# Social Screens and Systematic Boycott Risk*

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**Abstract**

We consider the pricing implications of screens adopted by socially responsible investors. A model including such investors reconciles the empirically observed risk-adjusted sin-stock abnormal return with a systematic "boycott risk premium" which has a substantial financial impact that is, however, not limited to the targeted firms. The boycott effect cannot be displaced by litigation risk, a neglect effect, and liquidity considerations, or by industry momentum and concentration. The boycott risk factor is valuable in explaining cross-sectional differences in mean returns across industries and its premium varies directly with the relative wealth of socially responsible investors and with the business cycle.

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## 1. Introduction

This paper evaluates the extent to which average expected stock return differences across industries may be attributed to a "boycott" risk premium. We derive a testable two-factor asset pricing model based on the assumption that morally guided investors are self-restricted from investing in controversial stocks. Formally the model supplements the segmented investor base frameworks of Errunza and Losq (1985) and Merton (1987), and empirically we are motivated by the frequently observed abnormal sin-stock returns (e.g., Fabozzi, Ma and Oliphant, 2008; Hong and Kacperczyk, 2009; Statman and Glushkov, 2009; Salaber, 2009).

The boycott factor is derived as a systematic risk factor supplementing the conventional market factor. The additional risk dimension arises from the non-pecuniary preferences of a group of investors regarding a set of boycotted assets. "Arbitrage" by traditional investors exclusively interested in the pecuniary aspects calls for these investors to overweight boycotted assets in their portfolios, requiring a larger compensation for risk. The model explains the commonly observed sin stock return premium as resulting from the systematic boycott risk premium. The degree of "mispricing" is captured by a stock's sensitivity to the boycott risk factor. The pricing errors of any stocks, not only sin stocks, may be reduced by the systematic boycott risk factor: the boycott of particular stocks extends to other stocks whose returns happen to be positively correlated with boycotted stocks (for instance stocks of firms that employ similar inputs or produce substitute products).

The model shows that the boycott risk premium is always positive, with the magnitude of the premium determined by the proportional amount of financial capital represented in the group of morally constrained investors. Empirically, we compare the boycott risk premium through

time, across periods during which norm-constrained institutions enhance the impact of moral constraints, and periods in which boycotting is mostly a private statement.

Following the prescriptions of Lewellen, Nagel, and Shanken (2010) in using the two-stage cross-sectional regression method, our boycott-augmented CAPM model dominates alternative models such as the CAPM, the Fama-French three-factor model (Fama and French, 1993), and the Carhart four-factor model (Carhart, 1997). We find robust pricing of a boycott risk premium across different industry-based test assets. The boycott risk premium is mostly quite similar across test assets.

Our paper supplements the existing literature on the financial impact of boycotts in two directions. First, we study the financial impact of extensive industry-wide boycotts as opposed to the individual-event-driven boycotts examined by Teoh, Welch, and Wazzan (1999). Second, besides explaining the superior performance of the so-called sin stocks relative to regular stocks, our model allows us to clarify the financial impact of boycotts on all stocks, including non-sin stocks.

## 2. Some Stylized Facts Concerning Boycotted Industries

Most boycotted industries fall into the category of "sin" industries. Depending on the definition of sin and the cultural or legal context of these sin industries, research reveals the following common features of sin firms.

### Risk-Adjusted Returns of Boycotted Stocks

The majority of studies on the topic of sin stocks focus on sin-stock or Vice-Fund performance relative to other traditional benchmarks. Utilizing sin-firm data from 1970 to 2007, Fabozzi, Ma and Oliphant (2008) (FMO hereafter) show that on average a portfolio of sin stocks

produces an annual return of 19.02 percent, while the average market return is only 7.87 percent annualized.[1] Hong and Kacperczyk (2009) (HK hereafter), using time series regressions for the sample period 1965-2006, hold a portfolio of sin stocks and sell short a portfolio of non-sin stocks. This strategy produces abnormal returns of 26 basis points per month. In a cross-sectional regression, after accounting for market size, past return and market-to-book ratio, they find that sin stocks outperform comparable stocks by 29 basis points per month. Statman and Glushkov (2009) construct a reverse sin portfolio, "accepted minus shunned", revised annually over the period 1991-2007. They find that this portfolio has a negative 2.6 percent annualized excess return by the Fama-French three-factor benchmarks; and a negative 3.3 percent annualized excess return by the CAPM benchmark. Other anecdotal evidence regarding positive abnormal returns for sin stocks includes Lemieux (2003), Ahrens (2004), and Waxler (2004).

The consensus on the superior sin-stock performance has inspired a stream of studies about the determinants of the sin premium. Salaber (2007) explores the sin premium of European stocks from a legal and a religious perspective. She shows that Protestants require higher risk-adjusted returns on sin stocks than do Catholics. She further finds that sin stocks have higher risk-adjusted returns if these sin stocks are in an environment subject to higher litigation risks and excise taxation. Salaber (2009) studies sin-stock returns over the business cycle. She finds an indication of higher risk in that an abnormal number of these stocks exit during recessions. Durand, Koh, and Tan (2013) link sin stock performance world-wide to cultural variables. They find that when cultures become more individualistic, sin stocks tend to outperform other stocks. FMO propose possible arguments for the sin stocks' abnormal returns. They speculate that sin industries are typically less competitive and are more subject to litigation and headline risks.

[1] Their annual sin stock return is numerically very close to the boycott premium implied from our model, even though our set of boycotted stocks differs substantially from the set FMO uses.

These risks lead to a permanent discount in valuation. They further attribute the positive risk-adjusted returns to initial IPO undervaluation resulting from the nature of the business of these firms.

**Norm-Constrained Institutions Hold Fewer Boycotted Stocks**

HK (2009) represent another stream of empirical research that ties the undervaluation of sin stocks to the lack of investor base. Their work is motivated by Merton's (1987) theory for the excess returns of neglected stocks. HK show that due to the increasingly popular social screens, sin stocks have lower levels of institutional ownership. The reduced popularity of sin stocks dampens analyst coverage of these sin stocks further. Less coverage of sin stocks decreases awareness of these stocks which increases the sin-stock risk premium based on Merton's neglect effect. Sin firms seem to be aware of at least the asymmetric information component of this negative neglect effect on their market value. Kim and Venkatachalam (2011) show that financial reporting quality of sin firms is superior relative to their control groups. Leventis, Hasan, and Dedoulis (2013) find moreover that sin firms are willing to pay higher fees to have their financial statements audited.

**Selection Process of Boycotted Firms**

Boycotted industries are typically controversial industries and are difficult to categorize objectively. Therefore, we base our selection procedure on previous studies as well as on surveys from real practices in the investment industry (in particular, the US Social Investment Forum, SIF, 1995-2012 biannual surveys).

Socially Responsible Investing (SRI) as an investment category was implemented on a significant scale starting in the mid-1990s. See Table 1. According to the Social Investment

Forum (SIF) 2012, more than one of every nine dollars under professional management in the US is now invested according to SRI guidelines. Over 90% of the funds following SRI guidelines use three or more screens to constrain their investments in controversial businesses. The top five screens based on the SIF biannual surveys between 1995 and 2005 were tobacco, alcohol, gaming, weapons, and environment. While the first three are lumped together as "sin" industries (see, for example, Salabar 2007; FOM 2008; HK 2009), the screen on environment is fueled by concerns of global warming and fossil fuel divestment.[2]

To identify a representative portfolio of boycotted stocks we follow a two-pronged approach by selecting first a minimal list of habitually boycotted stocks, and second a more extensive list of less universally boycotted stocks. The first has the advantage of excluding from classification as "boycotted" those that are not uniformly boycotted by most SRI funds over the period considered, while the second provides a broader, more diversified portfolio. The top five industries that are screened most frequently by SRI funds are alcohol, fossil fuel, gaming, weapons, and tobacco. Each is screened by around 80 percent or a higher fraction of the SRI funds (see Table 3). We take a value-weighted portfolio of all CRSP firms in these industries as our more extensive boycott factor portfolio.

Several components of the extensive set of boycotted firms are questionable as reliable indicators of a boycott, making a case for concentrating on the narrower group of boycotted firms. First, including the gaming industry is problematic. Since the late 1990s, an increasing number of states in the US has deregulated casino style gambling. According to a survey of

[2] The primary goal of fossil fuel divestment is to pressure government and fossil fuel industries (oil, gas, coal) to undergo "transformative change" with the objective of causing a drastic reduction in carbon emissions. This divestment campaign has gained prominence on university campuses and mission driven institutions – a phenomenon that is quite similar to the history of divestment from South Africa in protest against South Africa's system of Apartheid.

casino entertainment by the National Gaming Association, by 2013, 23 states had legalized casino-style gambling. The wave of legalization of casino-style gaming suggests that gaming has become more socially acceptable in recent years. This observation is enforced by the significant drop in the percentage of gaming screens used by the SRI portfolios, from its peak of 86% in 1999 to less than 20% in the beginning of 2003. If sensitivity to a boycott factor depressed prices of gaming firms, a systematic reduction of this sensitivity would lead to a positive impact on returns spuriously attributed to the boycott factor.[3]

Second, including all fossil fuel firms is difficult. According to the "Stranded Assets Program," a report by Oxford University, commissioned by HSBC's Climate Change Centre of Excellence, oil and gas together account for about 10%, 11%, and 20% of the total market cap of the Russell 1000, the S&P 500, and the FTSE 100, respectively. In contrast, coal is a much smaller and more fragmented industry. The coal industry's size and its salient pollution make it a more likely scapegoat among the three fossil industries. For instance, the world's largest sovereign wealth fund, the Government Pension Fund of Norway, has divested itself from 13 coal extractors without similar actions toward oil and gas companies.

[3] Additionally, including gaming firms is problematic for the earlier part of our sample due to a survivorship bias. As noted by Chari, Jagannathan, and Ofer (1986), stocks move in and out of the COMPUSTAT list depending on their performance. All gaming firms identified in previous studies are based on the COMPUSTAT Segment Current File. The Current File only covers stocks starting from 1985. HK (2009) back-fill firms in 1985 to 1926. This practice, while legitimate for their study creates survivorship bias for our full sample period regressions. Additionally, HK (2009)'s gaming firms are identified by the North American Industry Classification System (NAICS) which was not implemented until 1997. Therefore, gaming firms that did not survive through 1997 were not on the list. Moreover, firms that report data in the Segment File are typically large firms operating in multiple sectors. Including these firms will cause our value-weighted boycott factor to be strongly influenced by firms that only partially operate in boycotted industries. Consequently, the degree of "sinfulness" in our boycott factor is watered down. For example, Coco Cola would be on the list of boycotted firms based on the Segment File (as part of its operations involves alcohol), whereas it is also part of the FTSE KLD 400 social index.

Third, we follow the literature in dropping weapons as a morally questionable industry, following Salabar (2007) and HK (2009). The resulting narrower list of boycotted firms consists of alcohol, coal, and tobacco firms. Table 2 provides systematic year-by-year summary statistics regarding the boycotted stocks beginning in 1963 and ending in 2012. Over the entire sample period, there are per year on average 33 boycotted stocks in our narrow boycott measure and 199 boycotted stocks in our broader boycott measure.

The selection of a limited number of clearly boycotted stocks is meant to deliver the best proxy for a more abstract larger portfolio of assets boycotted to different degrees, with each asset's weight in the portfolio depending positively on its market weight as well as the degree to which it is boycotted. Thus, while the combined market value of the average of 33 boycotted stocks is negligible, it is used as a proxy for a portfolio with a total market value more similar to or larger than the total value of capital invested in institutions with social screens. Our narrow measure is conservative in the sense that only stocks are included that are pervasively and persistently shunned by socially responsible investors. We further consider a broader classification of boycotted stocks that includes around 200 firms on average.

## 3. Derivation of Boycott Implications

The position of boycotted stocks in the overall financial market is interesting. Boycotted firms still have access to the financial market but face reduced demand from a group of morally influenced investors. To attract a sufficient amount of investment, boycotted firms must offer higher returns. Hong and Kacperczyk (2009) offer this explanation for the sin stock premium, based formally on Merton's (1987) "neglect" framework in which investors refuse to buy stocks that they are not sufficiently familiar with.

In Merton idiosyncratic risk is priced because investors insist on holding exclusively stocks they are familiar with, and thus have only limited diversification opportunities. Neglected stocks face higher idiosyncratic risk as their risk is split over a smaller group of investors. HK point out that, in application to sin stocks, a risk premium then arises from two sources: limited participation which causes the idiosyncratic risk to be divided over fewer investors (reduction in $q_k$ in Merton's equation 16), and increased idiosyncratic risk inherent to sin firms who must deal with litigation risks (increase in $\sigma_k^2$ in Merton's equation 16).

The Merton (1987) model has several limitations as an explanation for the sin premium. First, the Merton model is a one-factor model in which idiosyncratic risk is priced. It relies on dramatically reduced diversification opportunities to the extent that, in spite of assets having a strict factor structure, no investors are able to diversify sufficiently to arbitrage the pricing effect of idiosyncratic risk. In a world where no investors hold more than just a few assets this makes more sense than in a setting where only some assets face reduced participation.

Second, Merton's framework cannot examine the systematic impact of commonalities in the neglect of assets. It assumes a diagonal covariance matrix for return errors and provides no formal explanation for what neglected assets may have in common. Simple CAPM alphas will be positive and increasing in the degree of an asset's neglect, but his assumption of white noise errors together with lack of structure regarding which investors neglect particular assets makes it problematic to identify an additional risk factor. Ignoring commonalities is reasonable under the incomplete information interpretation since acquiring information is costly for basically any asset. If neglect is due to moral distaste, however, it is straightforward to identify the assets avoided by a group of investors and it is possible to look closely at the implied systematic pricing effects for all assets.

A potentially more suitable framework for examining the systematic pricing effect of the boycott of sin stocks is that sketched by Fama and French (2007). They argue that investors may have non-pecuniary preferences for holding assets: "[investors] get direct utility from their holdings of some assets, above and beyond the utility from general consumption that the payoffs on the assets provide." (Fama and French, 2007, p.675). In the boycott case this is disutility from holding sin stocks. Fama and French cite SRI as an example with specific reference to tobacco companies and gun manufacturers (p.675).

As does Merton (1987), Fama and French (2007) point out that the simple CAPM fails to hold in this setting. Empirically, the implication is merely that there is no longer a reason for market CAPM alphas to be zero. However, whereas in contrast to Merton (1987) there are no covariance restrictions in their model, Fama and French do not pay attention to the commonalities in the investor tastes that cause the CAPM to fail in a specific way that can be captured by an additional systematic risk factor. As the direct distaste for assets follows a pattern and applies to a specific (non-negligible) market segment (group of assets and investors), it is feasible to identify a systematic factor that not only describes but is sufficient for describing the way in which the CAPM fails to hold theoretically.

We follow the suggested perspective in Fama and French (2007) to its logical conclusion when we identify distaste by particular investors for a specific group of assets. The resulting model is also formally similar to Merton (1987) with two crucial differences. First, market participation is sufficient to allow idiosyncratic risk to be diversified to the point where it has no or negligible pricing impact. Second, instead of the diagonal covariance structure assumed by Merton, here stock returns have a general covariance structure which formally allows us to examine the importance of boycotting as a systematic risk variable. The resulting model setup

resembles the segmented markets model of Errunza and Losq (1985) in that effectively access to some markets (assets) is denied to a group of investors.[4]

**The Theoretical Framework**

The effect of social screens is incorporated in the model by assuming that a fraction of investors is morally influenced. These investors refuse to invest in assets whose underlying activities they find morally objectionable. An immediate implication is that two types of investors no longer have identical investment opportunities. Two types of investors with different investment opportunity sets generally choose different optimal portfolios. This implies that the standard CAPM is no longer valid and that, in addition to the market factor, a second systematic risk factor emerges which we shall refer to as the "boycott" factor.

The formal model is presented in the Appendix. The introduction of a group of restricted/responsible investors (*R*-Investors) next to the standard unrestricted/unconstrained investors (*U*-Investors) in an otherwise standard Sharpe-Lintner CAPM generates a two-factor model that provides a specific boycott factor as well as implications concerning the determinants of the boycott risk premium and its effect on both sin and non-sin assets.

Figure 1 provides a synopsis of our model and how it relates to Fama and French (2007). The portfolio frontier for the restricted investors (*R*-Frontier) lies entirely inside that of the unrestricted investors (*U*-Frontier). As a result the tangency portfolio of the unrestricted investors ($T_U$) has a larger Sharpe Ratio than the tangency portfolio of the restricted investors ($T_R$). Because all investors hold risky assets only in portfolios $T_U$ and $T_R$, the market portfolio

[4] Errunza and Losq (1985) consider international market segmentation in which investors in one country are restricted from investing in the other country, but not the other way around. Key modeling differences with our model, however, are that they assume in effect constant absolute risk aversion, which is not necessary in our context. They further superimpose a factor structure on asset returns which also is not necessary in our case.

($M$) must be a convex combination of the two as shown. Thus the Sharpe Ratio of the market is below the maximum Sharpe Ratio ($SR_U$). As we know from Roll (1976) then the CAPM fails so that assets have non-zero alphas when their returns are adjusted for market risk. This is essentially the reasoning in Fama and French (2007) (see their Figure 1). However, they stop short of explaining the levels of the alphas.

Also from Roll (1976), if we knew the tangency portfolio of the restricted investors the return on this portfolio would be a sufficient factor to explain the cross-section of the mean returns of all non-sin stocks; whereas the tangency portfolio of the unrestricted investors would explain the mean returns of both sin stocks and non-sin stocks. However, neither portfolio is directly observable. Unrestricted investors will not just hold the market portfolio but, to diminish the risk from sin stocks being over-represented in their portfolios (unrestricted investors as a group hold all sin stocks), will hold fewer of those non-sin stocks that are positively correlated with sin stocks. Similarly, in equilibrium, the restricted investors will not just hold the portfolio of non-sin stocks, but will hold more of those non-sin stocks that are positively correlated with the sin stocks they cannot hold.

Two alternative portfolios, the market portfolio $M$ and the boycott portfolio $B$, that are observable in principle are sufficient to attain the maximum Sharpe Ratio $SR_U$ at $T_U$ (as shown in Figure 1) and therefore should price all assets.[5] These portfolios are held in positive quantities by the unrestricted investors to reach their tangency portfolio (so that $T_U$ lies in between $M$ and $B$); whereas the restricted investors need only hold $M$ and short $B$ to reach their tangency portfolio (so that $T_R$ lies to the right of $M$ and the net holdings of the sin stocks are zero at $T_R$. Note that,

[5] Huberman and Kandel (1987), Grinblatt and Titman (1987), and Jobson and Korkie (1985) showed that equality of the maximum Sharpe Ratio for the factor portfolio and for the asset portfolio is necessary and sufficient for the factors to price all assets.

while $T_R$ can be decomposed into *M* and *B*, both of these portfolios contain sin stocks, and the restricted investors of course would not hold these portfolios individually but just the combination that has zero net holdings of sin stocks). The case drawn in Figure 1 is typical in that the mean portfolio returns of the restricted are lower than those of the unrestricted. Here the mean return of the boycott portfolio must exceed the average market return, even though the market and boycott Sharpe Ratios may be similar.

