and stock mutual funds, both socially responsible and conventional. We also compare the tilts of indexes and funds, based on the model, to tilts based on social responsibility scores of the stocks contained in indexes and mutual funds. Specifically, our model enables us to determine whether social responsibility imposes a cost on investors, and whether social responsibility investing affects companies' cost

of capital. We place side by side socially responsible mutual funds and conventional mutual funds, socially responsible indexes (e.g., KLD 400) and conventional indexes (e.g., S&P 500). We examine excess returns by the common four-factor model and our six-factor model. This lets us determine whether the excess returns of socially responsible funds and indexes are higher or lower than those of corresponding conventional funds and indexes, and whether differences in excess returns are due to social responsibility tilts, reflected in loadings on the social responsibility factors, or differences in managers' skills, reflected in excess returns.

We find, consistent with Statman and Glushkov (2009) that, on average, top SR stocks outperform bottom SR stocks. The mean monthly return of TMB factor is 0.29% during our overall period, January 1992 through June 2011, and it is positive in sub-periods. We also find, consistent with Statman and Glushkov, that shunned stocks outperformed accepted stocks. The mean monthly return of the AMS factor during the overall period is 0.12%, and it is positive during sub-periods. The correlation between the returns of the TMB and AMS factors is low, -0.08, implying that they capture distinct dimensions of social responsibility.

The TMB and AMS social responsibility factors are distinct from the market, small-large, value-growth, and momentum factors as correlations between factor returns are not high. Yet correlations between TMB and AMS factor returns and the returns of the small-large factor are positive, and correlations with the returns of the value-growth factor are negative, indicating that the two social responsibility factors have small-growth tilts.

Turning to indexes, the MSCI KLD 400 social index has positive and statistically significant loadings on both the TMB and AMS factors, controlling for the market, small-large, value-growth and momentum factors¹. The positive loadings are consistent with the with the scores of companies in the index on social responsibility criteria. Selection into the KLD 400 index favors

¹ The MSCI KLD 400 Social Index is a free float-adjusted market capitalization index designed to provide exposure to U.S. companies that have positive Environmental, Social and Governance (ESG) characteristics. The MSCI KLD 400 Social Index consists of 400 companies selected from the MSCI USA Investable Market Index (IMI).

top companies and accepted companies. The S&P 500 conventional index also has a positive loading on the TMB factor, but the magnitude of the loading and its statistical significance are lower than those of the corresponding loading in the KLD 400 index. The S&P 500, in contrast to the KLD 400, has a negative loading on the AMS factor, consistent with the inclusion in the S&P 500 index of stocks in the tobacco, alcohol, and other shunned companies.

Analysis of the performance of mutual funds by the four and six-factor models reveals that both groups underperformed during our period, indicated by negative annualized alphas.

Analysis by the six-factor model indicates lesser underperformance by conventional funds relative to the socially responsible funds compared to the results by the four-factor model. The mean annualized alphas of the socially responsible funds and the conventional funds by the six-factor model are -1.13% and -0.14% respectively. They are -1.19% and -1.34% respectively by the four-factor model.

Asset pricing models

Stripped to their basics, all asset-pricing models are versions of the old reliable demand-and-supply model of introductory economics. The benefits that determine demand vary from product to product, but they can be classified into three groups, utilitarian, expressive, and emotional. (See Statman (1999, 2004, and 2011) Utilitarian benefits of cars include good gas mileage and reliability. Expressive benefits are those that enable us to signal to ourselves or others our values, social class, and tastes. Expressive characteristics include style (e.g., the style of a Jaguar automobile), and social responsibility (e.g., the environmental responsibility of a Prius). Emotional benefits include pride (e.g. ‘having arrived’ by a Rolls Royce) and exhilaration (e.g., BMW as the ‘Ultimate Driving Machine’)

High expected returns and low risk are two utilitarian benefits of stocks, and those who restrict the demand function to utilitarian benefits are considered rational. The rubric of rationality is not so easily extended to expressive and emotional benefits, such as the warm glow

of socially responsible mutual funds, the display of wealth in hedge funds, or the excitement of initial public offerings. The desire for particular expressive and emotional benefits can be described as reflecting taste, and people regularly pay for taste. For example, some people pay \$10,000 for Rolex watches that show the same time as Timex watches costing \$100 or less. Evidently, watch buyers enjoy expressive and emotional benefits from Rolex watches beyond the utilitarian benefits of time-telling, and they are willing to pay many thousands for these benefits. We can describe the ‘watch asset-pricing model’ as one containing factors accounting for differences between the prices of different watches. Some of these factors capture utilitarian benefits, such as reliable time-telling, whereas others capture expressive benefits, such as status, and emotional benefits, such as pride.

What stocks do investors want? Many investors like large-cap stocks, growth stocks and, perhaps, stocks of ‘socially responsible’ companies, such as those with good employee relations. Stocks with greater benefits fetch higher prices, and higher prices correspond to lower expected returns. Large-cap and growth stocks had relatively low expected returns (Fama and French (1992)). In the behavioral asset pricing model (BAPM), stocks with greater benefits have lower expected returns (Shefrin and Statman (1994), Statman (1999)). Statman and Glushkov (2009) found that stocks of companies with high ratings on social responsibility criteria, such as employee relations and environmental responsibility, yielded *higher* returns than those of stocks of companies rated low. They also found that stocks of ‘shunned’ companies, such as those producing tobacco or weapons, yielded *higher* returns than stocks of ‘accepted’ companies.

The asset pricing model of standard finance is moving away from the capital asset pricing model (CAPM)—in which beta is the only characteristic that determines expected stock returns—toward a model that is similar to the BAPM. For instance, the three-factor model formulated by Fama and French (1992), popular in standard finance, adds market capitalization and growth-value factors to the market factor as factors that affect expected returns. The four-

factor model has by now supplanted the three-factor model, adding momentum as the fourth factor.

One difference between the three or four-factor model of standard finance and the BAPM is in the interpretation of the factors. In standard finance, the small-large and value-growth factors are interpreted as measures of risk, i.e., small-cap and value stocks are high-risk stocks, and the high risk explains high expected returns. In contrast, in behavioral asset pricing theory, the same factors are interpreted as reflections of the expressive and emotional benefits of positive affect. Small-cap and value stocks are stocks of companies with negative affect. Investors spurn stocks of such companies, depressing their prices and pushing up their expected returns relative to stocks of admired companies. Statman, Fisher and Anginer (2008) found that respondents in *Fortune* surveys of company reputations spurned stocks of small-cap-value companies, whereas they were attracted to the admired stocks of large-cap-growth companies. Yet stocks of spurned companies yielded higher returns, on average, than stocks of admired companies.