**Implications and Intuition**

*Cross-sectional variation in mean returns*

The formal model provided in the Appendix implies that:

$$\mu_i = \beta_{im}\mu_m + \beta_{ib}\mu_b . \qquad (1)$$

The mean excess return of any asset *i* is determined by the asset's sensitivity to the market risk factor $\beta_{im}$ as well as by its sensitivity to a "boycott" factor $\beta_{ib}$ . The boycott factor, as defined is equation (A11), is the zero investment return on the portfolio of all sin stocks hedged to remove the correlation of sin stock returns with the remainder of the market.[6] Borrowing the interpretation in Errunza and Losq (1985) translated to our alternative context, the boycott portfolio consists of two components: long the value-weighted portfolio of sin stocks and short a hedge portfolio of non-sin stocks designed to offset as much as possible of the risk of the sin

[6] While the model generates a second systematic factor, it is doubtful that this factor would make a major difference in pricing all test assets. Any diversified portfolio that is not particularly selected along dimensions of social acceptability of the real activities of the underlying assets (selection based on statistical criteria or typical firm characteristics) will likely end up with zero or close to zero boycott betas. Harvey, Liu, and Zhu (2014) expand on the issue of data snooping and publication biases to argue that the hurdle for accepting new risk factors should be high. While this is reasonable in general, the implication that finance research has uncovered too many risk factors, is not warranted, at least not in the present context: simple non-homogeneities across groups of investors are quite common (e.g., location, age, tastes, market access, tax circumstances, employment risk, family situation). Theoretically, these give rise to new risk factors along the lines of the model presented here. However, they are not likely to be pervasive so that careful construction of test assets is required to identify differences in exposure. If the issue is whether a particular finding of an anomaly, just as clearly subject to data snooping or publication biases, can be explained as a reward for risk or not, it does not make sense to increase the hurdle for identifying a risk factor.

portfolio. Thus the boycott factor represents the risk characteristics of the part of the sin portfolio that is a distinct addition to the market, constituting a sufficient statistic of the risk diversification opportunities lacking for the restricted investors.

The intuition for the two risk factors is that they capture the preferences and portfolio choices of two distinct groups of investors (morally restricted – R – and morally unrestricted – U). Theoretically, the (different) tangency portfolios for the representative investors of these two groups suffice as the risk factors. However, these portfolios are not observable. The unrestricted investors, for instance, do not simply hold the market portfolio but in equilibrium as a group hold all the sin stocks while reducing those holdings of non-sin stocks that have returns positively correlated with the sin stocks now over-weighted in their portfolios relative to the market portfolio. The market portfolio and the boycott portfolio together represent the (unobservable) tangency portfolios of both investor types: the restricted investors hold the market portfolio and short the boycott portfolio (so that their net holdings of sin stocks are zero) while the tangency portfolio of the unrestricted investors consists of a mix of the market and the boycott portfolio.

In market equilibrium, a holder of the market portfolio or the boycott portfolio removes risk from the market and receives a systematic risk premium in return. Any asset is priced by how much risk it contributes to each of the two portfolios ($\beta_{im}, \beta_{ib}$) and by how much the market values the risk of each ($\mu_m, \mu_b$). One may take risks unrelated to these two portfolios, but as it does not remove risk from the market this risk is not priced and does not affect mean returns.

*Payoff Covariance*

The price $P_i$ of any security *i* equals the certainty-equivalent payoff discounted by the risk free rate $r_f$:

$$P_i = \frac{\bar{x}_i - \gamma \Sigma_{im} - \delta \Sigma_{ib}}{1 + r_f}. \qquad (2)$$

Here $\gamma = [(q_R \overline{w}_R / \rho_R) + (q_U \overline{w}_R / \rho_U)]^{-1}$ and $\delta = \gamma \left( \frac{q_R \overline{w}_R / \rho_R}{q_U \overline{w}_R / \rho_U} \right)$ are positive constants with $q_R$, $q_U$ the number of investors in each investor group, and $\rho_R$, $\rho_U$ measures of the degree of relative risk aversion and $\overline{w}_R, \overline{w}_U$ the wealth of the representative investor in each group. Further, $\bar{x}_i$ is the expected payoff and $\Sigma_{im}, \Sigma_{ib}$ are the payoff covariances of asset *i* with market portfolio payoffs and boycott portfolio payoffs, respectively. Since $\delta > 0$ (as long as responsible investors exist so that $q_R > 0$), equation (2) shows that the price of boycott factor risk is positive and that the price of an asset is reduced based on its payoff covariance with the boycott factor. An asset's payoff covariance with the boycott portfolio return is typically, but not always, related to its sin content.

The lower the asset's price the higher its mean excess return, $\mu_i = (\bar{x}_i / P_i) - (1 + r_f)$. Thus, the existence of type-*R* investors raises the mean returns of assets that are correlated with the boycott factor. Boycotts will increase the mean returns of assets positively correlated with the boycott factor whether they are sin stocks or not. It is not whether the asset is boycotted by the moral investors which determines the premium, but how much the asset's payoff covaries with the boycott factor. For instance, a sin firm and a non-sin firm may use the same inputs. If the boycott factor is also influenced by these input prices, the boycott will have the effect of discouraging investment in the activities of both the sin stock and the non-sin stock.

If the goal of SRI is to increase the cost of capital of socially questionable businesses and consequently discourage their influence, equations (1) and (2) suggest that this goal is achievable.

To the extent that the correlated assets are sin assets, the boycott accomplishes the desirable objective of the moral investors to lower values of objectionable businesses, reducing the incentive to expand these businesses. Alternatively put, the lower prices for given payoff distribution raise the expected returns and thus the cost of equity of these assets, reducing investment in related activities. For this reason, boycotting sin stocks is an effective but somewhat blunt instrument for discouraging morally or socially objectionable activity.

*The Boycott Factor Risk Premium*

Appendix equation (A19) provides the boycott factor risk premium if the relative risk aversion levels of both investor groups are assumed to be equal:

$$\mu_b = (1+r_f)\, f\left(\frac{\theta_m \Sigma_b}{\overline{x}_b(1-RWR)}\right), \quad \text{with} \quad f(\cdot) > 0 \ \text{ and } \ f'(\cdot) > 0. \tag{3}$$

Here $RWR \equiv q_R \overline{w}_R / q_M \overline{w}_M$ and $\theta_m$ is a measure of the market's average level of absolute risk aversion. It is easy to infer that $\mu_b$: (a) is always positive, and (b) increases in *RWR*. The risk premium depends directly on the payoff variance of the boycott risk factor relative to the average payoff and the degree of absolute risk aversion in the economy. *RWR* is the ratio of total wealth invested by responsible investors and total market wealth. Intuitively, the pervasiveness of a boycott should affect the risk premium. If a larger fraction of investors participates in SRI, the risk of the sin portfolio is spread over fewer unrestricted investors who then require a larger boycott risk premium for holding these assets and other assets positively correlated with them.

*Discussion*

Unconstrained investors do not arbitrage away the sin premium because, as a group, they hold all sin stocks so that they are over-weighted in these stocks relative to the market portfolio,

to the point that changes in the holdings of these sin stocks affect portfolio risk, even given market risk and full diversification. In addition to the fact that (as of 1999) more than 10% of investment under management formally applies moral investment constraints, an unknown fraction of funds without formal moral constraints or screens as well as private investors is guided at least in part by such tastes. Thus, we argue that the group of restricted investors is large enough that "arbitrage" by unrestricted investors does not eliminate the return premium.

In other words, the reduced demand from the morally guided investors lowers the price of the boycotted stock which makes it more attractive for "arbitrage" by unrestricted investors. As the unrestricted investors accumulate boycotted stocks in addition to their market holdings, the supplementary risk, to the extent that it is unrelated to the market, starts to carry an additional risk premium in equilibrium necessary to entice the unrestricted investors to hold the surplus of boycotted stocks. In total, underpricing resulting from reduced participation is only partly reversed by the arbitrage efforts of the unrestricted investors. The remaining underpricing covers the unrestricted investors for the extra risk not captured by the market factor.

The extra risk may be interpreted as a true "boycott" risk: returns on the group of sin stocks will vary with investor tendencies to boycott socially undesirable activities. The number of responsible investors and the extent of their participation in avoiding sin stocks changes with fluctuations in social norms as well as economic conditions. So, one way of viewing the boycott risk premium is as compensation for additional price risk resulting from sentiment swings regarding socially or morally objectionable ventures.

The boycott risk premium is mediated by the "arbitrage" of the unrestricted and this fact causes the risk premiums of individual assets to depend on the payoff distribution rather than just

the sin content (zero-one in this simple model) – it is the asset's covariance with the risk factor that matters rather than the sin characteristic of the asset. The risk premium on the boycott beta increases when the number and market impact of socially responsible investors increases because a smaller group of arbitrageurs must absorb more boycotted shares, implying a further tilt in their portfolios towards boycotted stocks consistent with a larger risk premium beyond the regular market risk premium.

*The Risk Premia and Underlying Macro Risk*

The underlying real macroeconomic risks that are represented by our two risk factors are not identified in the model. This is most easily understood by superimposing for the moment a factor structure on the thus-far general mean-variance structure of the returns and assuming that a large number of assets exists with finite idiosyncratic risk. If we had a one factor model with, say, unanticipated aggregate production growth as the sole factor shock then the risk content of both the market factor and the boycott factor would be reducible to this aggregate production risk only, and could be summarized by the loadings on the one risk factor. On the other hand, if there were a K-factor model consisting of $K > 2$ underlying real shocks, the market factor and boycott factor would become distinct linear combinations of the K shocks. Although the K real factor values then cannot be fully identified from the market and boycott portfolio returns, the two portfolios are nevertheless sufficient to capture the risk that is priced in the market. The upshot is that, in our model, it is possible that the two factors represent recognizable macroeconomic risks, but in a world with a variety of macroeconomic state variables the relation between risk factors and underlying macro risk may be complex.

## 4. From Theory to Measurement

We can now test this two-factor CAPM by finding the appropriate factor proxies and by specifying the test assets. The boycott factor return $r_b = (\mathbf{x} - \mathbf{p})' \bar{\mathbf{n}}_B / P_b$, with portfolio holdings $\bar{\mathbf{n}}_B$ given in equation (A11), is the zero-investment return created by holding the sin stock portfolio and shorting a portfolio that accounts for the part of sin stock payoffs already contained in the market. The resulting portfolio payoffs are the unique payoffs that the group of sin stocks contributes to the market. This portfolio can be well approximated by considering a zero-investment portfolio of sin stocks constructed to have no correlation with the rest of the market. To represent the theoretical concept of the value-weighted portfolio return of all stocks eschewed by morally guided investors we choose a value-weighted portfolio of stocks that are the most unequivocally boycotted, in the sense of being screened by many Socially Responsible Investing funds, To work with test assets that display variation in the boycott betas, we rely on industry portfolios.

The mean returns of industry portfolios have been notoriously hard to explain with standard asset pricing models. Fama and French (1997) first document the problems of their three-factor model in accounting for differences in the cost of equity across industries. More recent research (see for instance Lewellen, Nagel, and Shanken 2009, hereafter LNS, and Chou, Ho, and Ko 2012) confirms that standard asset pricing models fail to explain cross-sectional differences in mean industry returns. The industry portfolios, moreover, are suitable test assets for our purposes as they are likely to display significant variation in the nature of their real activities and, accordingly, should differ along the dimension of moral and social desirability.

LNS emphasize that a good fit in multifactor models is superficial if the test assets have a strong factor structure. As long as the factors correlate with the common sources of variation in the returns, loadings on proposed factors will explain the cross-sectional returns well, even if the empirical factors are mostly unrelated to the true factors. They propose to augment the popular 25 Fama-French portfolios sorted by size and book-to-market values with additional test portfolios that have weaker factor structures, sorted, for example by beta, firm characteristics, or by industry affiliation. But Lo and MacKinlay (1990) suggests that sorting on beta and other interesting characteristics known to be correlated with returns generates a data-snooping bias. This bias is exacerbated as more researchers sort on multiple characteristics, and consequently form a larger number of portfolios (Conrad, Cooper, and Kaul 2003). In contrast, sorting by industry affiliation is based on the nature of the firms' business and does not fall into the data-snooping trap.

Additionally, it is important to understand that our model does not stipulate a new factor that prices all portfolios. The boycott factor is relevant only for pricing portfolios that differ systematically in their loadings on this factor. Typical well-diversified portfolios, be they sorted by beta, size, value, or momentum, for instance, are unlikely to display clear differences in their boycott factor loadings. However, most of the social screens are industry-based – for example tobacco, gaming, alcohol – and accordingly industry portfolios ought to display significant differences in their exposure to the boycott factor. Industry portfolios, furthermore, do not have a strong factor structure and tend to generate considerable dispersion in average returns, and hence present a challenge to any asset testing model. In fact, the test results of most existing asset pricing models do not hold up well when industry portfolios are involved (LNS, Table 1).

The cross-sectional evaluation criteria primarily follow LNS (2009). Our model predictions are the following. *First,* the sign of the coefficient estimates on the boycott beta should be positive as predicted in our model. *Second*, the risk premium magnitudes for the market and boycotting factor portfolio should be close to their average excess returns. *Third*, the difference between realized and predicted portfolio returns should be zero on average. This is equivalent to verifying that the estimated second-pass intercept is zero, and may be interpreted as an indication that the risk-free asset is priced correctly. *Fourth*, by adding boycott factor betas in the second pass, the adjusted $R^2$ in our two factor model should show a significant improvement over competing models. *Fifth*, a proper model should in principle yield the same risk premium for any set of test assets. Thus, in employing various test portfolios we will compare the magnitudes of the implied factor risk premiums.

Other implications of the model relate to the time series properties of the boycott risk premium and the importance of return covariance rather than sin content per se. *Sixth*, the boycott risk premium should be positive but also vary over time depending on the economic importance of the group of responsible investors $q_R\overline{w}_R$ (the number of investors avoiding sin stocks times their average wealth), directly affecting the boycott risk premium in equation (3). While informal individual restraint in holding controversial stocks may have existed for a long time, formally announced explicit social screens were not prominent until the late 1990s. Therefore, the boycott risk premium is expected to be higher when a recent sample is used. More specifically, we hypothesize that the boycott risk premium should be increasing in the fraction of wealth invested by socially responsible investors.

*Seventh*, maintaining SRI principles has a cost (Adler and Kritzman, 2008) and may be viewed as a luxury good which fewer individuals are likely to adopt, and to a lesser extent, if the

economy is weak. Thus, if the economy is in a recession, we hypothesize that the boycott risk premium is lower: the boycott risk premium is pro-cyclical. Note, in contrast, that a weak economy might imply a higher market risk premium because investors are more risk averse in a recession (Chen, 1991). Nevertheless, the risk premium on sin stocks increases by less or decreases compared to non-sin stocks, causing the boycott risk premium to decrease. *Eighth*, as implied by equation (2), higher payoff covariance between any asset and the boycott factor lowers the price of the asset and raises its expected return. While the sin characteristic of the asset should correspond to a potentially large extent to the covariance with the boycott factor, the covariance and not the sin content is the ultimate driver of the boycott risk premium.

## 5. Data

We employ mostly two versions of the boycott factor: the narrow version based on all alcohol, coal, and tobacco firms; the broad version based on all alcohol, fossil fuel, gaming, weapons, and tobacco firms. We identify the appropriate firms from historical SIC codes which guarantees that firms are classified in the appropriate industry at each particular time. We construct the value-weighted *boycott* return as,

$$r_{bt} = \frac{\sum_{i=1}^{N} p_{it-1} I_{it-1} r_{it}}{\sum_{i=1}^{N} p_{it-1} I_{it-1}} \tag{4}$$

$I_{it-1}$ and $p_{it-1}$, respectively, are the zero-one variable indicating whether asset *i* is in the boycott portfolio (i.e., screened according to either the narrow or the broad criterion), and the market value of stock *i* in the previous month; $r_{it}$ is the monthly excess stock return of asset *i*. The monthly boycott factor begins in January 1963 and ends in December 2012. Summary statistics are presented in Table 4.

The popularity of SRI funds increased sharply since the mid-1990s, as based on the screen usage reported in Social Investment Forum (2012). After 1999, funds employing screens crossed the $1-trillion threshold, which is about 10% of the total wealth under professional management based on the Thomson Reuters Nelson tracked assets, as presented in Table 1.

The stock return data for the boycotted firms are from the CRSP Monthly Stock File using the SIC codes associated with the relevant screens. We admit all stocks listed on NYSE, AMEX, and NASDAQ between 1963.01 and 2012.12, but exclude ADRs, REITs, closed-end funds, and primes and scores (share type code of 10 or 11). The primary test assets are the 30 (FF30) and 48 (FF48) value-weighted industry portfolios provided by Kenneth French. The market excess return and size, value, and momentum risk factors are also from Kenneth French's website.

## 6. Empirical Results

Table 5 presents the empirical comparison between our boycott-augmented model, the CAPM, the Fama-French three-factor model (FF3), and the Carhart four-factor model (FF4). The Boycott-CAPM is given in equation (1). To further illustrate the impact of the boycott behavior on cross-sectional returns, we augment the Fama-French and the Carhart specifications with the boycott factor. Estimation employs the standard two-pass approach of Black, Jensen, and Scholes (1972) and Fama and MacBeth (1973). Our approach reflects the Black-Jensen-Scholes approach, commonly used since Fama and French (1992), in which factor loadings are estimated in the first pass utilizing the full time series for each test asset, and their significance levels are from cross-sectional estimates for each time period using the constant factor loading estimates.[7]

[7] The advantage of this method over the rolling factor loading estimates of the Fama-MacBeth approach is that factor loadings are estimated more efficiently if they are stationary. See Chan and Chen (1988) on this issue.

**The Boycott Risk Premium**

We first consider the period since January 1999 for which the boycott impact is likely to be clearest.[8] The boycott factor is constructed, consistent with the theory, as a zero-investment portfolio that is long on sin stocks and short on non-sin stocks and removing all correlation with the market. As discussed the boycott premium should be positive. The estimated boycott risk premium coefficient in Panel A of Table 5 confirms this prediction for the FF30 portfolios. The estimated monthly boycott risk premium is 1.33%, implying an annualized factor risk premium of around 16%, which is twice as large as the market risk premium. This implies that stock returns are actually rewarded more for their associations with boycott risk than for market risk. This number is quite high but of similar magnitude as the excess sin returns found by FMO.[9]

The magnitude of the boycott risk premium is similar to the average excess boycott factor returns presented in Table 4. The difference between the Boycott-CAPM implied risk premium and the average excess boycott factor is 0.56% per month, sizeable but not of the order-of-magnitude difference that should raise a red flag, following LNS. The boycott factor is not only economically important, but also is statistically significant at the 5% level.

The empirically observed risk-adjusted sin stock abnormal returns can be reconciled with the positive boycott risk premium. We infer from equation (1) that

$$\frac{\partial(\mu_i - \beta_{im}\mu_m)}{\partial\beta_{ib}} = \mu_b > 0, \qquad \forall i\,. \tag{5}$$

[8] The period January 1999 – December 2012 includes 168 months. While SRI funds existed before 1999 (see Table 1) it is important to avoid including a transition period in our sample during which the boycott premium increased substantially as this would imply falling prices, generating spuriously low average returns.

[9] The economic significance of the boycott risk premium depends on the dispersion of the boycott sensitivities across assets. For the quintile of industries with the highest boycott betas, the average boycott beta is around 0.55 and for the quintile with the lowest, the average boycott betas is around -0.12. Thus, the annualized expected return difference between these quintiles based on their boycott sensitivities is around 11% (16% times 0.67).

The numerator is interpreted as the risk-adjusted abnormal return (alpha) if the basic CAPM applies. In the investment world, this abnormal return is what a "vice fund" typically would brag about. Equation (5) states that the risk-adjusted abnormal return is an increasing function of the stock's sensitivity to the boycott factor. Trivially, if a vice fund only picks sin stocks its fund index will be highly correlated with the boycott factor, implying a high $\beta_{ib}$. Consequently, a vice fund is expected to beat the market index which has a relatively low $\beta_{mb}$. Table 6, Panel A confirms this observation by showing that the tobacco, alcohol and coal industries are indeed quite sensitive to the boycott factor, with boycott betas of 1.20, 0.33, and 0.64, respectively. If the stocks' excess returns were boycott-risk adjusted, the abnormal return should disappear. The relatively small and insignificant intercept of -0.29% for the boycott-augmented CAPM in Table 5 supports this claim.