There is affinity between behavioral asset pricing models and hedonic pricing models, offered by Lancaster (1966). Rosen (1974) refined hedonic pricing models, writing that he is offering “a model of product differentiation based on the hedonic hypothesis that goods are valued for their utility-bearing attributes or characteristics. Hedonic prices are defined as the implicit prices of attributes and are revealed to economic agents from observed prices of differentiated products and the specific amounts of characteristics associated with them.” (p. 34)

There is also affinity between behavioral asset pricing models and arbitrage pricing theory (APT), offered by Ross (1976). In turn, there is affinity between APT and factors models, such as the three and four-factor models. In their review of APT, Huberman and Wang (2008) wrote that “Fama and French (1993) use the spread between the stock returns of small and large firms as one of their factors...and Fama and French (1992) observe that expected stock returns and their correlations are also related to the ratio of book-to-market equity. Based on these

observations, Fama and French (1993) add the spread between stock returns of value and growth firms as another factor.”

Not all are comfortable with the commingling of utilitarian, expressive and emotional benefits in investment decisions and asset pricing models. Some are puzzled by the desire of socially responsible investors to exclude from their portfolios stocks of tobacco companies. Why not invest in stocks of tobacco companies if they produce the highest returns and then use these returns for antismoking campaigns? As Rob Moody, a financial advisor at Compass Advisors in Atlanta said, “Those investors who are interested in social or ethical investing would be ahead if they invested in anything else, including ‘unethical’ companies, and then donate their profits to the charities of their choice.”

Members of the Church of the Brethren refrain from investing in stocks of tobacco and other ‘sin’ stocks. A member of the church has heard recommendations such those of Moody and responded: “I occasionally see articles by investment columnists on the ‘sin’ funds that invest primarily in tobacco and alcohol, etc., advising people to take their profits from these funds and do good with them. That argument seems completely backwards to me, because the money is already out there supporting bad things.” (See Statman (2011)).

We can describe the preference to exclude stock of tobacco and alcohol companies as a reflection of investors’ taste. The role of taste in asset pricing and the commingling utilitarian, expressive and emotional benefits is evident in Fama and French (2007) and in an interview with Fama (2008). Fama said: “I think taste is just another enhancement, another dimension above and beyond risk that one might have to take into account in explaining prices... I might say to an investor: ‘You want a socially responsible product. Okay, but the implications are going to be that, if large numbers of investors want socially responsible investing, expected returns for socially responsible securities will probably be lower than for other securities.’ And the investor looks at it and says: ‘Yes, that’s fine. I’m willing to pay that price.’”

Fama commented on the unsatisfying state of current asset pricing models: “There’s been a ton of work done on asset pricing, risk, measurement of risk, and measurement of the relationship between expected return and risk, but it hasn’t been all that satisfying. For example, if we knew more, the Fama-French three-factor model would not have had such a large impact, because it’s a pure empirical asset pricing model. We concocted that model to cover what we observed. It’s used among academics; it’s used everywhere. That’s a comment on the fact that more formal theories developed to explain risk and return just haven’t worked that well. An empirically generated theory such as the Fama-French model seems to do better than the theoretically constructed paradigms.”

Commenting further on asset pricing models, Fama said: “In my view, people are spending inordinate amounts of time on consumption based asset pricing, and it hasn’t yielded anything. Some of the best brains in the business have spent their lives on that, and empirically it hasn’t amounted to anything. The other theories? It turned out that the CAPM never really worked. We had just never looked at it carefully enough. So we have more uncertainty now about what it means to say something is risky and how you measure the relation between risk and expected return. In the process, however, we’ve learned a great deal about how prices actually behave. We’re just much more uncertain about how to interpret it.”

We argue that we should not be embarrassed by factor models as our asset pricing models, even if they are not built on “theoretically constructed paradigms.” Instead, we should embrace behavioral asset pricing models and proceed to explore factors reflecting utilitarian, expressive, and emotional benefits. Here we explore a six-factor asset pricing model where two social responsibility factors are added to the four factors of the four-factor model.

Asset pricing models and market efficiency

Fama (1991) noted long ago that market efficiency per se is not testable. Market efficiency must be tested jointly with an asset pricing model, such as the CAPM or the three-factor model. For example, the excess returns of small-cap and value stocks, as judged by the CAPM, might indicate that the market is not efficient or that the CAPM is a bad model of expected returns. This leaves us a choice between two options. We can assume that the market is efficient and proceed to infer an asset pricing model, or we can assume an asset pricing model and proceed to infer whether the market is efficient.

We explore the first option, where we assume that the market is efficient and inferring an asset pricing model from it, including social responsibility factors. And we explore the second option, where we assume an asset pricing model which includes social responsibility factors and infer market efficiency from it (e.g., are excess returns of socially responsible mutual funds positive when assessed by an asset pricing model which includes social responsibility factors?)

Returns of stocks of socially responsible and conventional companies

There are three alternative hypotheses about the relative returns of the stocks of socially responsible companies and conventional companies. The first hypothesis is the 'doing good but not well' hypothesis where the expected returns of socially responsible stocks are lower than the expected returns of conventional stocks. This hypothesis might be true if the benefits of company actions that tilt it toward social responsibility fall short of the costs and investors, on average, know that. For instance, Barnea and Rubin (2006) argued that company insiders, such as managers, shortchange shareholders as they reap awards for socially responsible activities. But shareholders might not be shortchanged. Instead, as Fama noted in his interview, socially responsible investors might be willing to sacrifice returns for social responsibility. Consider stocks of 'sin' companies associated with alcohol, tobacco and gambling. The activities of such companies violate social norm and some socially responsible investors avoid them even if they yield higher returns than stocks in other industries. Indeed, Heinkel, Kraus, and Zechner (2001)

developed an equilibrium model where socially responsible investors refrain from investing in stocks of 'sin' companies, keeping low the prices of the stocks of sin companies and driving higher their expected returns. The findings of Hong and Kacperczyk (2009) are consistent with the Heinkel et al model. They found that the realized returns of 'sin' stocks were higher than the returns of other stocks.

The second hypothesis is the 'doing good while doing well' hypothesis where the expected returns of socially responsible stocks are higher than those of conventional stocks. This is possible if managers and investors are myopic, consistently underestimate the benefits of being socially responsible or overestimate its costs. Edmans (2011) noted that managers might be myopic about the benefits of employee satisfaction because its cost is immediately obvious in reductions in current earnings, while its benefits are less obvious and lie in the future. He provided evidence consistent with myopia and the 'doing good while doing well' hypothesis in a study that showed that stocks of companies with highly satisfied employees earned higher returns than stocks of other companies.

The third and last hypothesis is the 'no effect' hypothesis where expected returns of socially responsible stocks are equal to the expected returns of conventional stocks. The 'no effect' hypothesis might be true if costly company actions, such as better employee relations, increase benefits by as much as they increase costs, such that company profitability is not affected. This can happen, for instance, when the extra costs of higher employee pay are equal to the extra productivity benefits of more satisfied employees. The 'no effect' hypothesis might also be true if aspects of social responsibility which are consistent with the 'doing good while doing well' hypothesis are counterbalanced by other aspects which are consistent with the 'doing good but not well' hypothesis.

Statman (2000) found that socially responsible funds had returns approximately equal to those of conventional mutual funds, and Statman (2006) found that socially responsible indexes

had returns approximately equal to those of conventional index funds. Both studies are consistent with the 'no effect' hypothesis. Statman and Glushkov (2009) found that stocks of companies with good records on employee relations and similar social responsibility criteria earned higher returns than stocks of companies with poor records. This is consistent with the 'doing good while doing well' hypothesis. But they also found that stocks of 'shunned' companies, including those of companies associated with alcohol, tobacco and gambling, earned higher returns than stocks of companies in other industries. This is consistent with the 'doing good but not well' hypothesis. The two effects counterbalance each other such that the 'no effect' hypothesis prevails.

Data and methodology

We build our socially responsibility factors with data from the MSCI's ESG STATS database. (The database was formerly known as KLD after KLD Research & Analysis, Inc., which became a part of MSCI following its acquisition of RiskMetrics in June, 2010.) MSCI ESG produces social investment research and rates companies on strengths and concerns in the following criteria²:

- Corporate Governance (e.g., limited compensation to executives and members of the board, lack of tax disputes)
- Community relations (e.g., generous giving, support for housing)
- Diversity (e.g., promotion of women and minorities, outstanding family benefits)
- Employee Relations (e.g., strong union relations, cash profit sharing)
- Environment (e.g. pollution prevention, recycling)
- Human Rights (e.g., labor rights in outsourcing, no operations in Burma)
- Products (e.g., product quality and safety, provision of products for the economically disadvantaged)

² See more at <http://www.msci.com/products/esg/stats/>

We exclude from our analysis the criterion of corporate governance because data on this criterion have not been consistent over the years with the bulk of coverage starting in 2003 when KLD/ESG began including Russell 3000 firms.³ We also exclude from our analysis the criterion of human rights because of the paucity of data about strengths and concerns relating to this criterion. The database also includes indicators of companies associated with activities shunned by many socially responsible investors: Alcohol, Firearms, Gambling, Military, Nuclear Power, and Tobacco.

The MSCI ESG STATS ratings are published once a year at the end of each calendar year since the end of 1991. Initially, the ESG database contained only ratings of companies in the KLD 400 Social Index and the S&P 500 Index. In 2001 ESG expanded its coverage to include all companies in the Russell 1000 and in 2003 it expanded its coverage further to include all the companies in the Russell 3000. The coverage peaked in 2004 at 3,034 companies and declined somewhat to 2,965 companies by the end of 2010.

The staff of MSCI ESG analyzes information relevant to each strength and concern of each company. It assigns a score of '1' when a company demonstrates strength on an indicator on the list (e.g., charitable giving) and zero if it does not. Similarly, it assigns a score of '1' when a company's record raises concern on an indicator on the list (e.g., investment controversies) and zero otherwise.

The primary identifying information for a company in the ESG database is the company's historical ticker and CUSIP⁴. ESG began providing CUSIP numbers only in 1995. For the prior period we use company's historical ticker and dates to match ESG data to CRSP PERMNO. We restrict our attention to US common stocks in CRSP (share code 10 and 11). When a company

³ We note that ESG has made significant efforts to populate its corporate governance coverage for earlier years beyond what has been available in earlier vintages of the database.

⁴ ESG introduced the unique company ID since 2007. Due to a lag between the point when KLD receives the corporate action information and when it "published" KLD STATS, there exist cases when ticker and cusip information as of the end of calendar year is stale. We manually correct those cases to ensure the appropriate linking with CRSP.

has several stock issues, we select the one with the largest market capitalization. Excluded from the analysis are ESG-covered REITs and companies with common stock incorporated outside the US, such as Accenture Plc (Ireland) or Barrick Gold Corp (Canada).⁵ This procedure matches 4,817 distinct stocks out of total 5,476 names covered in ESG STATS between 1991 and 2010⁶.

Approximately 14% of all CRSP-matched ESG sample (4,227 company-year observations for 1,939 companies) had zero strengths and concerns on all 5 social responsibility (SR) criteria during our sample period, and 47% of the sample (14,270 company-year observations for 3,976 companies) have zero strengths and concerns data on at least three out of our five SR criteria. We further screen our sample by excluding companies that have zero strengths and concerns in at least three of our five SR criteria. This results in a final sample of 16,122 company-year records.

Factor Construction and Validation

We begin our construction of the social responsibility factors, top-bottom (TMB) and accepted-shunned (AMS), by calculating for each company its industry-adjusted net score⁷ for each year in each of the five criteria of social responsibility (community, diversity, employee relations, environment, and products). The net score is the difference between the number of strengths and the number of concerns. These year-end scores are matched with monthly stock returns in CRSP in the subsequent 12 months. This results in a sample of 184,183 company-month observations from January 1992 to June 2011. Based on companies' industry-adjusted net social responsibility scores, we form our value-weighted factor portfolios, TMB and AMS, at the end of each year.

⁵ In certain cases, ESG's cusip data is inaccurate (e.g., Transocean Ltd has an erroneous CUSIP of 2821287 instead of G9007810 during 2002-2005) resulting in a number of unmatched cases. For these situations, we rely on ticker-date match supplemented by visual inspection of historical company names correspondence between ESG and CRSP.

⁶ KLD/ESG is the first to provide SRI ratings so its data reaches further into the past than other data providers such as Innovest, Asset4, Trucost, SiRi, EIRIS and Oekom.