**Model Comparisons**

Table 5, Panel A presents six models, three of which are boycott-factor-augmented. The Carhart model (FF4) has the highest $R^2$ among the three competing base models. Nevertheless, when the FF4 factors are augmented with the boycott factor, the adjusted $R^2$ improves by more than 10%. The most noticeable $R^2$ improvement is when the boycott factor is added to the CAPM model. The boycott factor addition raises the $R^2$ by almost 50 percentage points. This is a substantial improvement compared to a negative adjusted $R^2$ for the CAPM model. A similar improvement is observed when the boycott factor is added to the FF3 model. The boycott factor is significantly positive at the 5% level, and all other factors are insignificant, reflecting the poor performance of traditional factor models in explaining mean returns across industry portfolios.[10]

[10] We also consider a conditional CAPM perspective intermediate between the CAPM and the boycott-augmented CAPM that could provide an interesting alternative explanation for the sin premium if the market betas of sin stocks

The improved explanatory power for expected return differences is further accompanied by decreases in the intercepts. Whenever the boycott factor is included in a model, the second-pass intercept in absolute value is generally about 0.15% per month closer to zero. The actual decrease in the intercept is around 0.70% per month. This is approximately the amount that is elsewhere claimed as the sin stocks' abnormal returns (Salaber 2009 and FOM 2008).

To visually compare the performance of our boycott-augmented specifications against the other models, we plot the fitted expected returns, computed by using the estimated parameter values from the models, against the realized average monthly test portfolio returns (shown for the CAPM and FF4 models and their boycott-factor-augmented versions). When $\hat{\beta}_{im}$ alone is used, the predicted expected returns show virtually no dispersion, whereas the actual average returns vary substantially across the 30 industry portfolios (Figure 2, top panels). The performance improves when $\hat{\beta}_{ib}$ is added (Figure 2, bottom panels).

**Alternative Test Assets**

As long as the portfolios have sufficient variation in their sensitivities to the risk factor, a good asset pricing model should yield the same risk premium regardless of the choice of test portfolios. Table 5, Panel B provides the implied risk premium when the FF48 industry returns are used as alternative test assets. The magnitudes of the market and boycott risk premiums are consistent across the different sets of test assets for all boycott-risk-enhanced model specifications. For the FF48 industry case, the boycott risk premium is a bit smaller, 1.23% per month versus 1.33% per month for the FF30 industries. The boycott risk premia are again

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are positively correlated over time with the market return. However, using the rolling beta approach in Petkova and Zhang (2005), we find that the time-varying betas for sin industries are either negatively correlated or uncorrelated with the market risk premium and accordingly the conditional CAPM cannot explain the sin premium (results available from the authors).

significant at the 5% level. The intercepts are even closer to zero. These observations are again confirmed by the improvements in the fit when the boycott factor is added.

We also consider the combination of the traditional FF25 size- and value-sorted assets with the FF30 portfolios, suggested by LNS, as well as the FF25 assets by themselves in Panels C and D of Table 5. We may expect these test portfolios to perform relatively worse for our model because the FF25 assets are unlikely to have much dispersion in their boycott factor sensitivities. For the F55 case, the boycott risk premium continues to be significant (though only marginally for the augmented CAPM), with high R-square and similar magnitude. In the FF25 case, the Fama-French factors already explain a significant fraction of cross-sectional variation in mean returns; the boycott-augmented model, with correction for the Fama-French and Carhart factors, has a boycott risk premium that has similar magnitude as for the other test assets but is not significant. A possible reason that even the FF25 test assets perform reasonably here may be that selecting on value causes boycotted stocks, having relatively low prices, to be put in high book-to-market portfolios. Thus the value effect would arise here because value stocks tend to load more highly on the boycott factor. Panel B of Table 6 illustrates that, indeed, the boycott betas of high book-to-market portfolios are considerably larger for every size class compared to the boycott betas of low book-to-market portfolios.

**Extended Time Series**

While SRI screens became economically significant only in the late-1990s, it is probable that private boycotts, i.e., a decreased appetite for morally or socially undesirable stocks in particular industries, had a market impact well before that time. To investigate this possibility, we extend our sample back to 1963. Table 5, Panels E, F, G and H show that the results are quite similar for the FF30, FF48, FF55 and FF25 sets of portfolios, with sizable improvements in

the R-squares when the boycott factor is added, significant boycott factor risk premia (except for the FF25 assets), and small intercepts. The key difference is that the boycott factor risk premia, although again similar across specifications, are substantially smaller, about 40 percent of the size for the post-1999 period. The smaller boycott risk premium is consistent with our model given that, in the period before SRI became popular, a smaller fraction of investors (lower *RWR*) restricted itself from investing in sin stocks. Figure 3 illustrates for the 1963-2012 sample the cross-sectional explanatory power of the CAPM and FF4 models (top panels) versus augmented CAPM and FF4 models (bottom panels) for the FF30 industry portfolios.[11]

**The Broad Boycott Factor and other Sin Screens**

To examine the robustness of our results with respect to the choice of boycotted industries, we consider the broader version of the boycott factor based on screening all alcohol, fossil fuel, gaming, weapons, and tobacco firms. As presented in Table 2, this amounts to an annual average number of around 200 boycotted firms. Table 3 shows that the broader boycott factor BCTb has a correlation with the narrower boycott factor BCTn of 62% for the January 1999 – December 2012 period. Its mean return is a larger 1.21% a month compared to 0.77% for BCTn.

Table 7 confirms that replacing the narrow boycott factor BCTn by the broader boycott factor BCTb has only a modest impact on the results for the January 1999 – December 2012 period. The magnitude and significance of the boycott risk premium is similar, and so are the R-

[11] As the sample here extends to more than 50 years, the betas are less likely to be stationary over the full period. The change in social norms and passage of certain legislation over time, in addition to basic changes in operations, may change investors' perception on particular industries. See, for instance, Liu, Lu, and Veenstra (2011). Thus, we also consider the Fama-MacBeth approach of rolling estimation of betas with 60 previous monthly observations. The first cross-sectional betas are generated by using the sample period January 1958 – December 1962, and the average risk premiums are for the period January 1963 – December 2012 (for all test assets except the FF48 for which the first betas are obtained from July 1969 – June 1974 and the first cross-sectional regression starts July 1975). The results are available from the authors. They are very similar for each group of test assets to those in Panels E, F, G, and H, in terms of magnitude and significance of the boycott risk premium, and in terms of explanatory power (R-square). The intercept, however, is larger in all cases but not statistically significant.

square and the intercept, for each of the four groups of test assets, compared to the results in Table 5.[12]

**Controlling for Industry-Wide Characteristics**

Do the boycott risk premiums substitute for other known determinants of industry portfolios returns? Chou et al. (2012) find that, in addition to the value and size attributes, a major part of the variation in industry returns is explained by (1) the industry momentum of Moskowitz and Grinblatt (1999) and (2) the degree of industry concentration of Hou and Robinson (2006). Industry momentum is an important control especially because Table 5 already shows that even unspecified momentum is a powerful determinant of industry returns. As Moskowitz and Grinblatt find, observed momentum effects for an individual asset are largely due to momentum throughout the asset's industry. Thus, a once-lagged industry return (with lag anywhere from 1 month to 1 year) positively forecasts the current return in the same industry. So, for instance, industries will have systematic exposure to momentum risk (in the sense of Carhart, 1997) which may be larger for sin industries. We add industry momentum by including lagged industry returns in the cross-sectional regressions following Moskowitz and Grinblatt (1999).

Industry concentration is the other industry control. It is particularly important to take into account in the sin context since FMO argue that a common characteristic of sin industries is that they are less competitive. We follow Hou and Robinson (2006) in measuring industry concentration by means of the Herfindahl Index.

[12] Results for all cases with the narrow and broad sin screens, as well as for intermediate choices of sin screens, are available from the authors and are quite similar for both the 1999-2012 and the 1963-2012 periods. The only exception is the broad sin screen for the 1963-2012 period for which the boycott risk premium is smaller and not statistically significant for both the FF30 and FF48 test assets. However, the broad sin screen is problematic for the extended period because the gambling industry classification was not available through much of the period before 1999 and because of the changing nature of fossil fuel's image over the full period .

Table 5 (Panels A and B) showed that controlling for the Carhart version of momentum risk decreases the boycott risk premium as is consistent with Moskowitz and Grinblatt, but it does so by less than a quarter of its value while retaining significance. As the Carhart factor reflects systematic momentum risk only for a 1-year lag and may not capture idiosyncratic momentum, we adopt the approach of Moskowitz and Grinblatt (1999) using their various momentum lengths and industry-specific momentum metric (one, three, six, nine, and 12-month lagged industry excess returns). Panel A of Table 8 documents for the 1999-2012 period that the boycott risk premium stays robustly significant and of similar size after controlling for industry momentum for each lag, for both the FF30 and FF48 test assets. Panel B provides the results for the full period (1963-2012 for the FF30 and 1969-2012 for the FF48 test assets). Again the boycott risk premium significance and size are little changed for the FF30 test assets and for all momentum lags. The exception is the one-month momentum lag for the FF30 assets for which the boycott risk premium is reduced and now only marginally significant. For the FF48 assets the size of the boycott risk premium is reduced in the full sample and becomes insignificant in three out of five cases (the one-, three-, and six-month momentum lags).[13]

To account for the level of market concentration as an industry characteristic following Hou and Robinson (2006) we obtain the Herfindahl Index for firm level sales (SALE from the Compustat North American Annual File) by industry and include it in our cross-sectional regressions as an industry characteristic. Panel C of Table 8 shows that including the Herfindahl index has no noteworthy impact on the boycott risk premium. We note, however, that our

[13] Reduced significance might be attributed to the fact that, for industry portfolios (as opposed to individual firms), the industry momentum factor (lagged industry returns drawn from the same distribution as current industry returns) is spuriously correlated with current industry returns. Separately, the insignificance of the industry momentum effect in the post-1999 data in Panel A of Table 8 may be related to the post-publication (i.e., post Moskowitz and Grinblatt, 1999) disappearance of the result conform the pattern stressed by McLean and Pontiff (2015).

industry classification differs from that in Hou and Robinson. Likely owing to the alternate industry grouping, when the Herfindahl index is included by itself, our results are opposite to the results in Hou and Robinson: a higher Herfindahl Index (more concentration), instead of lowering, raises industry returns, and this effect is marginally significant. Once we add the boycott risk sensitivities the Herfindahl Index effect becomes insignificant and sometimes reverses. This occurs probably because boycott risk sensitivities (related to sin content) and concentration are positively correlated, since sin firms face less competition as FMO suggest.[14]

The results remain similar when we also control for industry momentum (using the most significant six months lag). The presence of the Herfindahl Index somewhat strengthens the boycott premium (possibly because controlling for it removes the confounding impact of the higher concentration of typical sin industries, following Hou and Robinson, leading to lower average returns). Panel D, finally, illustrates that the boycott risk premium remains significant in all specifications for the 1963-2012 sample period: for both groups of test assets, when we control for concentration and industry momentum individually and jointly.

## 7. Alternative Explanations

The literature has provided several alternative theoretical explanations for the empirically identified sin premium and we compare these explanations explicitly to the systematic boycott risk explanation proposed here. The alternative explanations are that sin firms or boycotted

[14] Hou and Robinson (2006) argue that less competition implies lower required returns (firms have more cushion to weather aggregate shocks) whereas FMO (2008) argue that less competition implies higher required returns (firms may lose their competitive edge as aggregate circumstances vary). To see which argument prevails, it is important to adjust for boycott risk because sin stocks appear to be in less competitive industries, as FMO suggest and as evidenced by higher Herfindahl indexes. For instance, for the firms in the narrow boycott factor the average Herfindahl index of their industries is HHI (sin)=0.243, while for other firms the average index is HHI(non-sin)=0.141. Our results show that controlling for boycott risk sensitivities, the net effect of concentration on required returns via the channels advocated by Hou-Robinson and FMO is insignificant.

firms: (1) face more litigation risk (FMO 2008), (2) are less liquid (HK 2009), or (3) are neglected (Fang and Peress 2009 and HK 2009).

**Litigation Risk or Systematic Boycott Risk**

Consistent with Merton (1987), when investors have limited attention idiosyncratic risk matters for pricing. This idiosyncratic risk is highlighted by the nature of the business. Businesses that have a negative environmental impact or do not conform to the social norms are more subject to litigation risks. The abnormal returns observed for sin firms in previous research may merely be a compensation for the idiosyncratic risk of operating in a legally hostile environment that matters in a Merton (1987) world. If this hypothesis is true, average industry test portfolios returns are mainly driven by the litigation risks associated with the business nature of these industries. This implies that the cross-sectional returns may potentially be influenced by a litigation "characteristic" instead of the systematic boycott risk factor predicted by our model.

To rule out the possibility that cross-sectional returns are driven by the idiosyncratic risk of litigation issues associated with each industry we construct a variable *LTG*, as a proxy for the litigation risk. [15]

To test for the influence of the litigation "characteristic", we adopt the methodology employed by Jagannathan and Wang (1996, 1998). We include the constructed litigation variable

[15] For each FF30 or FF48 industry, we count the total non-missing number of after-tax settlement entries (Annual Item SETA in Compustat North American), both Litigation and Insurance, and scale them by the total number of firm-year observations for this industry. This ratio is called LTG and is used as a proxy for the litigation characteristic in an industry. Two issues may potentially make this a noisy measure for the litigation risk. First, we are not able to identify the nature of each lawsuit. We are interested in lawsuits originating from the nature of a firm's business. Lawsuits such as malpractice, financial class action, etc. have to be assumed to occur evenly across all industries. Second, some lawsuits may last longer than others and some settlement probabilities may be re-evaluated multiple times. So, lingering suits may overstate the count. There are two major advantages of using this proxy, however. First, it is conservative. The conditions for a SETA to be non-missing are quite strict. SETA is a special item in the income statement. Firms are not allowed to include a SETA entry in their accounts unless (1) lawsuits are filed and (2) loss is probable based on lawyer assessments. Second, the claims have to be larger than 10 percent of the company's current assets. This implies that any non-missing observations on SETA almost guarantee a substantial lawsuit initiated against the firm.

*LTG* as a proxy for a characteristic – the degree of sinfulness of an industry as revealed through litigation. If our boycott factor is indeed a systematic risk factor, this additional proxy for sinfulness or boycott risk should not explain any residual variation in average returns across the industry portfolios. On the other hand, if $\hat{\beta}_{ib}$ (the boycott beta) cannot stand up to a test against this cross-sectional variable, *LTG*, the systematic boycott factor should not be in the model.

Before we proceed to test if the boycott factor is a proper risk factor, we need to validate our proxy. Table 9 shows that the litigation variable is both economically and statistically significant: when the FF30 and FF48 portfolios are used as test assets, on average, if an industry's proportional number of law suits increases by 100%, average monthly cross-sectional portfolio returns will increase by 5.5% and 4.3%, respectively. Including the proxy also bring up the cross-sectional $R^2$ by about 10% in both cases and significantly reduces the pricing errors. Thus, our litigation-based proxy *LTG* appears to be a good indicator for the industry characteristics associated with the sin premium. The second model in Table 9 shows that when $\hat{\beta}_{ib}$ is added, the t-values for the *LTG* coefficients drop significantly from 2.05 to 0.32 when the FF30 portfolios are used and from 2.03 to 1.02 when the FF48 portfolios are used. The magnitudes of the characteristics coefficients also decrease substantially in both cases. In contrast, the boycott factor risk premiums remain both economically and statistically significant. The magnitudes and t-values for $\hat{\beta}_{ib}$ are similar compared to those before *LTG* was added. Therefore, we rule out the possibility that average industry portfolio returns are explained by litigation-risk-type characteristics as opposed to our systematic boycott risk factor.

**Liquidity or Systematic Boycott Risk**

*Idiosyncratic liquidity risk*

The boycott risk premium we find may instead be a liquidity-related phenomenon. Boycotted stocks have a smaller investor base: some investors, particularly morally constrained investors, do not hold these stocks in their investment portfolios. We argue that this fact causes arbitrageurs to hold these stocks in excess and that it is their concomitant increase in portfolio risk that generates the boycott risk premium. However, an alternative explanation is that the reduced investor base implies that in a liquidity-driven sell situation boycotted stocks will not be moved, unless there is a ready investor who happens to be "morally unconstrained".

There are other reasons for why boycotted stocks may be less liquid. One is that advertising to attract additional investors may be difficult for boycotted firms. Headline risk, as proposed by FMO (2008), refers to the risk that news stories about a controversial business, true or not, will always be interpreted as bad. In this sense norm-violating firms are better off operating quietly under the social radar. Second, the empirical work of HK (2009) suggests that sin firms tend to have fewer institutional investors compared to regular firms. Additionally, sin firms have less financial analyst coverage (sin firms are neglected). These findings suggest potentially less liquidity for boycotted stocks.

To investigate the liquidity perspective that competes with our risk perspective, we follow Amihud (2002) in constructing a measure of illiquidity based on the asset's return impact per dollar of trading volume.[16] If the lack of a broad investment base represents an arbitrage opportunity, it may only persist if large impediments prevent morally unconstrained investors

[16] Using data from the CRSP Daily Stock File we follow Amihud (2002) in calculating the illiquidity measure. Details are available from the authors.

from trading on it.[17] "Illiquidity" might be one type of friction that prevents morally indifferent investors from arbitraging away the difference. The regular- and boycotted-stock return differential may be a compensation for "illiquidity" instead of the boycott premium claimed in Section 6.

To rule out the "illiquidity premium" explanation, we use Amihud (2002)'s illiquidity measure as a portfolio characteristic. As shown in Table 9, when we incorporate this illiquidity measure *ILQ* as an industry cross-sectional characteristic in the second pass, the implied "illiquidity premium" is statistically insignificant and negative rather than positive as expected. This suggests that the industry-specific "illiquidity" is not compensated and thus certainly cannot explain the boycott premium. Most pertinently, Table 9 shows that including the illiquidity characteristic *ILQ* does not affect the level and significance of the boycott risk premium.

*Systematic liquidity risk*

An alternative mechanism by which liquidity may affect returns is via the Pastor-Stambaugh traded liquidity factor serving as an aggregate liquidity risk factor. Boycotted firms being presumably less liquid may have higher sensitivity to an aggregate market liquidity factor. If an industry portfolio only delivers higher returns when market liquidity is high, the marginal utility of wealth will be lower. Stocks whose highest returns occur when market liquidity is high will require higher rates of return. If boycotted stocks (or any stocks that have positively correlated returns with boycotted stocks) have larger exposures to market liquidity, higher risk premiums would be driven by these stocks' sensitivities to aggregate liquidity instead of their sensitivities to the boycott factor. If this hypothesis is true, we expect to see that expected stock returns shall be attributed to the liquidity factor loadings as opposed to the boycott factor loadings.

[17] This idea of friction is borrowed from the "Impediments to Trade" hypothesis proposed in Fang and Peress (2009).

The second-pass results in Table 9 show that the systematic liquidity factor *SLQ* has significant explanatory power for explaining bot the FF30 and FF48 test assets. However, the boycott factor continues to have significant marginal explanatory power for these test assets. Neither the sensitivity to liquidity nor the boycott factor sensitivity muffles the importance of the other. When one factor is added to the model, the economic importance of the other factor decreases somewhat. The addition of the boycott factor dramatically lowers the intercept which is not the case when the liquidity factor is added. Including both the liquidity and the boycott factor with the CAPM generates an R-square of 76% for the FF30 test assets, and 64% for the FF48 test assets. Thus, while market liquidity risk appears to be separately relevant in pricing the industry portfolios, it does not diminish the importance of boycott risk.

**Neglect Effect or Systematic Boycott Risk**

Merton (1987) attributes a divided investor base to the investors' concern about asymmetric information among investors. When a firm releases public information to both current and potential shareholders, the effective information received by current shareholders will not be the same as that received by potential investors. Current investors are supposedly more informationally engaged with the stocks they own because of the sunk cost that they have incurred. For a potential investor, the fear of being taking advantage of in conjunction with the fixed cost necessary to obtain information will cause typical investors to follow only a subset of traded stocks. Merton divides the information costs into two parts: (1) the cost of transmitting information from one party to another and (2) the cost of gathering and processing information. Increases in either type of information costs cause a firm to be followed by fewer investors which leads to it requiring a higher return in Merton's view.