⁷ [Industry adjustment aims to take into account the fact that some industries tend to have higher SR scores than others \(e.g., technology vs. energy\). We use Grinblatt and Moskowitz \(1999\) 20 industry classification.](#)

The long and the short sides of the TMB factor include approximately 50-60 stocks each at the end of 1991, increasing to approximately 225-250 stocks by the end of 2010. The long and short sides of AMS factor are also well-populated, with the average of 131 shunned stocks per month in the portfolio.

Table 1 reports factor returns during the entire sample (January 1992-June 2011) and 4 sub-periods. We see that the mean annualized return of the TMB factor was positive, 3.48%, during the overall period, whereas the mean annualized return of the AMS factor was negative, -1.44%. The signs of the returns of the two factors are consistent with the findings of Statman and Glushkov (2009). On average, the returns of top social responsibility stocks exceeded those of bottom social responsibility stocks (see figure 1), and the returns of accepted stocks fell short of the returns of shunned stocks. Returns of the two social responsibility factors during sub periods are consistent with returns during the overall period – a positive average return of TMB factor and a negative average return of AMS factor. Factor returns are positive during the overall period for market, small-large, value-growth, and momentum factors.

Table 2 shows correlations between factor returns. We see a low and negative correlation, -0.08, between the returns of the top-bottom and the returns of the accepted-shunned factors. We see a positive correlation between the returns of the small-large (SMB) factor and the returns of both the top-bottom (TMB) and accepted-shunned factors (AMS), and a negative correlation between the returns of the value-growth (HML) factor and the returns of both the top-bottom and accepted-shunned factors. This indicates that stocks of socially responsible companies tend to tilt toward small-growth.

Socially responsible and conventional indexes and mutual funds

Table 3 shows the four-factor and six-factor analysis of the returns of the KLD 400 socially responsible index and the S&P 500 conventional index. The KLD 400 index has positive and statistically significant loadings on both the top-bottom factor and the accepted-shunned factor, after controlling for the market, small-large, value-growth and momentum factors. This is consistent with the analysis of the individual stocks in the index demonstrating that its selection of stocks favors top companies and accepted companies. The S&P 500 conventional index also has a positive loading on the top-bottom factor, but its magnitude and statistical significance are lower than those of the corresponding loading of the KLD 400 index. Examining the individual stocks in the KLD 400 Index and the S&P 500 Index, we find that the average top-bottom score of the stocks in the KLD 400 Index is 0.17, exceeding the 0.07 score of the stocks in the S&P 500 Index.

The S&P 500, in contrast to the KLD 400, has a negative loading on the accepted-shunned factor, consistent with its inclusion in the S&P 500 index of stocks in the tobacco, alcohol, and other shunned industries. The average accepted-shunned score of the stocks in the KLD 400 Index is 0.93, higher than the 0.67 score of the stocks in the S&P 500 Index

Turing from indexes to mutual funds, we obtained data on returns, investment styles and objectives, fees, and total net assets from the CRSP Mutual Fund Database. We also obtained lists of socially responsible mutual funds, as classified by Lipper, Morningstar, and Social Invest. We obtained fund holdings from the Thomson-Reuters 13f holdings database which we have merged with the CRSP Mutual Fund Database using WRDS MFLinks.

We have found 352 socially responsible mutual funds in the three lists. After screening out global, fixed-income, balanced and other non-equity funds, we have 176 active equity US-focused socially responsible mutual funds and 11 socially responsible index funds (see the appendix for details). There are 162, 78 and 80 equity socially responsible funds in the respective

lists of Lipper, Morningstar and Social Invest. There are 114 equity socially responsible funds in the lists of at least two of the three list providers.

Table 3 also shows factor loadings and social responsibility scores of several mutual funds, as illustrations. After accounting for conventional four factors, the Vanguard FTSE Social Index fund has positive and statistically significant loadings on both the top-bottom and accepted-shunned factors, consistent with its preference for companies with high social responsibility rankings and its exclusion of shunned companies. Examining the individual stocks in the Vanguard FTSE Social Index fund, we find that the average top-bottom score of the stocks is 0.10, higher than the 0.07 score of the stocks in the S&P 500 Index, yet lower than the 0.17 score of stocks in the KLD 400 Index. Similarly, the average accepted-shunned score of the stocks in the Vanguard FTSE Social Index fund is 0.90, higher than the 0.67 score of the stocks in the S&P 500 Index, yet lower than the 0.93 score of stocks in the KLD 400 Index.

The Calvert Social Index fund, like the Vanguard index fund, has positive and statistically significant loadings on both socially responsible factors. The Calvert Social Investment Equities has positive loading on both factors, although they are not statistically significant.

The Ave Maria Catholic Values fund excludes companies whose practices are inconsistent with Catholic teachings, such as those producing contraceptives or providing abortions. It does not exclude companies with low scores on the social responsibility criteria such as employee relations or the environment. The Ave Maria fund has a *negative* and statistically significant loading on the top-bottom factor and a positive but not statistically significant loading on the accepted-shunned factor.

The Vice fund take pride in concentrating its holding of stocks of shunned companies. Consistent with that preference, it has a negative statistically significant loading on the accepted-shunned factor. It also has a negative, albeit insignificant, loading on the top-bottom factor. The average accepted-shunned score of the stocks in the Vice fund is *negative*, -0.47.

Analysis of Socially Responsible vs Conventional Funds

We match 176 active equity socially responsible US funds to 617 active conventional equity funds using Lipper objective code (e.g., Small Cap funds, Equity Income Funds, etc), Lipper classification code (e.g., Multi-Cap Value Fund, Small Cap Value Fund, etc) and the month when the fund was first offered to the public⁸.

Table 4 and Figure 2 provide very preliminary results. We will complete them in the next few weeks.

Conclusion

We explore a six-factor asset pricing model that adds two social responsibility factors to the common four factors of the four-factor asset pricing model. We see our contribution as a beginning of a larger contribution, developing an asset pricing model which includes all factors affecting asset prices. These factors reflect utilitarian benefits of assets but also their expressive and emotional ones. Future versions of the model will include additional factors reflecting utilitarian benefits, such as liquidity, and additional expressive and emotional benefits, such as the status reflected in private equity and hedge funds.

⁸ Lipper's objective codes are assigned based on the language that the fund uses in its prospectus to describe how it intends to invest. Lipper classification codes are assigned by Lipper to a specific population of equity funds and are based on how the fund invests. Lipper runs the actual holdings of the fund through an internal model to determine market cap and style versus a benchmark. Classifications are based on scores for a specific set of portfolio characteristics (P/E, P/B, etc). Since Lipper Objective and Classification Codes are populated in CRSP MFDB since June 30, 1998 and Dec 31, 1999, respectively, we backfill the earliest available code to the beginning of the sample in Jan 1992.

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Appendix. Screening for active equity US mutual funds

First, we exclude all funds in CRSP Mutual Fund Database with “Type of Securities Mainly Held by Fund” (policy) being Balanced (BAL), Preferred stocks (PFD), Money Market (MM), Bond and preferred stocks (B&P), Bonds (Bonds), Canadian and International (C&I), GS (Government Securities) and Tax-Free money market fund (TFM) as well as the funds whose Lipper Asset Code (lipper_asset_cd) is either Tax Free Fixed Income Funds (MB) or Taxable Fixed Income Funds (TX).

Among remaining funds, we select the ones whose Lipper classification code (lipper_class) is either EIEI, G, LCCE, LCGE, LCVE, MCCE, MCGE, MCVE, MLCE, MLGE, MLVE, SCCE, SCGE or SCVE, if it is available. If missing, then we select funds whose Strategic Insight Objective code (si_obj_cd) is either AGG, GMC, GRI, GRO, ING or SCG, if it is available. If missing, then we select funds whose Wiesenberger Objective Code is either G, G-I, AGG, GCI, GRI, GRO, LTG, MCG or SCG. If all of these codes are missing, then we select funds whose policy is Common Stock (CS). If missing, then we select funds whose average “Amount of fund invested in Common Stocks” (per_com) is greater than 80%.

Among selected funds, we additionally screen out all funds with INDEX, BOND, FIXED INCOME, BALANCED, MONEY MARKET, GOVERNMENT, MUNICIPAL, GVT or ENHANCED INDEX expressions appearing in fund names.

To identify 11 SR index funds, we use Index Fund Flag in CRSP (index_fund_flag='D' identifies a pure index fund) and search for “INDEX” in the fund name.

Table 1: Factor returns, Jan 1992-June 2011

TMB is the zero-investment value-weighted portfolio long stocks in the top SR portfolio and short stocks in the bottom SR portfolio. Top (bottom) SR portfolio includes stocks that rank in the top (bottom) 1/3 of the industry-adjusted net scores by at least 2 ESG attributes and not in the bottom (top) 1/3 by the rest of ESG attributes at the year end. AMS is the zero-investment portfolio long "accepted" stocks and short shunned stocks, i.e., stocks of firms in tobacco, alcohol, gambling, firearms, nuclear and military-related industries. Five ESG attributes considered are community relations, employee relations, environment, diversity, and product characteristics. Market is the CRSP value-weighted index in excess of risk free rate, SMB, HML and UMD are factor premiums for Fama-French factors and Momentum. S&P 500 and KLD 400 are mean total returns in excess of risk-free rate for S&P 500 and Domini KLD 400 indexes (KLD 400 index returns are supplemented by total returns of DSI exchange traded fund after Sep 2007).

Factor	N	Mean return	Std Dev	Minimum	Maximum
Overall period (Jan 1992-Jun 2011)					
TMB	234	0.29%	3.06%	-10.80%	10.80%
AMS	234	-0.12%	2.04%	-6.78%	8.01%
KLD 400	234	0.52%*	4.47%	-19.50%	10.80%
S&P 500	234	0.49%*	4.28%	-16.90%	9.56%
Market	234	0.53%*	4.45%	-18.50%	11.00%
SMB	234	0.27%	3.54%	-16.60%	22.10%
HML	234	0.38%*	3.42%	-12.90%	13.90%
UMD	234	0.54%	5.34%	-34.80%	18.40%
Subperiod I: Jan 1992-Dec 1996					
TMB	60	0.40%*	1.90%	-3.94%	6.36%
AMS	60	-0.27%	1.64%	-5.57%	5.13%
KLD 400	60	0.92%***	2.55%	-4.93%	7.41%
S&P 500	60	0.87%***	2.48%	-4.87%	7.15%
Market	60	0.84%***	2.46%	-5.83%	6.14%
SMB	60	0.07%	2.53%	-6.08%	8.43%
HML	60	0.65%**	2.50%	-3.98%	6.50%
UMD	60	0.77%***	2.09%	-4.71%	4.82%
Subperiod II: Jan 1997-Dec 2001					
TMB	60	0.11%	4.50%	-10.80%	10.80%
AMS	60	-0.06%	2.82%	-6.78%	8.01%
KLD 400	60	0.69%	5.55%	-15.20%	10.00%
S&P 500	60	0.58%	5.17%	-14.90%	9.31%
Market	60	0.51%	5.45%	-16.20%	8.00%
SMB	60	0.15%	5.57%	-16.60%	22.10%
HML	60	0.37%	5.19%	-12.90%	13.90%
UMD	60	1.23%	6.93%	-25.00%	18.40%
Subperiod III: Jan 2002-Dec 2006					
TMB	60	0.16%	2.51%	-6.08%	4.62%
AMS	60	-0.10%	1.82%	-3.97%	4.18%
KLD 400	60	0.34%	3.71%	-10.50%	10.40%
S&P 500	60	0.37%	3.58%	-11.00%	8.66%
Market	60	0.54%	3.61%	-10.10%	8.18%
SMB	60	0.49%	2.61%	-5.16%	5.84%
HML	60	0.73%***	2.01%	-6.51%	4.39%
UMD	60	0.31%	4.34%	-16.30%	9.65%
Subperiod IV: Jan 2007-Jun 2011					
TMB	54	0.49%	2.72%	-4.52%	10.00%
AMS	54	-0.06%	1.63%	-3.30%	4.62%
KLD 400	54	0.09%	5.53%	-19.50%	10.80%
S&P 500	54	0.08%	5.42%	-16.90%	9.56%
Market	54	0.20%	5.71%	-18.50%	11.00%
SMB	54	0.39%	2.38%	-4.28%	5.89%
HML	54	-0.29%	3.03%	-9.93%	7.68%
UMD	54	-0.22%	6.70%	-34.80%	12.50%

Table 2: Factor correlations, Jan 1992-Jun 2011

TMB is the zero-investment value-weighted portfolio long stocks in the top SR portfolio and short stocks in the bottom SR portfolio. Top (bottom) SR portfolio includes stocks that rank in the top (bottom) 1/3 of the industry-adjusted net scores by at least 2 ESG attributes and not in the bottom (top) 1/3 by the rest of ESG attributes at the year end. AMS is the zero-investment portfolio long "accepted" stocks and short shunned stocks, i.e., stocks of firms in tobacco, alcohol, gambling, firearms, nuclear and military-related industries. Five ESG attributes considered are community relations, employee relations, environment, diversity, and product characteristics. Market is the CRSP value-weighted index in excess of risk free rate, SMB, HML and UMD are factor premiums for Fama-French factors and Momentum. S&P 500 and KLD 400 are mean total returns in excess of risk-free rate for S&P 500 and Domini KLD 400 indexes (KLD 400 index returns are supplemented by total returns of DSI exchange traded fund after Sep 2007).