The impact of costs of transmitting information has been studied by Fang and Peress (2009). They find that stocks not covered by media earn significantly higher future returns than stocks that are heavily covered. Barber and Odean (2008) show that individual investors are net buyers of attention-grabbing stocks. Investors often face difficulties in choosing which stocks to buy from a large pool of stocks. Thus, attention-grabbing stocks are more likely to enter their choice sets. As suggested in FMO (2008), sin stocks tend to suffer "headline risk". Sin industries are constantly under public scrutiny, so that news is almost always interpreted as bad. Therefore, sin stocks are better off staying away from the public media. Consequently, attention-avoiding sin stocks are expected to have higher "media" premiums.

Information gathering and processing is generally conducted by financial analysts. If a firm is followed by relatively more analysts, the quality of information for a more heavily covered firm is expected to be higher than for a less covered firm. As sin stocks are followed by fewer financial analysts (see HK 2009), observed higher sin stock returns might merely be a compensation for the poor information available for this firm, and it would be the neglect effect that gives rise to the higher sin-stock abnormal returns. Arbel, Carvell, and Strebel (1983) find that the neglected firm effect persists after the usual adjustment for risk, and this effect is robust across firm size classes. Although the reason for sin stocks being neglected here is different from that in Arbel et al. the outcome of particular stocks being screened from the investment universe of certain investors is the same. The research concentration of analysts is dictated by institutions' predilections. Therefore, as long as social screens exist, the neglect premium should persist. Under the light of less institutional ownership of sin stocks, persistent higher sin stock returns are consistent with the finding in Hong, Lim, and Stein (2000) that stocks lightly covered tend to have higher average returns than heavily covered stocks. To rule out the possibility that cross-

sectional returns are driven by this neglect effect instead of the systematic boycott factor, we construct *analyst coverage* as a proxy for the neglect effect. [18] [19]

For each industry, we take the log of the total number of analysts in the industry scaled by this industry's market capitalization. We use this ratio as a proxy for the analyst coverage. The top three least covered industries among the FF30 industries are tobacco, coal and alcohol (not shown). The overall ranking by analyst coverage is consistent with the results reported by HK (2009) that sin industries are less covered by financial analysts.

Table 9 shows that our constructed analyst coverage ratio is a good proxy for the neglect effect. The significant negative estimated coefficient in Table 9 on the coverage ratio is consistent with the HK results: the asymmetric information issue is alleviated by analyst coverage. The expected payoff will not be discounted as much as when there is no coverage at all. The estimated coefficient, -0.177, means that when the number of analysts (adjusted by market cap) increases by 1%, the expected return in this industry, on average, will decrease by 0.177 percent per month. This negative risk premium is also statistically significant which suggests that the neglect effect as an industry characteristic affects equity pricing.

However, when we add the boycott factor loadings into the CAPM along with the coverage ratio, the boycott factor dominates. The neglect effect is statistically subsumed by the boycott factor. The "transparency" supposedly increased by analyst coverage no longer decreases the required rate of return. The significance and magnitudes of the boycott risk premium continue to

[18] Even though it might be expected that sin industries are more closely monitored by the government or the public media, Fang and Peress (2009), p. 2030 find that the extent of media coverage is virtually identical across industries.

[19] We follow Hong, Lim, and Stein (2000) in constructing the analyst coverage proxy using the IBES History Summary File (STATSUM_EPSUS) and the CRSP Monthly Stock File (MSF). Details are available from the authors.

be quite consistent across all specifications. This suggests that our boycott factor is indeed a systematic risk factor, overshadowing the characteristic-based risk source suggested by HK (2009, p.17).

Table 9 also presents the result of including each of the characteristics (LTG, NGL, and ILQ) as well as systematic liquidity (SLQ) together with the boycott risk factor and the other standard systematic risk factors. The characteristics are insignificant in all cases. For the FF30 test assets the boycott risk premium again keeps its magnitude and significance, both for the narrow and for the broad boycott factor measure. For the FF48 assets the magnitude of the boycott risk premium is significant for the broad boycott factor but somewhat reduced and marginally significant for the narrow boycott factor. Overall it appears that the characteristics used in previous explanations for the sin premium are simply proxies for boycott risk sensitivities.

## 8. Validating the Boycott Premium as a Systematic Risk Premium

To further validate the model we examine implications beyond explanatory power for cross-sectional mean returns. First, return premiums must be related more directly to payoff covariances than to sin characteristics. Second, fluctuations in the boycott premium should be consistent with the theory.

### Portfolios Sorted by Boycott Factor Loadings

The theory implies that boycotts can increase targeted firms' investment hurdle rates (required returns), but also affect the hurdle rates of firms whose returns happen to be statistically positively correlated with targeted firms. Therefore, any stocks without the sin characteristic that nonetheless have similar exposure to the boycott factor (maybe because of shared inputs or other un-priced common factors), ought to have similar returns. To explicitly

illustrate this implication, we construct a portfolio of stocks that are clearly non-sin. We employ all sin criteria used by either practitioners or researchers and consider the union of all these criteria. The advantage of including all these criteria is that we avoid a gray area, so that remaining stocks that are statistically positively correlated with the boycott factor are clearly not sin stocks.

We remove all stocks that, either by SIC or NAICS code, are classified in any one of the eight screens listed in Table 3. Additionally, we identify the industry classifications of the stocks that were at any point in time included in the Vice Fund.[20] For example, Playboy is part of the Vice Fund stock holdings and the SIC code of Playboy, 2721, is the industry classification. We consider the entire set of firms so classified as "sin" firms for this purpose.

Our "sin net" captures 2766 sin firms out of the 9912 firms that are admitted into our data set. Approximately 28% of the firms are filtered out by this extensive sin screen. We obtain boycott factor loadings for the remaining stocks (with superscript *N* indicating non-sin stocks).

$$r_{it}^{N} = \alpha_i + \beta_{1i} Mkt_t + \beta_{2i} SMB_t + \beta_{3i} HML_t + \beta_{4i} UMD_t + \beta_{5i} r_{bt} + \varepsilon_{it} \qquad (6)$$

Non-sin stocks are ranked based on the sin factor loadings generated from equation (6). These stocks are assigned to five portfolios based on their individual rankings. The equal-weighted monthly mean excess returns are reported in Table 10, Panel A, for each of the five portfolios of non-sin stocks and also for five portfolios of sin stocks from the narrow boycott factor, similarly sorted by their boycott betas. In general, stocks that are more susceptible to the boycott factor have relatively higher monthly excess returns for both sin stocks and non-sin stocks. Predictably this pattern is not as strong as when sin stocks are included since we removed most of the stocks

[20] Vice Fund data is from Thomson Reuters Mutual Fund Holdings (S12 file – fund identifier 7386). The Vice Fund data starts from 2002 and provides updated holdings on a quarterly basis.

with high boycott factor loadings. This is clear by comparing in Panel A the boycott betas for the sin stocks (average boycott beta of 0.60) and the non-sin stocks (average boycott beta -0.05).

We then construct a zero-investment portfolio *p* by taking a long position in the quintile of non-sin stocks that are most positively correlated with the sin factor and a short position in the least positively correlated quintile of non-sin stocks (those with the lowest correlation with the boycott factor). The zero-investment portfolio is regressed on the FF3 or FF4 (Carhart) risk factors as in equation (7):

$$r_{pt}^{N} = \alpha_p + \beta_{1p} Mkt_t + \beta_{2p} SMB_t + \beta_{3p} HML_t + \beta_{4p} UMD_t + \epsilon_{pt} \qquad (7)$$

The results are in Table 10, Panel B and suggest that stocks that have clearly no sin characteristics nevertheless may earn a boycott risk premium if their returns happen to be correlated with sin stocks so that they have positive sensitivity to the boycott risk factor. The alpha is fairly sizable at around 5% annualized, but only marginally significant.

**Payoff Covariance or Sin Characteristic**

A further indication that it is not the sin character but rather covariance with the boycott factor that drives average returns is obtained by looking directly at payoff covariances. We first identify the systematic component of an asset's variation in earnings:

$$X_{it} = a_i + b_{iM} X_{Mt} + b_{iB} X_{Bt} + \varepsilon_{it}, \qquad (8)$$

where $X_{it}$ represents the payoffs (we use earnings before extraordinary items, item IB from the Compustat North American Merged Fundamental Annual File data) of firm *i* at time *t* and $X_{Mt}$ and $X_{Bt}$ refer to market and boycott factor payoffs, respectively. The coefficient $b_{iB}$ then reflects asset *i*'s systematic risk stemming from covariance with aggregate boycott factor payoffs. If

estimated boycott betas $\hat{\beta}_{iB}$ are measures of an asset's underlying systematic risk, they should be directly related to the estimated boycott payoff covariances $\hat{b}_{iB}$:

$$\hat{\beta}_{iB} = \gamma_0 + \gamma_1 \hat{b}_{iB} + \gamma_2 C_i + \eta_i, \qquad (9)$$

with $\gamma_1 > 0$ and any characteristics variables $C_i$ having little explanatory power not already incorporated in $\hat{b}_{iB}$ (i.e., $\gamma_2 = 0$).

It can be inferred from the earlier Table 6 that the boycott betas and boycott payoff covariances (the latter obtained as the $\hat{b}_{iB}$ from equation 8) are significantly positively correlated as expected. For the FF30 assets the correlation is 0.750 for the recent sample period (starting from 1999) and 0.903 for the full sample period (starting from 1963); for the FF48 assets the correlation is 0.661 for the recent sample period (starting from 1999) and 0.837 for the full sample period (starting from 1969 for the 48 industries).

Table 11 provides the regression results for equation (9). In all cases (the 1999-2012 and 1963-2012 sample periods for both the FF30 and FF48 test assets) the $\gamma_1$ estimates are positive and strongly significant. In addition, once payoff covariances are taken into account, the characteristics variables (neglect, idiosyncratic liquidity, and litigation) and industry controls (only concentration here since the average momentum by industry is almost perfectly correlated with each industry's average return) have little explanatory power for the boycott betas.[21]

[21] Replacing the boycott beta by the boycott payoff covariance in the various risk models in Table 5 should work to the extent that it is truly the fundamental boycott risk that is priced. However, asset prices respond not just to current earnings but also to information about future earnings. The latter fundamental is better captured by the boycott beta than by the payoff covariance measure. Results available from the authors show that indeed the boycott payoff covariance is priced significantly (for the FF30 and FF48 test assets over both the post-1990 and post-1963 test periods), but does not perform as well as the boycott beta, in that its contribution to the explanation of average industry returns (measured by the cross-sectional R-square) is substantially lower.

**The Boycott Risk Premium**

The boycott risk premium should vary over time with the economic clout of investors that exercise moral restraint in investment practices. We consider the following implications of this connection. First, as boycotting sin stocks becomes more popular, the boycott premium should increase. However, the willingness of investors to forgo investment returns may vary endogenously over the business cycle. Thus, second, since responsible investing is costly (see also Adler and Kritzmann, 2008), if moral restraint is a luxury good, the extent of moral investing should decrease in a recession, causing a decrease in the boycott risk premium.

We estimate the following process for the boycott premium:

$$BCT_t = c_0 + c_1 YMP_{t-1} + c_2 RWR_{t-1} + e_t . \qquad (10)$$

The state of the economy is captured by $YMP_{t-1}$, aggregated output relative to potential, for which a low value is associated with a recession. If indeed moral investing is a luxury good then we expect $c_1 > 0$. The aggregate preference for moral investing is captured by $RWR_{t-1}$. More interest in moral investing should imply a higher boycott premium: $c_2 > 0$.

The time series regression employs the monthly realized boycott risk premium $BCT_t$ as estimated for each month from the second-pass cross-sectional regressions. $YMP_{t-1}$ is the previous quarter's log aggregate output minus log potential output, both available from the St. Louis Fed (Seasonally adjusted real GDP, GDPC1, and potential output, GDPPOT). The quarterly availability implies that the boycott risk premium aggregated over three months is paired with the output gap lagged by three months).

The aggregate preference toward socially responsible investing is captured by the ratio of investment in mutual funds that hold *no sin stocks* in the previous period to total investment in

mutual funds, $RWR_{t-1}$. We use the Thomson-Reuters S12 data to identify mutual fund holdings of sin stocks starting in 1980, thus restricting our sample period here to go from 1980.q1 to 2012.q4. For any mutual fund with a reporting date during a particular quarter we identify whether it holds any of the sin stocks in our narrow boycott factor. If it holds any sin stocks it is classified as unrestricted; if it holds no sin stocks it is classified as restricted (for the particular quarter). The $RWR_t$ is found as the ratio of the value of all holdings in quarter *t* of mutual funds classified as restricted to the value of the holdings of all mutual funds. This measure is lagged by one reporting period which is two quarters.[22]

Figure 4 provides an overview of the pattern of co-movement of $BCT_t$ and $RWR_t$ over the business cycle. $BCT_t$ has a quarterly mean return of 1.63 percent, varying from a high of 74.6 percent to a low of -19.7 percent and standard deviation of 10.7 percent. $RWR_t$ has a mean level of 44.7 percent varying between 13.6 and 84.6 percent over the sample period with standard deviation of 12.3 percent. Since $BCT_t$ in particular is a highly volatile series, and we are focusing on required returns, we show a (one-year) moving average of both variables. It is difficult to provide a precise timing of events because mutual funds report bi-annually, making it difficult to pinpoint the timing of changes in socially responsible investment wealth.

Comparing the one-year moving average of the boycott risk premium with the one-year moving average of the restricted wealth ratio lagged by one reporting period (two quarters), the two series move together fairly closely with a correlation coefficient of 0.36 that is statistically

[22] There are several reasons for describing the current state based on a two-quarter lag. First, throughout much of the sample period, funds are required to report their holdings only twice annually. Second, holdings commonly are valued after they are reported, using then prevailing asset prices. Third, our procedure implies that existing mutual funds newly classified as restricted must have been selling sin stocks in the preceding quarter, thus in effect participating in the boycott at that time. Note that the two-quarter lag in the restricted wealth ratio means that investors in real time are able to forecast the boycott premium which is consistent with the notion of a time-varying risk premium.

highly significant. Figure 4 captures clearly the steep ascent in the boycott risk premium when socially responsible investing takes off in the late 1990s. After 2002, the boycott risk premium diverges, falling below the level consistent with the relative wealth of socially responsible investors. A possible explanation is that the Vice Fund started operating in 2002, making arbitrage (esp. international arbitrage) by unconstrained investors easier and cheaper. Figure 4 also illustrates clearly that the boycott premium decreases during recessions (the shaded areas), as we expect if moral responsibility is a luxury good.

More formally, we estimate equation (10). Table 12 shows that, individually, both $YMP_{t-1}$ and $RWR_{t-1}$ have the predicted positive sign on $BCT_t$ at the 5% level of significance. However, when we use both variables jointly to explain $BCT_t$ the business cycle variable loses its significance. A plausible reason is that both relative socially responsible wealth ($RWR_t$) and the business cycle measure ($YMP_t$) are alternative proxies for the theoretical variable $q_R$ (the number of socially responsible investors) with some overlapping information. The conclusion is unaltered when we add the FF4 (Carhart) risk factors in explaining the boycott risk premium. These standard risk factors have only limited explanatory power for $BCT_t$ with the exception of the value premium $HML_t$ which has a strongly significant positive impact on $BCT_t$. The latter is consistent with our observation that sin stocks are underpriced and thus behave like value stocks.

The *realized* boycott risk premium $BCT_t$ is the sum of both the required boycott risk premium and the boycott factor return shock. The latter adds noise to the required boycott risk premium which we may absorb by including contemporaneous surprise shocks on the right-hand side of the regression. Thus to improve estimation efficiency we include $\Delta RWR_t$ and $\Delta YMP_t$ in the regression to capture surprise shocks during the return period. A positive shock to either the

relative wealth ratio or the business cycle measure means that the future required boycott risk premium increases. For this to occur, the current price of the boycott factor must fall, implying a negative current boycott return shock. Thus, $\Delta RWR_t$ (the change in the relative wealth ratio during the period) and $\Delta YMP_t$ (measured as realized GDP growth over the next four quarters, assuming that signals about GDP improvement over the upcoming year are reflected in current stock prices, as Fama, 1991, argues) are expected to affect $BCT_t$ with a negative sign.

Table 12 shows that this is indeed the case although only $\Delta YMP_t$ is significantly negative.[23] In principle, inclusion of these shock variables should improve estimation of the coefficients on the original state variables. However, the significance of the $YMP_{t-1}$ variable decreases a bit. Thus, while the lagged restricted wealth ratio consistently positively and significantly explains the boycott risk premium, the business cycle measure positively affects the boycott risk premium, as expected if moral investing is a luxury good, but is only marginally significant.

## 9. Conclusion

The classical result of two-fund separation is based on several critical assumptions, including that investors have identical investment opportunities. However, if social screens are prevalent in economically relevant measure, this assumption is violated. Boycotted stocks are not available to a group of morally constrained investors, who face a reduced investment opportunities set. The violation of the identical investment opportunities assumption gives rise to

[23] The significant link between the boycott risk premium and future aggregate output is also consistent with the result in Liew and Vassalou (2000) that (the size and value factor) risk premiums forecast aggregate output. In the Merton (1973) view all risk factors other than the market factor are state variables reflecting future investment opportunities. A risk factor realization must then represent a change in future investment opportunities that should be accompanied by a change in future aggregate output. Our model neither requires nor rules out such a link (see also our discussion at the end of Section 3).

an additional source of risk – a boycott risk factor: absorption of boycotted stocks by unconstrained investors requires compensation for the extra risk of holding these stocks in excess of the otherwise efficient market weights.

We derive a boycott-augmented CAPM by explicitly segregating the investor base into two groups based on their moral constraints. The model implies that the risk premiums of any stocks are linear combinations of the market and boycott risk factors and sheds light on the commonly observed abnormal return on sin stocks. By incorporating the boycott risk factor, this abnormal return disappears. The perceived superior performance of sin stocks identified in previous studies is because of their close association with the boycott factor.

In a two-stage cross-sectional regression framework, we evaluate the CAPM, FF3 and FF4 models relative to their boycott-augmented versions by considering the incremental contribution of the proposed boycott factor to each model's overall explanatory power. We find that the boycott risk premium is both theoretically and empirically positive. The magnitude of the boycott risk premium is generally close to the average return of the portfolio of boycotted stocks regardless of the choice of the test assets. Furthermore, while the boycotted firms face beyond-normal litigation risk, neglect, and illiquidity, the boycott risk premium cannot be driven out by the litigation risks suggested by HK (2009), the neglect effect of Merton (1987), and measures of idiosyncratic liquidity (Amihud, 2002) or systematic liquidity exposure (Pastor and Stambaugh, 2003). Similarly, accounting for standard industry characteristics such as industry momentum and concentration does not diminish the importance of the boycott risk premium.

The boycott factor results provide a strong indication that non-pecuniary preferences regarding the underlying activities funded by securities may have pervasive pricing effects, as

previously argued by Fama and French (2007). Distaste for particular activities systematically reduces the demand for financing these activities, exerting downward price pressure on the securities. Risk arbitrage by unencumbered investors is limited by the specific risk of these securities, causing the prices of any securities with comparable risk characteristics, but potentially unrelated underlying activities, to be affected as well. The boycott event here represents a measurable instance of reduced demand for non-pecuniary reasons.