	TMB	AMS	KLD 400	S&P 500	MARKET	SMB	HML	UMD
TMB	1.00	-0.08	0.12	0.05	0.08	0.26	-0.46	0.00
AMS	-0.08	1.00	0.15	0.08	0.15	0.32	-0.30	0.19
KLD 400	0.12	0.15	1.00	0.98	0.96	0.10	-0.22	-0.28
S&P 500	0.05	0.08	0.98	1.00	0.98	0.07	-0.18	-0.29
MARKET	0.08	0.15	0.96	0.98	1.00	0.23	-0.25	-0.26
SMB	0.26	0.32	0.10	0.07	0.23	1.00	-0.35	0.08
HML	-0.46	-0.30	-0.22	-0.18	-0.25	-0.35	1.00	-0.15
UMD	0.00	0.19	-0.28	-0.29	-0.26	0.08	-0.15	1.00

Table 3: A sample of indexes and mutual funds

TMB is the zero-investment value-weighted portfolio long stocks in the top SR portfolio and short stocks in the bottom SR portfolio. Top (bottom) SR portfolio includes stocks that rank in the top (bottom) 1/3 of the industry-adjusted net scores by at least 2 ESG attributes and not in the bottom (top) 1/3 by the rest of ESG attributes at the year end. Five ESG attributes considered are community relations, employee relations, environment, diversity, and product characteristics. AMS is the zero-investment portfolio long "accepted" (not shunned) stocks and short shunned stocks, i.e., firms in tobacco, alcohol, gambling, firearms, nuclear and military-related industries. Average TMB (AMS) score is the difference between "top SR" ("accepted") and "bottom SR" ("shunned") value-weighted dummy indicators for a snapshot of fund holdings as of the end of 2010. (1) is a 4-factor model (Fama-French+Momentum) and (2) is a 6-factor model with SR factors, TMB and AMS.

	01/01/1992-06/30/2011				From the start date of the fund through 03/31/2011									
	DS 400		S&P 500		Vanguard FTSE Social		Calvert Social Index		Calvert Social		Ave Maria		Vice Fund	
	(1)	(2)	(1)	(2)	Index Inv	A Fund	Inv. Eq. A	Catholic Values	Inv. Eq. A	Catholic Values	Inv. Eq. A	Catholic Values	Inv. Eq. A	Catholic Values
Average TMB score	0.169	0.068	0.102	0.126	0.101	-0.049	0.101	-0.001	0.101	-0.049	0.101	-0.001	0.101	-0.001
Average AMS score	0.934	0.671	0.901	0.89	0.786	0.701	0.786	-0.469	0.786	0.701	0.786	-0.469	0.786	-0.469
Alpha (annualized)	1.02% (1.29)	0.36% (0.47)	0.31% (0.87)	0.126% (0.34)	-3.24%*** (-2.94)	-3.26%*** (-3.11)	-2.87%*** (-2.82)	-3.12%*** (-3.2)	-0.33% (-0.26)	-0.25% (-0.18)	0.27% (0.15)	1.4% (0.77)	1.14% (0.4)	0.67% (0.24)
MRKT	0.99*** (63.80)	0.98*** (65.39)	0.98*** (136.63)	0.98*** (131.95)	1.03*** (48.21)	1.04*** (50.44)	0.99*** (50.61)	1.01*** (52.76)	0.91*** (34.81)	0.91*** (34.36)	0.85*** (21.88)	0.82*** (21.39)	0.86*** (14.3)	0.84*** (13.97)
SMB	-0.18*** (-8.98)	-0.20*** (-10.50)	-0.19*** (-21.67)	-0.19*** (-20.37)	-0.01 (-0.21)	-0.06* (-1.77)	-0.03 (-0.84)	-0.07** (-2.18)	-0.05 (-1.43)	-0.05 (-1.6)	0.39*** (6.52)	0.41*** (6.8)	0.05 (0.45)	0.18 (1.6)
HML	-0.04** (-2.11)	0.02 (1.02)	0.02* (1.76)	0.03** (2.09)	-0.02 (-0.63)	0.02 (0.81)	-0.06** (-2.46)	-0.01 (-0.47)	0.01 (0.23)	0.02 (0.42)	0.29*** (5.1)	0.22*** (3.59)	0.01 (0.06)	-0.09 (-0.91)
UMD	-0.01 (-1.08)	-0.02 (-1.46)	-0.02*** (-2.98)	-0.02** (-2.57)	-0.08*** (-5.16)	-0.08*** (-5.47)	-0.06*** (-4.03)	-0.06*** (-3.79)	-0.05** (-2.49)	-0.06** (-2.61)	-0.07** (-2.28)	-0.09*** (-2.96)	0.10** (2.23)	0.11** (2.4)
TMB	0.13*** (5.50)	0.02* (1.92)	0.06* (1.87)	0.09*** (2.95)	0.06* (1.87)	0.06* (1.87)	0.09*** (2.95)	0.01 (0.17)	0.01 (0.17)	0.01 (0.17)	-0.19*** (-3.34)	-0.19*** (-3.34)	-0.05 (-0.49)	-0.44*** (-2.96)
AMS	0.11*** (3.54)	-0.03* (-1.68)	0.19*** (4.35)	0.15*** (3.53)	0.19*** (4.35)	0.19*** (4.35)	0.15*** (3.53)	0.06 (0.98)	0.06 (0.98)	0.06 (0.98)	0.03 (0.37)	0.03 (0.37)	-0.44*** (-2.96)	-0.44*** (-2.96)
N (months)	243	231	243	231	130	130	129	129	231	231	118	118	103	103
Adj R-sq	0.95	0.96	0.99	0.99	0.97	0.97	0.97	0.97	0.87	0.87	0.9	0.91	0.73	0.74

Table 4: Alphas from 4- and 6-factor models for socially responsible and matched conventional funds

Table contains annualized mean cross-sectional alphas and other descriptive statistics for a sample of socially responsible funds vs conventional funds matched with SR funds by the fund initiation date, Lipper classification and Lipper objective code. TMB is the zero-investment value-weighted portfolio long stocks in the top SR portfolio and short stocks in the bottom SR portfolio. Top (bottom) SR portfolio includes stocks that rank in the top (bottom) 1/3 of the industry-adjusted net scores by at least 2 ESG attributes and not in the bottom (top) 1/3 by the rest of ESG attributes at the year end. Five ESG attributes considered are community relations, employee relations, environment, diversity, and product characteristics. AMS is the zero-investment portfolio long "accepted" (not shunned) stocks and short shunned stocks, i.e., firms in tobacco, alcohol, gambling, firearms, nuclear and military-related industries.

Panel A. Alphas (annualized) by the 4-factor model

Time Period	Socially Responsible Funds											
	Mean	Max	Min	1%	5%	10%	25%	50%	75%	90%	95%	99%
Jan 1992-Jun 2011	-1.19%	5.52%	-11.16%	-7.70%	-5.57%	-3.88%	-2.75%	-1.21%	0.31%	2.14%	2.49%	5.39%
Jan 1992-Dec 1996	-2.68%	2.10%	-11.73%	-11.73%	-11.73%	-6.06%	-5.04%	-3.08%	0.10%	0.83%	2.11%	2.10%
Jan 1997-Dec 2001	0.59%	17.46%	-18.80%	-18.80%	-8.72%	-7.06%	-2.31%	1.78%	3.44%	5.98%	8.18%	17.46%
Jan 2002 - Dec 2006	-2.83%	4.07%	-12.89%	-12.89%	-7.74%	-6.57%	-4.83%	-2.20%	-0.84%	0.39%	1.13%	4.07%
Jan 2007-Jun 2011	-1.10%	5.52%	-12.24%	-10.93%	-5.02%	-4.09%	-2.82%	-0.86%	0.45%	2.16%	4.00%	5.39%

Conventional Funds

Time Period	Conventional Funds											
	Mean	Max	Min	1%	5%	10%	25%	50%	75%	90%	95%	99%
Jan 1992-Jun 2011	-1.34%	8.23%	-20.60%	-9.71%	-5.84%	-4.73%	-2.67%	-1.27%	0.15%	1.72%	2.54%	6.23%
Jan 1992-Dec 1996	-1.53%	5.38%	-8.94%	-8.94%	-6.41%	-5.28%	-2.77%	-1.87%	0.34%	2.26%	2.69%	5.38%
Jan 1997-Dec 2001	0.97%	19.18%	-10.66%	-9.86%	-5.83%	-3.66%	-1.63%	0.25%	2.34%	8.02%	11.82%	18.29%
Jan 2002 - Dec 2006	-2.53%	6.49%	-14.09%	-9.49%	-7.85%	-6.42%	-4.07%	-2.20%	-0.73%	0.06%	0.97%	6.38%
Jan 2007-Jun 2011	-1.33%	4.55%	-20.60%	-7.95%	-5.32%	-4.16%	-2.69%	-1.36%	0.13%	1.74%	2.86%	3.47%

Panel B. Alphas (annualized) by the 6-factor model (4-factor+TMB+AMS)

Time Period	Socially Responsible Funds											
	Mean	Max	Min	1%	5%	10%	25%	50%	75%	90%	95%	99%
Jan 1992-Jun 2011	-1.14%	6.01%	-10.51%	-7.11%	-5.18%	-3.85%	-2.71%	-1.18%	0.44%	2.05%	2.73%	3.68%
Jan 1992-Dec 1996	-2.64%	0.87%	-11.03%	-11.03%	-11.03%	-5.98%	-5.24%	-2.53%	0.26%	0.55%	0.87%	0.87%
Jan 1997-Dec 2001	0.67%	18.79%	-18.28%	-18.28%	-8.02%	-7.26%	-2.38%	1.51%	3.71%	5.64%	7.07%	18.79%
Jan 2002 - Dec 2006	-2.93%	3.95%	-13.17%	-13.17%	-8.58%	-6.93%	-5.02%	-2.21%	-0.64%	0.71%	1.02%	3.95%
Jan 2007-Jun 2011	-1.04%	6.01%	-10.14%	-9.90%	-5.12%	-3.94%	-2.58%	-1.05%	0.70%	2.19%	2.76%	4.57%

Conventional Funds

Time Period	Conventional Funds											
	Mean	Max	Min	1%	5%	10%	25%	50%	75%	90%	95%	99%
Jan 1992-Jun 2011	-1.13%	9.35%	-17.31%	-9.99%	-5.50%	-4.23%	-2.50%	-1.06%	0.42%	2.16%	3.07%	6.57%
Jan 1992-Dec 1996	-1.41%	5.50%	-9.30%	-9.30%	-6.04%	-4.80%	-2.91%	-1.89%	0.61%	1.77%	4.43%	5.50%
Jan 1997-Dec 2001	1.09%	19.63%	-10.42%	-9.61%	-6.66%	-3.99%	-1.28%	0.15%	2.63%	7.08%	13.45%	18.59%
Jan 2002 - Dec 2006	-2.62%	6.48%	-15.42%	-9.25%	-8.10%	-6.64%	-4.13%	-2.16%	-0.72%	0.22%	1.02%	6.06%
Jan 2007-Jun 2011	-0.98%	6.35%	-17.31%	-8.02%	-5.08%	-4.09%	-2.34%	-0.90%	0.39%	2.14%	3.08%	4.51%

Figure 1: Factor returns over time, Dec 1994-Jun 2011

The figure represents 3-year moving average of monthly returns of Socially Responsible factors, TMB and AMS, vs one another and HML factor. TMB is the zero-investment value-weighted portfolio long stocks in the top SR portfolio and short stocks in the bottom SR portfolio. Top (bottom) SR portfolio includes stocks that rank in the top (bottom) 1/3 of the industry-adjusted net scores by at least 2 ESG attributes and not in the bottom (top) 1/3 by the rest of ESG attributes at the year end. AMS is the zero-investment portfolio long "accepted" stocks and short "shunned" stocks, i.e., stocks of firms in tobacco, alcohol, gambling, firearms, nuclear and military-related industries. Five ESG attributes are community relations, employee relations, environment, diversity, and product characteristics.