## Appendix

*Unrestricted investors*

Investor type *U* (unrestricted/unconstrained) represents the representative morally unrestricted investor. In the traditional single-period CAPM setting, the terminal wealth of the unconstrained investor is fully consumed: $c_U = w_U$, with $w_U$ the end of period wealth of the unrestricted investor. The investment problem of an unrestricted investor under the aforementioned assumptions is as follows:

$$\underset{\mathbf{n}_U}{Max}\ E[U(w_U)],\quad s.t.\quad w_U = (\overline{w}_U / P_f) + \mathbf{n}_U' (\mathbf{x} - \mathbf{p}) \ . \tag{A1}$$

The wealth constraint follows from $w_U = \mathbf{n}_U' \mathbf{x} + n_U^f$, where $\mathbf{n}_U$ is a vector representing the number of shares Investor *U* purchases in each of the *N* existing risky assets, and $\mathbf{x}$ is the vector of payoffs per share in each of the *N* risky assets; $n_U^f$ is the number of risk free discount bonds with unit payoff purchased by Investor *U*, and $\overline{w}_U = \mathbf{n}_U' \mathbf{P} + n_U^f P_f$, where $\overline{w}_U$ is the initial wealth of Investor *U*, $\mathbf{P}$ the vector of prices of the risky assets, and $P_f$ the price of the discount bond. The constraint in (A1) is obtained by eliminating $n_U^f$ from the initial and final wealth equations and defining $\mathbf{p} = \mathbf{P} / P_f$. The first-order conditions for the investment choices of the unrestricted investors from (1) are

$$E[U'(w_U)(\mathbf{x} - \mathbf{p})] = 0 \, . \tag{A2}$$

Under the assumption that payoffs $\mathbf{x}$ are multivariate normally distributed we may apply Stein's Lemma after using the definition of covariance in equations (A2) to obtain:

$$\overline{\mathbf{x}} - \mathbf{p} = \theta_U \, \mathbf{\Sigma} \, \mathbf{n}_U \tag{A3}$$

where $\theta_U = -E[U''(w_U)] / E[U'(w_U)]$ is akin to the degree of absolute risk aversion of the unconstrained investor, which will depend on initial wealth of Investor *U* and other model parameters (unless we assume CARA utility). The covariance matrix of the payoffs for the risky assets is given by $\mathbf{\Sigma}$ and the expected payoffs of the risky assets are represented by $\overline{\mathbf{x}}$ .

*Morally guided investors (restricted or responsible investors)*

The investment decision problem for the representative morally guided investor, investor type *R* (restricted/responsible), is similar except that this investor chooses to boycott what are considered to be "sin" stocks – stocks issued by firms whose activities this investor finds morally or socially unacceptable. Final perceived consumption/wealth for Investor *R* is given now by $w_R = \mathbf{n}_R' \mathbf{x} + n_R^f$. Given $\overline{w}_R = \mathbf{n}_R' \mathbf{P} + n_R^f P_f$, Investor *R*'s decision problem is

$$\underset{\mathbf{n}_R}{Max}\ E[U(w_R)], \quad s.t. \quad w_R = (\overline{w}_R / P_f) + \mathbf{n}_R' (\mathbf{x} - \mathbf{p}) \ , \tag{A4}$$

where $\mathbf{n}_R$ is a vector representing the number of shares Investor *R* purchases in only the $N_N$ risky assets that are not morally objectionable. The first-order conditions for Investor *R* are

$$E[U'(w_R)(\mathbf{x} - \mathbf{p})] = 0, \tag{A5}$$

leading to

$$\overline{\mathbf{x}}_\mathbf{N} - \mathbf{p}_\mathbf{N} = \theta_R \, \mathbf{\Sigma}_\mathbf{N} \, \mathbf{n}_R, \tag{A6}$$

where the matrix of asset payoff covariances is partitioned into those related to "sin stocks" from morally objectionable firms (S) and non-sin (N) firms: $\mathbf{\Sigma} = \begin{pmatrix} \mathbf{\Sigma}_\mathbf{N} & \mathbf{\Sigma}_\mathbf{NS} \\ \mathbf{\Sigma}_\mathbf{SN} & \mathbf{\Sigma}_\mathbf{S} \end{pmatrix}$ so that $\mathbf{\Sigma}_\mathbf{N}$ represents the payoff covariance matrix of all stocks that are not boycotted and $\overline{\mathbf{x}}_\mathbf{N}, \mathbf{p}_\mathbf{N}$ are the vectors of mean payoffs and prices, respectively, of the non-boycotted assets.

*Market equilibrium*

Assuming that there are $q_U$ investors of type *U* and $q_R$ investors of type *R*, the demand for assets may be obtained and set equal to the exogenous supply of shares, $\overline{\mathbf{n}} = \begin{pmatrix} \overline{\mathbf{n}}_\mathbf{N} \\ \overline{\mathbf{n}}_\mathbf{S} \end{pmatrix}$, and zero for the risk free asset, yielding the conditions for market equilibrium:

$$\overline{\mathbf{n}} = q_U \, \mathbf{n}_U + q_R \, \mathbf{n}_R, \ \ 0 = q_U n_U^f + q_R n_R^f \quad . \tag{A7}$$

Solving for the risky asset demands of both groups from equations (3) and (6) gives

$$\mathbf{n}_U = (\theta_U \, \mathbf{\Sigma})^{-1} (\overline{\mathbf{x}} - \mathbf{p}), \ \mathbf{n}_R = (\theta_R \, \mathbf{\Sigma}_\mathbf{N})^{-1} (\overline{\mathbf{x}}_\mathbf{N} - \mathbf{p}_\mathbf{N}), \tag{A8}$$

and substituting into equation (A7) yields:

$$\bar{\mathbf{n}} = \left[ (\boldsymbol{\Sigma}\, \theta_U / q_U)^{-1} + \begin{pmatrix} \mathbf{I} \\ \mathbf{0} \end{pmatrix} (\boldsymbol{\Sigma}_{\mathbf{N}}\, \theta_R / q_R)^{-1} (\mathbf{I} \quad \mathbf{0}) \right] (\bar{\mathbf{x}} - \mathbf{p}) . \tag{A9}$$

A standard inversion identity states that given matrices $\mathbf{X_1}, \mathbf{X_2}, \mathbf{X_3},$ and $\mathbf{X_4}$, with $\mathbf{X_1}$ and $\mathbf{X_4}$ invertible, we have (see, for instance, Söderström 1994, pp. 156-157):

$$(\mathbf{X}_1^{-1} + \mathbf{X_2 X_4^{-1} X_3})^{-1} = \mathbf{X_1} - \mathbf{X_1 X_2} (\mathbf{X_4} + \mathbf{X_3 X_1 X_2})^{-1} \mathbf{X_3 X_1} .$$

Use this identity to manipulate the inverse of the term in brackets in equation (A9):

$$\left[ (\boldsymbol{\Sigma}\, \theta_U / q_U)^{-1} + \begin{pmatrix} \mathbf{I} \\ \mathbf{0} \end{pmatrix} (\boldsymbol{\Sigma}_{\mathbf{N}}\, \theta_R / q_R)^{-1} (\mathbf{I} \quad \mathbf{0}) \right]^{-1} =$$

$$(\theta_U / q_U) \left[ \boldsymbol{\Sigma} - \left( \frac{(\theta_U / q_U)}{(\theta_U / q_U) + (\theta_R / q_R)} \right) \boldsymbol{\Sigma} \begin{pmatrix} \boldsymbol{\Sigma}_{\mathbf{N}}^{-1} & \mathbf{0} \\ \mathbf{0} & \mathbf{0} \end{pmatrix} \boldsymbol{\Sigma} \right] \tag{A10}$$

Then we obtain

$$\bar{\mathbf{x}} - \mathbf{p} = \gamma\, \boldsymbol{\Sigma}\, \bar{\mathbf{n}} + \delta\, \boldsymbol{\Sigma}\, \bar{\mathbf{n}}_{\mathbf{B}},$$

$$\bar{\mathbf{n}}_{\mathbf{B}} = \begin{pmatrix} -\boldsymbol{\Sigma}_{\mathbf{N}}^{-1} \boldsymbol{\Sigma}_{\mathbf{NS}} \bar{\mathbf{n}}_{\mathbf{S}} \\ \bar{\mathbf{n}}_{\mathbf{S}} \end{pmatrix}, \quad \gamma = \frac{1}{(q_R \bar{w}_R / \rho_R) + (q_U \bar{w}_R / \rho_U)} , \quad \delta = \gamma \left( \frac{q_R \bar{w}_R / \rho_R}{q_U \bar{w}_R / \rho_U} \right). \tag{A11}$$

where $\bar{\mathbf{n}}_{\mathbf{B}}$ represents the "boycott" portfolio of shareholdings. Further $\bar{w}_R$ and $\bar{w}_U$ are the average wealth levels and $\rho_R, \rho_U$ are measures of the degree of relative risk aversion of the investor types, where $\rho_R \equiv \theta_R \bar{w}_R$ and $\rho_U \equiv \theta_U \bar{w}_U$.

Convert equation (A11) into an expression for mean returns rather than expected net payoffs, using that gross stock returns equal $1 + r_i^s = x_i / P_i$. Therefore, $x_i - p_i \equiv x_i - (P_i / P_f)$ equals $P_i (r_i^s - r_f)$ because $P_f \equiv 1/(1 + r_f)$. Define the excess return as $r_i \equiv r_i^s - r_f$ and the mean excess return as $\mu_i \equiv \mu_i^s - r_f$. Since $1 + r_i^s = x_i / P_i$ the covariance matrix of risky asset *returns* $\boldsymbol{\sigma}$ is

related to the covariance matrix of risky asset *payoffs* $\mathbf{\Sigma}$ such that for a specific element $\sigma_{ij}$ of this matrix we have that $\sigma_{ij} = \Sigma_{ij} / P_i P_j$. Then we can write for a particular element of the vector in equation (A11):

$$\mu_i = \gamma P_m \sigma_{im} + \delta P_b \sigma_{ib}, \tag{A12}$$

where *m* represents the market, $P_m = q_m \overline{w}_m = q_U \overline{w}_U + q_R \overline{w}_R$ is the cost of the market portfolio, and $P_b$ the cost of the boycott portfolio. Apply equation (A12) to the market portfolio and the boycott portfolio to obtain equations for $\mu_m$ and $\mu_b$:

$$\mu_m = \gamma P_m \sigma_m^2 + \delta P_b \sigma_{mb}, \quad \mu_b = \gamma P_m \sigma_{bm} + \delta P_b \sigma_b^2. \tag{A13}$$

Then solve equations (A13) for $\gamma P_m$ and $\delta P_b$, and substitute the resulting expressions into equation (A12) to generate the two-factor result

$$\mu_i = \beta_{im} \mu_m + \beta_{ib} \mu_b, \tag{A14}$$

where $\beta_{im}, \beta_{ib}$ are the population values of the slope estimates for a linear regression of the return of asset *i* on the market portfolio return and the boycott portfolio return:

$$\beta_{ib} = \frac{\sigma_{ib} \sigma_m^2 - \sigma_{im} \sigma_{mb}}{\sigma_b^2 \sigma_m^2 - \sigma_{bm}^2}, \quad \beta_{im} = \frac{\sigma_{im} \sigma_b^2 - \sigma_{ib} \sigma_{mb}}{\sigma_b^2 \sigma_m^2 - \sigma_{bm}^2}. \tag{A15}$$

*Covariance with Cashflows of Boycotted Firms*

From equation (A11), the solution for the relative price vector of the risky assets is solved in terms of underlying variables as:

$$\mathbf{p} = \overline{\mathbf{x}} - (\gamma \mathbf{\Sigma}\, \overline{\mathbf{n}} + \delta \mathbf{\Sigma}\, \overline{\mathbf{n}}_{\mathbf{B}}), \tag{A16}$$

pre-multiplying by a vector of holdings of portfolio *i* yields for a specific asset or portfolio *i* that

$$p_i = \overline{\mathbf{n}}_{\mathbf{i}}' \mathbf{p} = \overline{x}_i - \gamma \Sigma_{im} - \delta \Sigma_{ib}, \tag{A17}$$

which becomes equation (2) in the text given that $p_i = P_i / P_f = P_i (1 + r_f)$.

*The Boycott Risk Premium*

The existence of morally guided investors of type *R* means that $q_R > 0$. It follows that $\delta > 0$ (defined in equation A11), meaning that the *price of boycott risk is positive*: the larger an asset or portfolio *i*'s payoff covariance, $\Sigma_{ib} \equiv \bar{\mathbf{n}}_\mathbf{i}' \boldsymbol{\Sigma} \bar{\mathbf{n}}_\mathbf{B}$, with the boycott factor payoff, the lower its price relative to the risk free asset, $p_i = P_i / P_f = P_i(1+r_f)$, and the higher its expected excess return, $\mu_i = (\bar{\mathbf{n}}_\mathbf{i}' \bar{\mathbf{x}} / P_i) - (1/P_f)$.

The boycott risk premium, $\mu_b$, can be derived from equation (A11) and the construction of the boycott factor as $x_b - p_b \equiv \bar{\mathbf{n}}_\mathbf{B}'(\mathbf{x} - \mathbf{p})$. Taking expected value we have $\bar{x}_b - p_b = (\gamma + \delta)\Sigma_b$, with $\Sigma_b = \bar{\mathbf{n}}_\mathbf{S}' (\boldsymbol{\Sigma}_\mathbf{S} - \boldsymbol{\Sigma}_\mathbf{SN} \boldsymbol{\Sigma}_\mathbf{N}^{-1} \boldsymbol{\Sigma}_\mathbf{NS}) \bar{\mathbf{n}}_\mathbf{S}$ which is strictly positive because $\boldsymbol{\Sigma}$ is positive definite. Since we can write the mean return as $\mu_b = [(\bar{x}_b - p_b)/p_b]/P_f$ we have

$$\mu_b = \frac{(\gamma + \delta)\ \Sigma_b (1 + r_f)}{\bar{x}_b - (\gamma + \delta)\ \Sigma_b}, \tag{A18}$$

The denominator reflects the price of the boycott factor portfolio: $P_b = [\bar{x}_b - (\gamma + \delta)\ \Sigma_b]/(1+r_f)$. The price of this boycott portfolio must be positive in general equilibrium. This is true because the boycott portfolio represents the value of the payoffs from sin stocks after hedging the payoffs that are already available in the market. Since the sin stocks could not otherwise exist in positive supply (at least not in our one-period context) the value of the residual payoffs is positive.

If we assume that the relative risk aversion levels of both investor groups are equal, $\rho_R = \rho_U$, then from (A11) and (A18) we obtain equation (3) in the text:

$$\mu_b = (1+r_f)\, f\left( \frac{\theta_m \Sigma_b}{\bar{x}_b (1 - RWR)} \right), \quad \text{with} \quad f(\cdot) > 0,\ f'(\cdot) > 0, \text{ and } RWR \equiv \frac{q_R \bar{w}_R}{q_M \bar{w}_M} \quad .$$

It follows that $\mu_b$: (a) is always positive; and (b) increases in *RWR*.

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# Table 1 Socially Responsible Investing Trends in the United States

This table shows for the U.S. the year-by-year amounts of assets (in units of $1 trillion) under professional management, invested in Socially Responsible Investing funds, and subject to screens.

Total Assets: all Assets tracked by Thomson Reuters Nelson. E.g. $16.30 in 1999 means that according to the *1999 Thomson Reuters Nelson' Directory of Investment Managers*, there were $16.30 trillion in investment assets under professional management in the U.S.

SRI Assets: Socially Responsible Investing Assets. E.g. $2.16 in 1999 means that among the $16.30 trillion assets under professional management (including pension funds, mutual fund families, foundations, religious organizations and community development financial institutions), $2.16 trillion assets were considered as following Socially Responsible Investing policy.

Screened Assets: E.g. $1.50 in 1999 means that of the $2.16 trillion SRI assets, $1.5 trillion assets employed at least one negative screen restricting investment in certain industries.

| | 1995 | 1997 | 1999 | 2001 | 2003 | 2005 | 2007 | 2010 | 2012 |
|---|---|---|---|---|---|---|---|---|---|
| **Screened Assets** | $0.16 | $0.53 | $1.50 | $2.01 | $2.14 | $1.69 | $2.10 | $2.51 | $3.31 |
| **SRI Assets** | $0.64 | $1.19 | $2.16 | $2.34 | $2.18 | $2.29 | $2.71 | $3.07 | $3.74 |
| **Total Assets** | $7.00 | $13.70 | $16.30 | $19.90 | $19.20 | $24.40 | $25.10 | $25.20 | $33.30 |

# Table 2 Profile of Boycotted Stocks

This table reports the number of firms by year and average market capitalization (in units of $1 million) of the boycotted stocks subject to the most prevalent screens used by SRI portfolios. The definitions of Tobacco, Alcohol, Coal, Fossil (Coal, Oil, and Gas), and Weapons are based on the Fama-French SIC based classification scheme. Stocks with SIC codes of 2100-2199 belong to the tobacco industry, those with SIC codes of 2080-2085 are in the alcohol industry, and those with SIC codes of 1200-1299 are in the coal industry. Stocks with SIC codes of 1300-1389 are in the oil and gas industry, and those with SIC codes of 3769-3769, 3795, and 3480-3489 are in the weapons industry. Gaming stocks are identified following HK (2009)'s NAICS codes: 7132, 71312, 713210, 71329, 713290, 72112, and 721120.

| | Number of Firms | | | | | | Average Market Capitalization ($ Million) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Tobacco | Alcohol | Coal | Fossil | Weapons | Gaming | Tobacco | Alcohol | Coal | Fossil | Weapons | Gaming |
| **1963** | 10 | 9 | 3 | 22 | 4 | n/a | 316 | 148 | 69 | 157 | 220 | n/a |
| **1964** | 12 | 9 | 4 | 26 | 4 | n/a | 335 | 158 | 158 | 172 | 177 | n/a |
| **1965** | 12 | 10 | 4 | 30 | 4 | n/a | 342 | 184 | 160 | 180 | 194 | n/a |
| **1966** | 13 | 10 | 5 | 51 | 4 | n/a | 279 | 151 | 127 | 122 | 186 | n/a |
| **1967** | 10 | 12 | 4 | 52 | 4 | n/a | 348 | 192 | 119 | 162 | 202 | n/a |
| **1968** | 10 | 12 | 4 | 54 | 4 | n/a | 379 | 229 | 160 | 223 | 209 | n/a |
| **1969** | 10 | 14 | 4 | 59 | 4 | n/a | 388 | 223 | 152 | 219 | 197 | n/a |
| **1970** | 10 | 14 | 4 | 62 | 4 | n/a | 415 | 210 | 202 | 173 | 133 | n/a |
| **1971** | 11 | 13 | 5 | 64 | 4 | n/a | 583 | 234 | 224 | 231 | 186 | n/a |
| **1972** | 11 | 13 | 5 | 69 | 4 | n/a | 705 | 335 | 170 | 239 | 176 | n/a |
| **1973** | 11 | 22 | 8 | 100 | 7 | n/a | 632 | 241 | 94 | 173 | 84 | n/a |
| **1974** | 11 | 21 | 10 | 106 | 8 | n/a | 545 | 171 | 105 | 141 | 69 | n/a |
| **1975** | 10 | 20 | 10 | 112 | 8 | n/a | 708 | 179 | 194 | 152 | 72 | n/a |
| **1976** | 10 | 20 | 11 | 123 | 7 | n/a | 829 | 219 | 238 | 163 | 113 | n/a |
| **1977** | 10 | 19 | 11 | 122 | 8 | n/a | 873 | 167 | 207 | 184 | 118 | n/a |
| **1978** | 10 | 19 | 9 | 127 | 8 | n/a | 925 | 170 | 209 | 186 | 298 | n/a |
| **1979** | 10 | 19 | 8 | 158 | 10 | n/a | 1022 | 212 | 263 | 230 | 368 | n/a |
| **1980** | 9 | 19 | 8 | 212 | 9 | n/a | 1355 | 251 | 357 | 365 | 464 | n/a |
| **1981** | 9 | 17 | 8 | 302 | 9 | n/a | 1651 | 310 | 322 | 260 | 507 | n/a |
| **1982** | 8 | 17 | 8 | 334 | 8 | n/a | 2008 | 378 | 217 | 133 | 438 | n/a |
| **1983** | 9 | 18 | 8 | 331 | 8 | n/a | 2330 | 448 | 239 | 166 | 630 | n/a |
| **1984** | 8 | 18 | 10 | 319 | 9 | n/a | 2866 | 371 | 177 | 158 | 576 | n/a |
| **1985** | 6 | 18 | 11 | 301 | 8 | 8 | 4374 | 465 | 179 | 186 | 671 | 113 |
| **1986** | 7 | 17 | 13 | 284 | 9 | 7 | 4732 | 730 | 150 | 191 | 703 | 199 |
| **1987** | 6 | 16 | 13 | 252 | 8 | 7 | 5797 | 951 | 153 | 282 | 769 | 249 |
| **1988** | 7 | 17 | 13 | 235 | 8 | 8 | 4962 | 895 | 191 | 280 | 863 | 226 |
| **1989** | 7 | 17 | 13 | 228 | 8 | 8 | 7360 | 894 | 277 | 382 | 870 | 302 |
| **1990** | 7 | 17 | 9 | 237 | 8 | 12 | 7380 | 892 | 229 | 445 | 799 | 296 |
| **1991** | 7 | 16 | 9 | 233 | 10 | 10 | 12066 | 1233 | 214 | 404 | 860 | 389 |
| **1992** | 6 | 16 | 10 | 230 | 11 | 11 | 15760 | 1291 | 195 | 406 | 854 | 520 |
| **1993** | 6 | 18 | 10 | 248 | 11 | 25 | 11328 | 1075 | 230 | 461 | 963 | 665 |
| **1994** | 6 | 18 | 11 | 243 | 10 | 34 | 11237 | 1035 | 264 | 460 | 656 | 441 |
| **1995** | 6 | 22 | 11 | 239 | 11 | 35 | 13999 | 1122 | 262 | 521 | 1734 | 455 |
| **1996** | 7 | 23 | 11 | 237 | 12 | 37 | 16064 | 1128 | 646 | 742 | 2386 | 494 |
| **1997** | 9 | 26 | 9 | 226 | 12 | 37 | 16418 | 1302 | 397 | 993 | 2666 | 426 |
| **1998** | 8 | 26 | 5 | 197 | 12 | 31 | 15933 | 1554 | 507 | 735 | 3007 | 391 |
| **1999** | 6 | 26 | 5 | 162 | 10 | 26 | 16047 | 2046 | 351 | 864 | 1925 | 672 |
| **2000** | 4 | 24 | 6 | 155 | 6 | 20 | 3432 | 2108 | 289 | 1156 | 2555 | 851 |
| **2001** | 6 | 19 | 7 | 163 | 8 | 22 | 23805 | 2518 | 857 | 1260 | 3197 | 822 |
| **2002** | 5 | 17 | 5 | 133 | 9 | 22 | 22347 | 3233 | 1051 | 1344 | 3645 | 1255 |
| **2003** | 5 | 17 | 5 | 125 | 9 | 22 | 18913 | 3080 | 1106 | 1629 | 2790 | 1357 |
| **2004** | 5 | 14 | 5 | 124 | 10 | 19 | 24576 | 4030 | 2045 | 1907 | 3213 | 1889 |
| **2005** | 5 | 13 | 10 | 136 | 10 | 20 | 32670 | 3969 | 2682 | 2726 | 3724 | 3188 |
| **2006** | 5 | 12 | 12 | 157 | 10 | 18 | 20152 | 4078 | 3211 | 2930 | 4936 | 4013 |
| **2007** | 7 | 13 | 11 | 162 | 10 | 17 | 20238 | 4141 | 3240 | 3131 | 5763 | 6444 |
| **2008** | 7 | 11 | 11 | 157 | 10 | 16 | 26950 | 1277 | 4258 | 3705 | 5234 | 3113 |
| **2009** | 7 | 11 | 11 | 153 | 10 | 14 | 22441 | 1076 | 2464 | 2731 | 4013 | 1628 |
| **2010** | 7 | 12 | 10 | 139 | 9 | 14 | 26614 | 995 | 3831 | 3468 | 4596 | 3127 |
| **2011** | 7 | 13 | 8 | 145 | 8 | 14 | 34665 | 1098 | 4976 | 4269 | 5763 | 4475 |
| **2012** | 6 | 13 | 9 | 140 | 6 | 15 | 42626 | 1879 | 2710 | 3658 | 3591 | 4223 |
| **Average** | 8 | 17 | 8 | 166 | 8 | 13 | 10054 | 1106 | 823 | 909 | 1567 | 984 |