Figure 1a. Top-Bottom (TMB) vs. HML

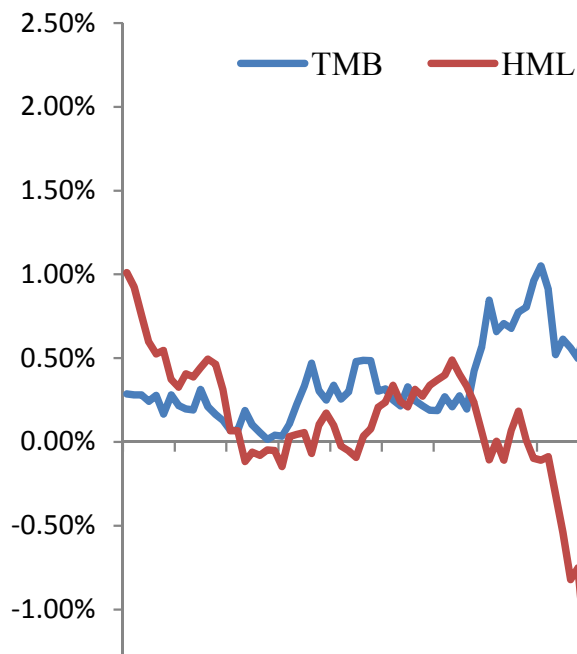


Figure 1b. Accepted-Shunned (AMS) vs HML

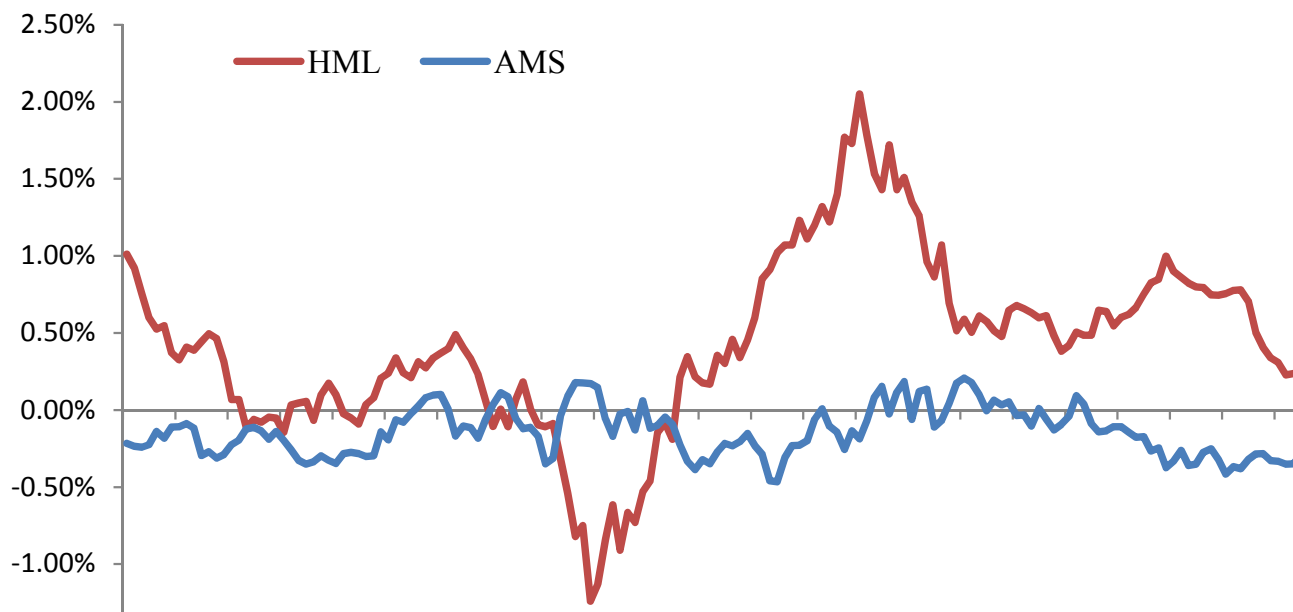


Figure 1 (continued)

Figure 1c. Accepted-Shunned (AMS) vs Top-Bottom (TMB)

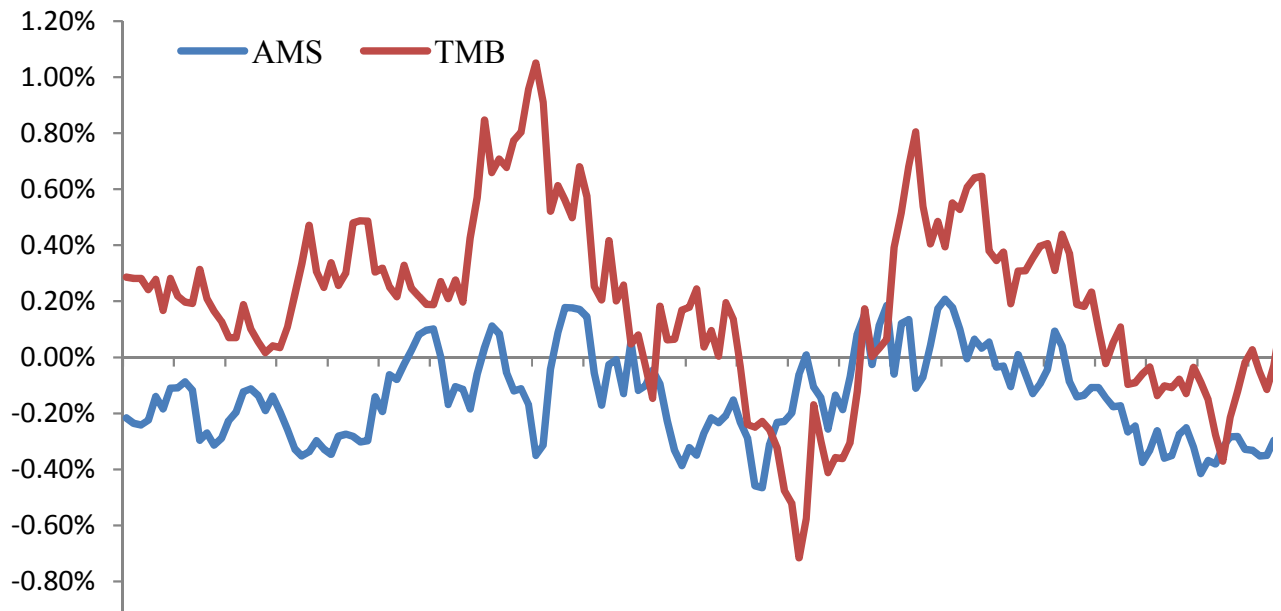


Figure 2: Distribution of 4- and 6-factor alphas for socially responsible and conventional funds, Jan 1992-Jun 2011