## Table 3 Investment Screens in Previous Literature

This table provides a survey of the previous academic literature regarding the investment screens applied to identify sin firms. NAICS stands for the North American Industry Classification System, SIC stands for the Standard Industry Classification Code, Permno is a stock identifier. HK is Hong and Kacperczyk (2009). Other papers following the HK criteria are Liston and Soydemir (2010), Salaber (2007, 2009), Chong, Her and Phillips (2006), Liu, Lu, and Veenstra (2014), and Visaltanachoti, Zheng, and Zou (2011). KV is Kim and Venkatachalam (2011). RHZ is Renneboog, Horst, and Zhang (2008, 2011). RHZ's ethical negative screens include animal testing, abortion, genetic engineering, non-marital insurance. RHZ's social negative screens cover workplace diversity, human rights, and labor standards. RHZ's environmental negative screens include firms that: have low environmental standards, contribute to global warming, and/or operate nuclear power plants. FMO is Fabozzi, Ma, and Oliphant (2008). LW is Lobe and Walkshäusl (2011). SRI % refers to the percentage of SRI funds employing the particular screen as reported in the Social Investment Forum for 1999.

| Screen | SRI % | HK | KV | RHZ | FMO | LW |
|---|---|---|---|---|---|---|
| Tobacco | 96 | SIC | SIC | Y | Y | Y |
| Alcohol | 83 | SIC | SIC | Y | Y | Y |
| Gaming | 86 | NAICS | NAICS | Y | Y | Y |
| Weapons | 81 | (SIC)* | | Y | Y | Y |
| Pornography | | | PERMNO | Y | Y | Y |
| Ethical | 23** | | | Y | Y | |
| Social | | | | Y | | |
| Environmental | 79 | | | Y | | Y |
| Region | World | US | US | World | World | World |

* Only used in robustness tests

** Abortion, Abortifacients, Contraceptives, and Family Planning in the SIF 1999 report

# Table 4 Factor Summary Statistics

This table provides summary statistics for the risk factors used in the model comparisons. We consider both the recent period, 1999-2012, and the full sample period, 1963-2012. The meanings of the factor abbreviations are described in the label column. Italics indicate *p-values*.

## Panel A. Period 1999-2012

| Factor | N | Mean | Std. | Min | Max | Label |
|---|---|---|---|---|---|---|
| MKT | 168 | 0.220 | 4.730 | -17.230 | 11.340 | Market Excess Return (percent) |
| SMB | 168 | 0.471 | 3.731 | -16.390 | 22.020 | Size Factor Return (percent) |
| HML | 168 | 0.321 | 3.611 | -12.680 | 13.870 | Value Factor Return (percent) |
| UMD | 168 | 0.306 | 6.133 | -34.720 | 18.390 | Momentum Factor Return (percent) |
| BCTn | 168 | 0.766 | 5.010 | -11.772 | 19.433 | Market-Orthogonalized Boycott Factor Return (percent) [Narrow Screen] |
| BCTb | 168 | 1.210 | 4.821 | -11.781 | 16.220 | Market-Orthogonalized Boycott Factor Return (percent) [Broad Screen] |

| Corr. | MKT | SMB | HML | UMD | BCTn | BCTb |
|---|---|---|---|---|---|---|
| MKT | 1.000 | 0.290 | -0.166 | -0.337 | 0.003 | 0.013 |
| | | *0.000* | *0.031* | *0.000* | *0.970* | *0.863* |
| SMB | | 1.000 | -0.363 | 0.123 | -0.225 | -0.141 |
| | | | *0.000* | *0.111* | *0.003* | *0.068* |
| HML | | | 1.000 | -0.156 | 0.407 | 0.399 |
| | | | | *0.044* | *0.000* | *0.000* |
| UMD | | | | 1.000 | -0.064 | 0.005 |
| | | | | | *0.411* | *0.952* |
| BCTn | | | | | 1.000 | 0.619 |
| | | | | | | *0.000* |
| BCTb | | | | | | 1.000 |

## Panel B. Period 1963-2012

| Factor | N | Mean | Std. | Min | Max | Label |
|---|---|---|---|---|---|---|
| MKT | 600 | 0.469 | 4.498 | -23.240 | 16.100 | Market Excess Return (percent) |
| SMB | 600 | 0.250 | 3.120 | -16.390 | 22.020 | Size Factor Return (percent) |
| HML | 600 | 0.394 | 2.891 | -12.680 | 13.870 | Value Factor Return (percent) |
| UMD | 600 | 0.702 | 4.279 | -34.720 | 18.390 | Momentum Factor Return (percent) |
| BCTn | 600 | 0.323 | 3.942 | -15.506 | 17.926 | Market-Orthogonalized Boycott Factor Return (percent) [Narrow Screen] |
| BCTb | 600 | 0.382 | 3.423 | -11.696 | 16.088 | Market-Orthogonalized Boycott Factor Return (percent) [Broad Screen] |

| Corr. | MKT | SMB | HML | UMD | BCTn | BCTb |
|---|---|---|---|---|---|---|
| MKT | 1.000 | 0.309 | -0.301 | -0.128 | 0.005 | 0.005 |
| | | | *0.000* | *0.002* | *0.913* | *0.899* |
| SMB | | | -0.227 | -0.009 | -0.146 | -0.032 |
| | | | *0.000* | *0.833* | *0.000* | *0.428* |
| HML | | | 1.000 | -0.153 | 0.152 | 0.168 |
| | | | | *0.000* | *0.000* | *0.000* |
| UMD | | | | 1.000 | -0.017 | 0.056 |
| | | | | | *0.681* | *0.169* |
| BCTn | | | | | 1.000 | 0.503 |
| | | | | | | *0.000* |
| BCTb | | | | | | 1.000 |

# Table 5 Model Comparison for the Narrow Boycott Factor

The table reports the risk premiums estimated from the cross-sectional regressions of the CAPM, Boycott-CAPM, FF3, Boycott-FF3, FF4, and Boycott-FF4 models. The test assets are the FF30 and FF48 industry test portfolios, the FF25 value and size sorted portfolios and the FF55 portfolios (the FF30 and FF25 portfolios jointly). The narrow boycott factor (BCTn) is the value-weighted return of the tobacco, alcohol, and coal industries firms. The first-pass factor loadings are estimated based on sample period 1999.01-2012.12 for Panels A through D, 1963.01-2012.12 for Panels E, G and H, and 1969.07-2012.12 for Panel F (due to the unavailability of the health industry portfolio within the FF48 portfolios before 1969.07). The BJS (Black-Jensen-Scholes) *t*-statistics are for the cross-sectional regression slopes with betas estimated over the full sample period, and the GMM *t*-statistics are based on 12 monthly lags. $R^2$ is the adjusted R-squared for the cross-sectional fit between predicted and realized mean returns.

| **Panel A. 1999.01-2012.12** | | | | | | | | **Panel B. 1999.01-2012.12** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FF30** | Const | MKT | SMB | HML | UMD | BCTn | $R^2$ | **FF48** | Const | MKT | SMB | HML | UMD | BCTn | $R^2$ |
| RP | 0.415 | 0.111 | | | | | -0.026 | RP | 0.479 | 0.068 | | | | | -0.017 |
| *BJS-t* | *1.315* | *0.236* | | | | | | *BJS-t* | *1.523* | *0.150* | | | | | |
| *GMM-t* | *1.157* | *0.220* | | | | | | *GMM-t* | *1.305* | *0.136* | | | | | |
| RP | -0.286 | 0.594 | | | | 1.332 | 0.481 | RP | -0.127 | 0.498 | | | | 1.231 | 0.400 |
| *BJS-t* | *-0.765* | *1.156* | | | | *2.287* | | *BJS-t* | *-0.425* | *1.063* | | | | *2.199* | |
| *GMM-t* | *-0.615* | *0.940* | | | | *2.063* | | *GMM-t* | *-0.342* | *0.870* | | | | *1.903* | |
| RP | 0.584 | -0.173 | 0.711 | 0.234 | | | 0.063 | RP | 0.372 | 0.061 | 0.221 | 0.213 | | | 0.035 |
| *BJS-t* | *1.657* | *-0.345* | *1.366* | *0.714* | | | | *BJS-t* | *1.382* | *0.137* | *0.592* | *0.648* | | | |
| *GMM-t* | *1.778* | *-0.337* | *1.769* | *0.660* | | | | *GMM-t* | *1.466* | *0.124* | *0.841* | *0.571* | | | |
| RP | -0.211 | 0.552 | 0.027 | 0.198 | | 1.327 | 0.455 | RP | -0.039 | 0.426 | 0.126 | 0.173 | | 1.270 | 0.415 |
| *BJS-t* | *-0.574* | *1.066* | *0.059* | *0.600* | | *2.197* | | *BJS-t* | *-0.140* | *0.933* | *0.343* | *0.524* | | *2.294* | |
| *GMM-t* | *-0.480* | *0.883* | *0.072* | *0.516* | | *2.207* | | *GMM-t* | *-0.112* | *0.746* | *0.459* | *0.452* | | *2.267* | |
| RP | 0.301 | 0.159 | 0.583 | 0.356 | 1.761 | | 0.420 | RP | 0.166 | 0.314 | 0.290 | 0.300 | 1.451 | | 0.349 |
| *BJS-t* | *0.845* | *0.306* | *1.196* | *1.056* | *1.574* | | | *BJS-t* | *0.598* | *0.678* | *0.757* | *0.905* | *1.479* | | |
| *GMM-t* | *0.731* | *0.260* | *1.419* | *0.950* | *1.895* | | | *GMM-t* | *0.519* | *0.559* | *0.913* | *0.759* | *1.720* | | |
| RP | -0.148 | 0.542 | 0.155 | 0.287 | 0.855 | 1.045 | 0.557 | RP | -0.064 | 0.493 | 0.195 | 0.239 | 0.822 | 1.045 | 0.512 |
| *BJS-t* | *-0.438* | *1.054* | *0.332* | *0.841* | *0.829* | *2.088* | | *BJS-t* | *-0.223* | *1.047* | *0.516* | *0.718* | *0.904* | *2.179* | |
| *GMM-t* | *-0.385* | *0.876* | *0.369* | *0.745* | *0.848* | *2.294* | | *GMM-t* | *-0.178* | *0.813* | *0.622* | *0.612* | *0.964* | *2.290* | |

| **FF55** | **Panel C. 1999.01-2012.12** | | | | | | | **FF25** | **Panel D. 1999.01-2012.12** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RP | 0.437 | 0.135 | | | | | -0.007 | RP | 0.507 | 0.121 | | | | | -0.039 |
| *BJS-t* | *1.226* | *0.273* | | | | | | *BJS-t* | *0.565* | *0.128* | | | | | |
| *GMM-t* | *1.071* | *0.259* | | | | | | *GMM-t* | *0.573* | *0.137* | | | | | |
| RP | -0.142 | 0.590 | | | | 0.998 | 0.254 | RP | 0.089 | 0.494 | | | | 0.298 | -0.060 |
| *BJS-t* | *-0.414* | *1.158* | | | | *1.716* | | *BJS-t* | *0.198* | *0.776* | | | | *0.351* | |
| *GMM-t* | *-0.352* | *0.972* | | | | *1.512* | | *GMM-t* | *0.209* | *0.749* | | | | *0.332* | |
| RP | 0.425 | -0.062 | 0.379 | 0.322 | | | 0.228 | RP | 1.046 | -0.738 | 0.401 | 0.353 | | | *0.570* |
| *BJS-t* | *1.455* | *-0.132* | *1.280* | *1.071* | | | | *BJS-t* | *2.552* | *-1.314* | *1.355* | *1.226* | | | |
| *GMM-t* | *1.487* | *-0.125* | *1.580* | *0.937* | | | | *GMM-t* | *2.794* | *-1.325* | *1.677* | *1.055* | | | |
| RP | 0.037 | 0.283 | 0.389 | 0.257 | | 1.136 | 0.488 | RP | 1.016 | -0.761 | 0.448 | 0.302 | | 1.841 | 0.600 |
| *BJS-t* | *0.109* | *0.566* | *1.312* | *0.857* | | *1.968* | | *BJS-t* | *2.479* | *-1.357* | *1.534* | *1.060* | | *1.481* | |
| *GMM-t* | *0.094* | *0.468* | *1.606* | *0.752* | | *1.957* | | *GMM-t* | *2.420* | *-1.183* | *1.901* | *0.894* | | *1.509* | |
| RP | 0.178 | 0.245 | 0.360 | 0.376 | 1.671 | | 0.502 | RP | 0.221 | 0.162 | 0.421 | 0.367 | 2.803 | | 0.645 |
| *BJS-t* | *0.524* | *0.470* | *1.216* | *1.233* | *1.728* | | | *BJS-t* | *0.414* | *0.236* | *1.429* | *1.273* | *2.816* | | |
| *GMM-t* | *0.430* | *0.381* | *1.499* | *1.117* | *2.062* | | | *GMM-t* | *0.327* | *0.181* | *1.722* | *1.164* | *2.414* | | |
| RP | -0.015 | 0.391 | 0.373 | 0.316 | 1.135 | 0.909 | 0.597 | RP | 0.328 | 0.013 | 0.446 | 0.335 | 2.533 | 1.179 | 0.643 |
| *BJS-t* | *-0.041* | *0.732* | *1.256* | *1.043* | *1.322* | *1.827* | | *BJS-t* | *0.636* | *0.019* | *1.527* | *1.174* | *2.813* | *0.984* | |
| *GMM-t* | *-0.033* | *0.568* | *1.551* | *0.952* | *1.344* | *1.909* | | *GMM-t* | *0.545* | *0.016* | *1.904* | *1.024* | *2.773* | *0.871* | |

| Panel E. 1963.01-2012.12 | | | | | | | | Panel F. 1969.07-2012.12 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FF30** | Const | MKT | SMB | HML | UMD | BCTn | $R^2$ | **FF48** | Const | MKT | SMB | HML | UMD | BCTn | $R^2$ |
| RP | 0.618 | -0.025 | | | | | -0.035 | RP | 0.767 | -0.214 | | | | | 0.035 |
| *BJS-t* | *2.657* | *-0.084* | | | | | | *BJS-t* | *3.077* | *-0.677* | | | | | |
| *GMM-t* | *2.637* | *-0.080* | | | | | | *GMM-t* | *3.176* | *-0.641* | | | | | |
| RP | 0.164 | 0.360 | | | | 0.535 | 0.480 | RP | 0.399 | 0.098 | | | | 0.475 | 0.214 |
| *BJS-t* | *0.695* | *1.183* | | | | *2.628* | | *BJS-t* | *1.539* | *0.298* | | | | *1.986* | |
| *GMM-t* | *0.636* | *1.095* | | | | *2.402* | | *GMM-t* | *1.486* | *0.277* | | | | *1.746* | |
| RP | 0.707 | -0.104 | 0.051 | -0.064 | | | -0.089 | RP | 0.580 | 0.014 | -0.258 | -0.014 | | | 0.096 |
| *BJS-t* | *2.521* | *-0.314* | *0.277* | *-0.406* | | | | *BJS-t* | *1.938* | *0.038* | *-1.339* | *-0.083* | | | |
| *GMM-t* | *2.570* | *-0.319* | *0.261* | *-0.353* | | | | *GMM-t* | *2.076* | *0.039* | *-1.280* | *-0.071* | | | |
| RP | 0.210 | 0.335 | 0.036 | -0.123 | | 0.523 | 0.494 | RP | 0.246 | 0.298 | -0.234 | -0.077 | | 0.524 | 0.288 |
| *BJS-t* | *0.757* | *1.011* | *0.192* | *-0.784* | | *2.511* | | *BJS-t* | *0.790* | *0.809* | *-1.222* | *-0.448* | | *2.166* | |
| *GMM-t* | *0.750* | *1.044* | *0.181* | *-0.698* | | *2.341* | | *GMM-t* | *0.834* | *0.830* | *-1.153* | *-0.396* | | *1.934* | |
| RP | 0.584 | 0.027 | 0.083 | -0.024 | 0.516 | | -0.022 | RP | 0.469 | 0.135 | -0.255 | -0.000 | 0.343 | | 0.106 |
| *BJS-t* | *1.918* | *0.076* | *0.434* | *-0.144* | *0.880* | | | *BJS-t* | *1.557* | *0.371* | *-1.314* | *-0.002* | *0.586* | | |
| *GMM-t* | *1.756* | *0.072* | *0.406* | *-0.128* | *0.876* | | | *GMM-t* | *1.473* | *0.356* | *-1.262* | *-0.002* | *0.566* | | |
| RP | 0.178 | 0.374 | 0.051 | -0.103 | 0.201 | 0.507 | 0.494 | RP | 0.206 | 0.345 | -0.233 | -0.068 | 0.142 | 0.514 | 0.278 |
| *BJS-t* | *0.592* | *1.046* | *0.262* | *-0.607* | *0.342* | *2.509* | | *BJS-t* | *0.655* | *0.921* | *-1.215* | *-0.384* | *0.238* | *2.111* | |
| *GMM-t* | *0.539* | *0.995* | *0.248* | *-0.550* | *0.328* | *2.376* | | *GMM-t* | *0.612* | *0.874* | *-1.151* | *-0.342* | *0.224* | *1.907* | |

| **FF55** | Panel G. 1963.01-2012.12 | | | | | | | **FF25** | Panel H. 1963.01-2012.12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RP | 0.760 | -0.111 | | | | | -0.008 | RP | 1.169 | -0.430 | | | | | 0.044 |
| *BJS-t* | *3.105* | *-0.359* | | | | | | *BJS-t* | *3.044* | *-1.018* | | | | | |
| *GMM-t* | *2.959* | *-0.332* | | | | | | *GMM-t* | *2.875* | *-0.957* | | | | | |
| RP | 0.456 | 0.159 | | | | 0.382 | 0.069 | RP | 0.877 | -0.158 | | | | 0.466 | 0.009 |
| *BJS-t* | *1.928* | *0.521* | | | | *1.903* | | *BJS-t* | *2.846* | *-0.456* | | | | *0.669* | |
| *GMM-t* | *1.768* | *0.482* | | | | *1.759* | | *GMM-t* | *2.956* | *-0.496* | | | | *0.654* | |
| RP | 0.935 | -0.395 | 0.171 | 0.258 | | | 0.313 | RP | 1.145 | -0.650 | 0.188 | 0.432 | | | 0.704 |
| *BJS-t* | *3.974* | *-1.328* | *1.307* | *2.066* | | | | *BJS-t* | *4.057* | *-1.915* | *1.444* | *3.562* | | | |
| *GMM-t* | *4.149* | *-1.341* | *1.253* | *1.801* | | | | *GMM-t* | *3.884* | *-2.025* | *1.369* | *3.063* | | | |
| RP | 0.632 | -0.136 | 0.205 | 0.244 | | 0.426 | 0.432 | RP | 0.918 | -0.502 | 0.248 | 0.354 | | 2.530 | 0.800 |
| *BJS-t* | *2.706* | *-0.455* | *1.574* | *1.955* | | *2.120* | | *BJS-t* | *3.096* | *-1.447* | *1.925* | *2.933* | | *3.228* | |
| *GMM-t* | *2.617* | *-0.447* | *1.513* | *1.715* | | *1.961* | | *GMM-t* | *2.324* | *-1.199* | *1.793* | *2.462* | | *2.641* | |
| RP | 0.691 | -0.135 | 0.172 | 0.278 | 0.707 | | 0.380 | RP | 0.451 | 0.078 | 0.211 | 0.439 | 2.540 | | 0.730 |
| *BJS-t* | *2.392* | *-0.386* | *1.316* | *2.210* | *1.355* | | | *BJS-t* | *1.255* | *0.190* | *1.620* | *3.625* | *3.338* | | |
| *GMM-t* | *2.117* | *-0.350* | *1.263* | *1.973* | *1.314* | | | *GMM-t* | *0.980* | *0.168* | *1.490* | *3.244* | *2.247* | | |
| RP | 0.463 | 0.050 | 0.203 | 0.261 | 0.544 | 0.412 | 0.473 | RP | 0.173 | 0.277 | 0.274 | 0.360 | 2.752 | 2.700 | 0.836 |
| *BJS-t* | *1.577* | *0.142* | *1.555* | *2.085* | *1.061* | *2.078* | | *BJS-t* | *0.450* | *0.650* | *2.122* | *2.987* | *3.542* | *3.385* | |
| *GMM-t* | *1.358* | *0.126* | *1.494* | *1.867* | *1.005* | *1.979* | | *GMM-t* | *0.274* | *0.450* | *1.976* | *2.470* | *1.938* | *1.888* | |

# Table 6 Market and Boycott Factor Loadings

**Panel A.** This table reports the market $\beta_{iM}$ and boycott factor $\beta_{iB}$ loadings for industries *i* obtained from the time-series regressions of the Boycott-CAPM (with the narrow boycott factor), using the monthly data over the periods stated in the first row of the table. It also shows the sensitivities $b_{iB}$ of each industry's earnings (before extraordinary items – Compustat Annual file item IB) to the aggregate earnings of the boycotted industries (narrow measure) generated by following regressions: $X_{it} = a_i + b_{iM} X_{Mt} + b_{iB} X_{Bt} + \varepsilon_{it}$, where $X_{it}$ is individual Fama-French industry's annual earnings, $X_{Mt}$ is earnings of all industries combined, and $X_{Bt}$ is the earnings of the three boycotted industries combined.

| **1999-2012** | | | | **1963-2012** | | | | **1999-2012** | | | | **1969-2012** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FF30** | $\beta_{iM}$ | $\beta_{iB}$ | $b_{iB}$ | **FF30** | $\beta_{iM}$ | $\beta_{iB}$ | $b_{iB}$ | **FF48** | $\beta_{iM}$ | $\beta_{iB}$ | $b_{iB}$ | **FF48** | $\beta_{iM}$ | $\beta_{iB}$ | $b_{iB}$ |
| Smoke | 0.446 | 1.204 | 3.661 | Smoke | 0.674 | 1.187 | 2.942 | Smoke | 0.446 | 1.204 | 3.661 | Smoke | 0.673 | 1.177 | 2.941 |
| Coal | 1.310 | 0.635 | -0.011 | Coal | 1.161 | 0.402 | 0.966 | Coal | 1.310 | 0.635 | -0.009 | Coal | 1.182 | 0.413 | 0.967 |
| Util | 0.406 | 0.393 | 0.095 | Beer | 0.761 | 0.400 | 0.362 | Util | 0.406 | 0.393 | 0.094 | Beer | 0.755 | 0.402 | 0.361 |
| Mines | 1.000 | 0.381 | 0.451 | Food | 0.713 | 0.354 | 0.261 | Gold | 0.332 | 0.374 | 0.175 | Food | 0.677 | 0.372 | 0.198 |
| Beer | 0.322 | 0.333 | 0.503 | Util | 0.530 | 0.223 | 0.212 | Ships | 1.070 | 0.374 | 0.123 | Soda | 0.846 | 0.285 | 0.817 |
| Oil | 0.754 | 0.305 | 0.671 | Hlth | 0.832 | 0.212 | 0.100 | Mines | 1.344 | 0.340 | 0.729 | Drugs | 0.784 | 0.239 | 0.138 |
| Food | 0.403 | 0.299 | 0.203 | Hshld | 0.820 | 0.181 | 0.237 | Beer | 0.322 | 0.333 | 0.502 | Util | 0.525 | 0.236 | 0.211 |
| Carry | 0.962 | 0.254 | 0.398 | Meals | 1.074 | 0.150 | 0.046 | Hlth | 0.611 | 0.323 | 0.123 | Hlth | 1.142 | 0.228 | 0.069 |
| Whlsl | 0.818 | 0.225 | 0.034 | Whlsl | 1.074 | 0.119 | 0.016 | Oil | 0.754 | 0.305 | 0.669 | Hshld | 0.804 | 0.202 | 0.236 |
| Cnstr | 1.128 | 0.216 | -0.176 | Cnstr | 1.186 | 0.099 | -0.028 | Food | 0.352 | 0.303 | 0.123 | Ships | 1.088 | 0.184 | 0.126 |
| Txtls | 1.340 | 0.205 | -0.072 | Paper | 0.950 | 0.086 | 0.024 | Insur | 0.878 | 0.283 | -0.473 | MedEq | 0.897 | 0.182 | 0.034 |
| Hshld | 0.477 | 0.185 | 0.089 | Mines | 0.953 | 0.082 | 0.180 | Soda | 0.573 | 0.254 | 0.509 | Insur | 0.964 | 0.161 | -0.158 |
| Chems | 1.080 | 0.177 | 0.071 | Fin | 1.068 | 0.081 | -0.076 | Guns | 0.346 | 0.250 | 0.220 | Meals | 1.056 | 0.154 | 0.046 |
| Hlth | 0.524 | 0.171 | 0.221 | Carry | 1.118 | 0.074 | 0.303 | Aero | 0.972 | 0.249 | 0.523 | Guns | 0.818 | 0.126 | 0.181 |
| Paper | 0.862 | 0.157 | -0.083 | Chems | 1.040 | 0.066 | 0.086 | RlEst | 1.203 | 0.226 | -0.002 | Whlsl | 1.043 | 0.121 | 0.016 |
| Fin | 1.030 | 0.156 | -0.292 | Other | 1.084 | 0.064 | 0.104 | Whlsl | 0.818 | 0.225 | 0.034 | Agric | 0.863 | 0.120 | -0.006 |
| Meals | 0.670 | 0.155 | 0.086 | Oil | 0.790 | 0.059 | 0.302 | BldMt | 1.129 | 0.209 | -0.114 | Banks | 1.073 | 0.110 | -0.147 |
| Trans | 0.885 | 0.112 | -0.054 | Clths | 1.130 | 0.055 | 0.043 | Txtls | 1.340 | 0.205 | -0.072 | PerSv | 1.103 | 0.100 | 0.022 |
| Other | 0.847 | 0.089 | 0.208 | Txtls | 1.135 | 0.033 | -0.030 | Hshld | 0.477 | 0.185 | 0.088 | BldMt | 1.165 | 0.100 | 0.019 |
| Books | 1.038 | 0.086 | -0.248 | Rtail | 0.998 | 0.021 | 0.122 | Chems | 1.080 | 0.177 | 0.070 | Gold | 0.641 | 0.098 | 0.056 |
| Clths | 1.017 | 0.051 | 0.068 | Books | 1.072 | 0.015 | -0.076 | Cnstr | 1.181 | 0.174 | -0.241 | Paper | 0.967 | 0.091 | 0.018 |
| Games | 1.396 | 0.036 | -0.128 | Trans | 1.081 | 0.004 | 0.003 | Banks | 0.981 | 0.170 | -0.373 | Mines | 1.103 | 0.082 | 0.362 |
| ElcEq | 1.303 | 0.032 | 0.012 | ElcEq | 1.214 | -0.004 | 0.041 | Drugs | 0.497 | 0.170 | 0.284 | Aero | 1.134 | 0.077 | 0.396 |
| Autos | 1.418 | 0.029 | -0.563 | Games | 1.330 | -0.004 | -0.077 | Paper | 0.850 | 0.156 | -0.075 | Oil | 0.792 | 0.065 | 0.299 |
| FabPr | 1.405 | 0.022 | 0.193 | Telcm | 0.767 | -0.044 | -0.603 | Meals | 0.670 | 0.155 | 0.085 | Rubbr | 1.063 | 0.064 | -0.024 |
| Steel | 1.810 | -0.012 | -0.309 | FabPr | 1.226 | -0.063 | 0.070 | FabPr | 1.158 | 0.146 | -0.049 | Chems | 1.037 | 0.063 | 0.085 |
| Telcm | 1.001 | -0.046 | -0.207 | Autos | 1.138 | -0.080 | -0.150 | PerSv | 0.769 | 0.144 | 0.073 | Clths | 1.129 | 0.055 | 0.043 |
| Rtail | 0.813 | -0.082 | 0.179 | Steel | 1.295 | -0.113 | -0.139 | MedEq | 0.663 | 0.121 | 0.109 | Boxes | 0.956 | 0.049 | 0.040 |
| Servs | 1.327 | -0.285 | 0.045 | Servs | 1.325 | -0.153 | -0.020 | Trans | 0.889 | 0.113 | -0.063 | Toys | 1.167 | 0.046 | -0.054 |
| BusEq | 1.606 | -0.335 | -0.124 | BusEq | 1.286 | -0.269 | -0.129 | Boxes | 1.032 | 0.100 | -0.101 | Other | 1.150 | 0.044 | 0.103 |
| *Mean* | *0.980* | *0.172* | *0.164* | | *1.027* | *0.108* | *0.170* | Agric | 0.701 | 0.090 | 0.084 | Txtls | 1.127 | 0.041 | -0.030 |
| *Std.* | *0.381* | *0.274* | *0.709* | | *0.208* | *0.252* | *0.579* | Other | 0.887 | 0.083 | 0.207 | RlEst | 1.196 | 0.032 | 0.001 |
| | | | | | | | | Rubbr | 0.981 | 0.076 | -0.065 | Rtail | 1.005 | 0.023 | 0.122 |
| | | | | | | | | Toys | 0.949 | 0.075 | -0.289 | Cnstr | 1.301 | 0.020 | -0.076 |
| | | | | | | | | Clths | 1.017 | 0.051 | 0.068 | Books | 1.060 | 0.018 | -0.090 |
| | | | | | | | | Books | 1.000 | 0.049 | -0.289 | Fun | 1.361 | 0.013 | -0.082 |
| | | | | | | | | Fun | 1.507 | 0.045 | -0.030 | Trans | 1.067 | 0.005 | -0.001 |
| | | | | | | | | ElcEq | 1.303 | 0.032 | 0.013 | FabPr | 1.091 | 0.001 | -0.007 |
| | | | | | | | | Autos | 1.418 | 0.029 | -0.560 | ElcEq | 1.207 | -0.010 | 0.041 |
| | | | | | | | | Mach | 1.410 | 0.020 | 0.216 | Telcm | 0.781 | -0.039 | -0.606 |
| | | | | | | | | Steel | 1.810 | -0.012 | -0.313 | Mach | 1.227 | -0.074 | 0.075 |
| | | | | | | | | Telcm | 1.001 | -0.046 | -0.211 | Autos | 1.133 | -0.096 | -0.148 |
| | | | | | | | | Rtail | 0.813 | -0.082 | 0.178 | Steel | 1.295 | -0.138 | -0.142 |
| | | | | | | | | Fin | 1.505 | -0.163 | -0.162 | Fin | 1.241 | -0.149 | -0.006 |
| | | | | | | | | LabEq | 1.416 | -0.260 | 0.057 | LabEq | 1.333 | -0.167 | -0.006 |
| | | | | | | | | BusSv | 1.341 | -0.290 | 0.043 | BusSv | 1.307 | -0.186 | -0.023 |
| | | | | | | | | Comps | 1.604 | -0.339 | 0.134 | Comps | 1.235 | -0.261 | -0.101 |
| | | | | | | | | Chips | 1.629 | -0.346 | -0.306 | Chips | 1.413 | -0.305 | -0.193 |
| | | | | | | | | *Mean* | *0.974* | *0.152* | *0.112* | | *1.041* | *0.091* | *0.128* |
| | | | | | | | | *Std.* | *0.383* | *0.248* | *0.587* | | *0.206* | *0.220* | *0.479* |

## Panel B. Test Asset Boycott Factor Loadings for the FF25 Assets

The boycott factor betas (BCT Beta = $\beta_{iB}$) for each of the 25 size and value sorted assets obtained in the context of the two-factor boycott-augmented CAPM are presented for the 1999.01-2012.12 and 1963.01-2012.12 periods.

| 1999-2012 | | Size | | | | |
|---|---|---|---|---|---|---|
| | **BCT Beta** | Smallest | 2 | 3 | 4 | Largest |
| Value | Lowest | -0.366 | -0.255 | -0.220 | -0.196 | -0.035 |
| | 2 | -0.194 | -0.020 | 0.064 | 0.163 | 0.130 |
| | 3 | -0.116 | 0.070 | 0.182 | 0.217 | 0.161 |
| | 4 | -0.050 | 0.101 | 0.232 | 0.231 | 0.283 |
| | Highest | 0.025 | 0.128 | 0.206 | 0.277 | 0.228 |

| 1963-2012 | | Size | | | | |
|---|---|---|---|---|---|---|
| | **BCT Beta** | Smallest | 2 | 3 | 4 | Largest |
| Value | Lowest | -0.257 | -0.165 | -0.140 | -0.107 | 0.047 |
| | 2 | -0.149 | -0.048 | -0.001 | 0.048 | 0.082 |
| | 3 | -0.089 | 0.006 | 0.046 | 0.081 | 0.049 |
| | 4 | -0.056 | 0.022 | 0.083 | 0.109 | 0.121 |
| | Highest | -0.034 | 0.019 | 0.068 | 0.113 | 0.085 |

# Table 7 Model Comparison for the Broad Boycott Factor

The table reports the risk premiums estimated from the cross-sectional regressions of the CAPM, Boycott-CAPM, FF3, Boycott-FF3, FF4, and Boycott-FF4 models. The test assets are the FF30 and FF48 industry test portfolios, the FF25 value and size sorted portfolios and the FF55 portfolios (the FF30 and FF25 portfolios jointly). The broad boycott factor (BCTb) is the value-weighted return of the tobacco, alcohol, coal, oil, gas, weapons, and gaming industries firms. The first-pass factor loadings are estimated for the period 1999.01-2012.12. The BJS (Black-Jensen-Scholes) *t*-statistics are for the cross-sectional regression slopes with betas estimated over the full sample period, and the GMM *t*-statistics are based on 12 monthly lags. $R^2$ is the adjusted R-squared for the cross-sectional fit between predicted and realized mean returns.

**Panel A. 1999-2012**

| **FF30** | Const | MKT | SMB | HML | UMD | BCTb | $R^2$ |
|---|---|---|---|---|---|---|---|
| RP | 0.119 | 0.161 | | | | 1.080 | 0.682 |
| *BJS-t* | *0.364* | *0.341* | | | | *2.162* | |
| *GMM-t* | *0.284* | *0.295* | | | | *1.993* | |
| RP | 0.283 | 0.050 | 0.085 | 0.110 | | 1.056 | 0.694 |
| *BJS-t* | *0.833* | *0.101* | *0.187* | *0.330* | | *2.080* | |
| *GMM-t* | *0.754* | *0.090* | *0.259* | *0.303* | | *1.955* | |
| RP | 0.313 | -0.012 | -0.008 | 0.042 | -0.413 | 1.174 | 0.695 |
| *BJS-t* | *0.878* | *-0.024* | *-0.018* | *0.123* | *-0.455* | *2.515* | |
| *GMM-t* | *0.746* | *-0.019* | *-0.022* | *0.126* | *-0.435* | *2.204* | |

**Panel B. 1999-2012**

| **FF48** | Const | MKT | SMB | HML | UMD | BCTb | $R^2$ |
|---|---|---|---|---|---|---|---|
| RP | 0.102 | 0.213 | | | | 1.066 | 0.644 |
| *BJS-t* | *0.336* | *0.470* | | | | *2.211* | |
| *GMM-t* | *0.254* | *0.395* | | | | *1.996* | |
| RP | 0.209 | 0.155 | -0.045 | 0.116 | | 1.113 | 0.675 |
| *BJS-t* | *0.782* | *0.348* | *-0.123* | *0.349* | | *2.236* | |
| *GMM-t* | *0.647* | *0.287* | *-0.169* | *0.305* | | *2.049* | |
| RP | 0.236 | 0.108 | -0.096 | 0.084 | -0.309 | 1.190 | 0.675 |
| *BJS-t* | *0.856* | *0.237* | *-0.260* | *0.248* | *-0.374* | *2.492* | |
| *GMM-t* | *0.664* | *0.189* | *-0.340* | *0.226* | *-0.407* | *2.210* | |

**Panel C. 1999-2012**

| **FF55** | | | | | | | |
|---|---|---|---|---|---|---|---|
| RP | 0.126 | 0.296 | | | | 0.864 | 0.396 |
| *BJS-t* | *0.377* | *0.600* | | | | *1.808* | |
| *GMM-t* | *0.302* | *0.523* | | | | *1.692* | |
| RP | 0.437 | -0.134 | 0.416 | 0.198 | | 1.013 | 0.672 |
| *BJS-t* | *1.500* | *-0.285* | *1.400* | *0.657* | | *2.075* | |
| *GMM-t* | *1.393* | *-0.255* | *1.747* | *0.590* | | *1.998* | |
| RP | 0.414 | -0.101 | 0.412 | 0.210 | 0.427 | 0.986 | 0.666 |
| *BJS-t* | *1.287* | *-0.204* | *1.391* | *0.709* | *0.560* | *2.136* | |
| *GMM-t* | *1.054* | *-0.167* | *1.787* | *0.674* | *0.540* | *1.992* | |

**Panel D. 1999-2012**

| **FF25** | | | | | | | |
|---|---|---|---|---|---|---|---|
| RP | -0.147 | 0.673 | | | | 0.649 | 0.001 |
| *BJS-t* | *-0.294* | *0.991* | | | | *0.994* | |
| *GMM-t* | *-0.332* | *1.045* | | | | *0.914* | |
| RP | 1.067 | -0.836 | 0.476 | 0.302 | | 1.116 | 0.659 |
| *BJS-t* | *2.595* | *-1.481* | *1.637* | *1.059* | | *1.712* | |
| *GMM-t* | *2.828* | *-1.401* | *2.060* | *0.901* | | *2.056* | |
| RP | 0.529 | -0.228 | 0.468 | 0.325 | 2.137 | 1.070 | 0.674 |
| *BJS-t* | *0.995* | *-0.339* | *1.610* | *1.141* | *2.454* | *1.640* | |
| *GMM-t* | *0.976* | *-0.303* | *2.030* | *0.989* | *2.657* | *1.766* | |

# Table 8 Industry Controls

**Panel A** presents the estimated coefficients from the Black-Jensen-Scholes cross-sectional regressions of the CAPM, narrow Boycott-CAPM, FF4 (Carhart, 1997), and Boycott-FF4 models together with industry momentum controls using monthly data during 1999.01-2012.12. The test assets are the Fama French 30-industry (left) and 48-industry (right) portfolios. The right-hand side factor loadings are generated from full sample observations between 1999.01 and 2012.12. IM_k is the industry momentum variable equal to each industry's past excess return over a k-month period. The *t*-statistics are in italics.

| | **FF30 1999-2012** | | | | | | | **FF48 1999-2012** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| k | Const. | MKT | SMB | HML | UMD | BCTn | IM_k | Const. | MKT | SMB | HML | UMD | BCTn | IM_k |
| 1 | 0.058 | 0.384 | | | | | 0.033 | 0.259 | 0.224 | | | | | 0.018 |
| | *0.191* | *0.858* | | | | | *1.133* | *0.881* | *0.525* | | | | | *0.768* |
| 1 | -0.411 | 0.629 | | | | 1.097 | 0.021 | -0.230 | 0.529 | | | | 1.162 | 0.009 |
| | *-1.200* | *1.285* | | | | *2.033* | *0.784* | *-0.825* | *1.167* | | | | *2.166* | *0.397* |
| 1 | 0.096 | 0.252 | 0.380 | 0.407 | 1.470 | | -0.014 | 0.085 | 0.264 | 0.280 | 0.370 | 1.529 | | -0.010 |
| | *0.263* | *0.464* | *0.729* | *1.143* | *1.356* | | *-0.643* | *0.312* | *0.564* | *0.738* | *1.095* | *1.575* | | *-0.532* |
| 1 | -0.231 | 0.537 | 0.018 | 0.325 | 0.785 | 1.014 | 0.000 | -0.116 | 0.436 | 0.164 | 0.317 | 0.954 | 1.096 | -0.007 |
| | *-0.670* | *1.000* | *0.037* | *0.909* | *0.779* | *1.972* | *0.004* | *-0.413* | *0.923* | *0.437* | *0.924* | *1.033* | *2.249* | *-0.353* |
| 3 | 0.359 | 0.183 | | | | | 0.016 | 0.483 | 0.116 | | | | | 0.015 |
| | *1.112* | *0.403* | | | | | *0.539* | *1.640* | *0.277* | | | | | *0.627* |
| 3 | -0.447 | 0.771 | | | | 1.582 | 0.006 | -0.108 | 0.540 | | | | 1.286 | 0.009 |
| | *-1.260* | *1.614* | | | | *2.824* | *0.212* | *-0.368* | *1.238* | | | | *2.399* | *0.380* |
| 3 | 0.228 | 0.169 | 0.497 | 0.513 | 2.246 | | 0.013 | 0.231 | 0.155 | 0.324 | 0.433 | 1.553 | | 0.008 |
| | *0.649* | *0.323* | *1.027* | *1.479* | *2.049* | | *0.554* | *0.849* | *0.339* | *0.792* | *1.301* | *1.617* | | *0.401* |
| 3 | -0.256 | 0.568 | 0.006 | 0.374 | 1.052 | 1.261 | 0.006 | -0.010 | 0.338 | 0.230 | 0.343 | 0.836 | 1.111 | 0.001 |
| | *-0.757* | *1.101* | *0.012* | *1.090* | *1.062* | *2.465* | *0.255* | *-0.035* | *0.734* | *0.568* | *1.027* | *0.928* | *2.238* | *0.031* |
| 6 | 0.479 | 0.025 | | | | | 0.046 | 0.508 | -0.025 | | | | | 0.032 |
| | *1.481* | *0.055* | | | | | *1.561* | *1.650* | *-0.057* | | | | | *1.354* |
| 6 | -0.131 | 0.415 | | | | 1.287 | 0.045 | -0.052 | 0.351 | | | | 1.251 | 0.032 |
| | *-0.368* | *0.849* | | | | *2.197* | *1.732* | *-0.177* | *0.768* | | | | *2.208* | *1.444* |
| 6 | 0.340 | 0.097 | 0.477 | 0.440 | 1.563 | | 0.031 | 0.213 | 0.186 | 0.279 | 0.318 | 1.353 | | 0.023 |
| | *0.975* | *0.189* | *0.969* | *1.215* | *1.407* | | *1.375* | *0.774* | *0.401* | *0.729* | *0.948* | *1.396* | | *1.283* |
| 6 | -0.054 | 0.387 | 0.188 | 0.388 | 0.915 | 1.050 | 0.027 | -0.030 | 0.343 | 0.219 | 0.267 | 0.792 | 1.084 | 0.022 |
| | *-0.162* | *0.758* | *0.384* | *1.078* | *0.885* | *2.023* | *1.264* | *-0.103* | *0.727* | *0.577* | *0.795* | *0.876* | *2.170* | *1.235* |
| 9 | 0.466 | -0.102 | | | | | -0.004 | 0.648 | -0.193 | | | | | -0.005 |
| | *1.389* | *-0.214* | | | | | *-0.131* | *2.092* | *-0.435* | | | | | *-0.255* |
| 9 | -0.289 | 0.415 | | | | 1.525 | -0.004 | 0.002 | 0.265 | | | | 1.387 | -0.001 |
| | *-0.765* | *0.798* | | | | *2.603* | *-0.145* | *0.007* | *0.560* | | | | *2.432* | *-0.054* |
| 9 | 0.567 | -0.237 | 0.583 | 0.356 | 1.091 | | 0.008 | 0.418 | -0.004 | 0.229 | 0.362 | 1.043 | | 0.002 |
| | *1.587* | *-0.459* | *1.172* | *1.041* | *0.982* | | *0.415* | *1.524* | *-0.008* | *0.581* | *1.054* | *1.037* | | *0.115* |
| 9 | -0.038 | 0.309 | 0.083 | 0.235 | 0.043 | 1.257 | 0.002 | 0.154 | 0.204 | 0.146 | 0.281 | 0.427 | 1.175 | -0.007 |
| | *-0.108* | *0.591* | *0.173* | *0.686* | *0.042* | *2.353* | *0.086* | *0.538* | *0.434* | *0.376* | *0.819* | *0.457* | *2.347* | *-0.419* |
| 12 | 0.523 | -0.168 | | | | | 0.013 | 0.642 | -0.172 | | | | | 0.002 |
| | *1.591* | *-0.346* | | | | | *0.435* | *2.153* | *-0.381* | | | | | *0.102* |
| 12 | -0.203 | 0.342 | | | | 1.398 | 0.003 | 0.028 | 0.275 | | | | 1.341 | -0.005 |
| | *-0.532* | *0.652* | | | | *2.390* | *0.120* | *0.091* | *0.567* | | | | *2.367* | *-0.253* |
| 12 | 0.397 | -0.069 | 0.546 | 0.488 | 1.475 | | 0.000 | 0.305 | 0.100 | 0.375 | 0.427 | 1.533 | | -0.013 |
| | *1.121* | *-0.129* | *1.109* | *1.418* | *1.285* | | *0.000* | *1.094* | *0.207* | *0.943* | *1.263* | *1.496* | | *-0.717* |
| 12 | -0.215 | 0.487 | 0.059 | 0.384 | 0.348 | 1.361 | -0.014 | 0.042 | 0.329 | 0.339 | 0.336 | 0.908 | 1.204 | -0.021 |
| | *-0.616* | *0.902* | *0.122* | *1.110* | *0.339* | *2.500* | *-0.568* | *0.145* | *0.668* | *0.856* | *0.987* | *0.958* | *2.347* | *-1.150* |

**Panel B** presents the estimated coefficients from the Black-Jensen-Scholes cross-sectional regressions of the CAPM, narrow Boycott-CAPM, Carhart, and Boycott-Carhart models together with industry momentum controls using monthly data from 1963.01-2012.12 for the FF30 test assets and from 1969.07-2012.12 for the FF48 test assets. The right-hand side factor loadings are generated from full sample observations. IM_k is the industry momentum variable equal to each industry's past excess return over a k-month period. The *t*-statistics are in italics.

| | **FF30** | **1963-2012** | | | | | | **FF48** | **1969-2012** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| k | Const. | MKT | SMB | HML | UMD | BCTn | IM_k | Const. | MKT | SMB | HML | UMD | BCTn | IM_k |
| 1 | 0.416 | 0.161 | | | | | 0.075 | 0.563 | 0.046 | | | | | 0.049 |
| | *1.871* | *0.575* | | | | | *5.304* | *2.319* | *0.150* | | | | | *3.752* |
| 1 | 0.177 | 0.364 | | | | 0.341 | 0.079 | 0.389 | 0.197 | | | | 0.274 | 0.049 |
| | *0.764* | *1.247* | | | | *1.688* | *5.456* | *1.506* | *0.599* | | | | *1.152* | *3.758* |
| 1 | 0.301 | 0.326 | 0.021 | -0.047 | 0.615 | | 0.056 | 0.367 | 0.300 | -0.145 | -0.030 | 0.572 | | 0.028 |
| | *1.031* | *0.939* | *0.113* | *-0.289* | *1.126* | | *4.270* | *1.243* | *0.822* | *-0.773* | *-0.174* | *1.002* | | *2.394* |
| 1 | 0.071 | 0.530 | -0.024 | -0.088 | 0.430 | 0.390 | 0.059 | 0.252 | 0.397 | -0.138 | -0.050 | 0.473 | 0.325 | 0.026 |
| | *0.245* | *1.519* | *-0.128* | *-0.542* | *0.784* | *1.908* | *4.489* | *0.822* | *1.060* | *-0.748* | *-0.286* | *0.811* | *1.350* | *2.283* |
| 3 | 0.581 | -0.066 | | | | | 0.013 | 0.668 | -0.062 | | | | | 0.012 |
| | *2.512* | *-0.228* | | | | | *0.985* | *2.725* | *-0.203* | | | | | *0.952* |
| 3 | 0.116 | 0.320 | | | | 0.539 | 0.014 | 0.387 | 0.177 | | | | 0.359 | 0.011 |
| | *0.497* | *1.083* | | | | *2.605* | *1.008* | *1.513* | *0.552* | | | | *1.500* | *0.894* |
| 3 | 0.475 | 0.069 | 0.118 | 0.059 | 1.163 | | 0.014 | 0.478 | 0.192 | -0.176 | -0.012 | 0.569 | | 0.008 |
| | *1.591* | *0.193* | *0.631* | *0.363* | *2.096* | | *1.085* | *1.609* | *0.531* | *-0.935* | *-0.069* | *0.999* | | *0.751* |
| 3 | 0.106 | 0.379 | 0.059 | -0.054 | 0.758 | 0.502 | 0.015 | 0.244 | 0.379 | -0.168 | -0.088 | 0.352 | 0.453 | 0.007 |
| | *0.366* | *1.081* | *0.317* | *-0.334* | *1.370* | *2.454* | *1.162* | *0.792* | *1.020* | *-0.897* | *-0.511* | *0.609* | *1.859* | *0.621* |
| 6 | 0.671 | -0.036 | | | | | 0.025 | 0.786 | -0.131 | | | | | 0.025 |
| | *2.885* | *-0.125* | | | | | *1.800* | *3.141* | *-0.428* | | | | | *1.985* |
| 6 | 0.235 | 0.322 | | | | 0.576 | 0.028 | 0.476 | 0.118 | | | | 0.452 | 0.027 |
| | *1.006* | *1.100* | | | | *2.776* | *1.944* | *1.807* | *0.365* | | | | *1.824* | *2.125* |
| 6 | 0.615 | 0.065 | 0.052 | 0.068 | 0.402 | | 0.019 | 0.595 | 0.119 | -0.139 | 0.004 | 0.372 | | 0.013 |
| | *2.062* | *0.185* | *0.272* | *0.398* | *0.722* | | *1.444* | *1.987* | *0.331* | *-0.734* | *0.021* | *0.645* | | *1.145* |
| 6 | 0.268 | 0.340 | 0.031 | 0.020 | 0.134 | 0.541 | 0.024 | 0.376 | 0.273 | -0.118 | -0.051 | 0.173 | 0.491 | 0.016 |
| | *0.910* | *0.966* | *0.158* | *0.120* | *0.241* | *2.622* | *1.855* | *1.208* | *0.738* | *-0.631* | *-0.292* | *0.294* | *1.985* | *1.384* |
| 9 | 0.534 | 0.101 | | | | | 0.033 | 0.697 | -0.012 | | | | | 0.024 |
| | *2.298* | *0.347* | | | | | *2.355* | *2.806* | *-0.038* | | | | | *1.978* |
| 9 | -0.010 | 0.562 | | | | 0.654 | 0.029 | 0.389 | 0.239 | | | | 0.427 | 0.024 |
| | *-0.041* | *1.856* | | | | *3.120* | *1.994* | *1.474* | *0.733* | | | | *1.760* | *1.931* |
| 9 | 0.517 | 0.150 | 0.120 | -0.054 | 0.461 | | 0.034 | 0.526 | 0.212 | -0.106 | -0.080 | 0.338 | | 0.022 |
| | *1.762* | *0.433* | *0.641* | *-0.327* | *0.832* | | *2.606* | *1.777* | *0.597* | *-0.562* | *-0.462* | *0.582* | | *1.952* |
| 9 | 0.072 | 0.531 | 0.132 | -0.140 | 0.254 | 0.559 | 0.028 | 0.306 | 0.376 | -0.080 | -0.145 | 0.205 | 0.427 | 0.021 |
| | *0.242* | *1.509* | *0.706* | *-0.850* | *0.461* | *2.699* | *2.153* | *0.989* | *1.026* | *-0.425* | *-0.830* | *0.348* | *1.762* | *1.871* |
| 12 | 0.643 | -0.084 | | | | | 0.045 | 0.691 | -0.052 | | | | | 0.044 |
| | *2.733* | *-0.289* | | | | | *3.213* | *2.783* | *-0.169* | | | | | *3.629* |
| 12 | 0.206 | 0.292 | | | | 0.531 | 0.044 | 0.414 | 0.180 | | | | 0.381 | 0.047 |
| | *0.863* | *1.002* | | | | *2.585* | *3.058* | *1.596* | *0.563* | | | | *1.593* | *3.813* |
| 12 | 0.451 | 0.210 | -0.039 | -0.087 | 0.500 | | 0.038 | 0.412 | 0.319 | -0.157 | -0.083 | 0.530 | | 0.035 |
| | *1.509* | *0.603* | *-0.205* | *-0.526* | *0.905* | | *3.005* | *1.382* | *0.895* | *-0.806* | *-0.484* | *0.922* | | *3.091* |
| 12 | 0.057 | 0.546 | -0.062 | -0.164 | 0.132 | 0.560 | 0.038 | 0.226 | 0.455 | -0.119 | -0.140 | 0.312 | 0.434 | 0.036 |
| | *0.193* | *1.590* | *-0.324* | *-0.989* | *0.240* | *2.722* | *2.935* | *0.740* | *1.257* | *-0.622* | *-0.804* | *0.536* | *1.805* | *3.306* |

**Panel C** reports the narrow boycott risk premium after controlling for industry concentration (the industry's Herfindahl Index, HHI) and lagged 6-month industry momentum (IM_6). The risk premiums are estimated by Black-Jensen-Scholes cross-sectional regressions with boycott factor loadings estimated from the sample period 1999.01-2012.12. The left (right) panel reports the risk premiums based on the FF30 (FF48) industry portfolios as test assets. Constants are omitted because they do not have the usual interpretation when the right-hand-side variables are not all tradable assets. The *t*-statistics are in italics.

| **FF30 1999-2012** | | | | | | | **FF48 1999-2012** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MKT | SMB | HML | UMD | BCTn | HHI | IM_6 | MKT | SMB | HML | UMD | BCTn | HHI | IM_6 |
| 0.121 | | | | | 1.421 | | 0.129 | | | | | 0.740 | |
| *0.257* | | | | | *1.728* | | *0.286* | | | | | *1.519* | |
| 0.653 | | | | 1.513 | -0.861 | | 0.510 | | | | 1.176 | 0.377 | |
| *1.208* | | | | *2.104* | *-0.808* | | *1.088* | | | | *2.097* | *0.802* | |
| 0.220 | 0.480 | 0.284 | 1.808 | | 1.297 | | 0.406 | 0.219 | 0.244 | 1.488 | | 0.744 | |
| *0.429* | *1.011* | *0.838* | *1.603* | | *1.683* | | *0.870* | *0.573* | *0.738* | *1.510* | | *1.696* | |
| 0.534 | 0.161 | 0.283 | 0.889 | 1.015 | 0.107 | | 0.551 | 0.147 | 0.201 | 0.897 | 0.980 | 0.576 | |
| *1.031* | *0.343* | *0.834* | *0.844* | *1.819* | *0.146* | | *1.165* | *0.390* | *0.604* | *0.978* | *2.032* | *1.304* | |
| 0.026 | | | | | 1.416 | 0.044 | 0.031 | | | | | 0.642 | 0.034 |
| *0.057* | | | | | *1.774* | *1.503* | *0.071* | | | | | *1.354* | *1.438* |
| 0.483 | | | | 1.424 | -0.631 | 0.043 | 0.358 | | | | 1.193 | 0.317 | 0.034 |
| *0.941* | | | | *2.000* | *-0.630* | *1.733* | *0.782* | | | | *2.083* | *0.680* | *1.516* |
| 0.136 | 0.410 | 0.390 | 1.719 | | 1.146 | 0.025 | 0.269 | 0.227 | 0.268 | 1.424 | | 0.575 | 0.021 |
| *0.266* | *0.845* | *1.067* | *1.530* | | *1.499* | *1.107* | *0.577* | *0.595* | *0.797* | *1.463* | | *1.294* | *1.179* |
| 0.396 | 0.225 | 0.384 | 1.090 | 0.978 | 0.215 | 0.027 | 0.398 | 0.187 | 0.233 | 0.868 | 1.051 | 0.401 | 0.021 |
| *0.772* | *0.457* | *1.061* | *1.031* | *1.700* | *0.286* | *1.237* | *0.840* | *0.492* | *0.693* | *0.952* | *2.104* | *0.909* | *1.169* |

**Panel D.** reports the narrow boycott risk premium after controlling for industry concentration (the industry's Herfindahl Index, HHI) and lagged 6-month industry momentum (IM_6). The risk premiums are estimated by Black-Jensen-Scholes cross-sectional regressions with boycott factor loadings estimated from the sample period during 1963.01-2012.12 for FF30 (left panel) and 1969.07-2012.12 for FF48 (right panel). Constants are omitted because they do not have the usual interpretation when the right-hand-side variables are not all tradable assets. The *t*-statistics are in italics.

| **FF30 1963-2012** | | | | | | | **FF48 1969-2012** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MKT | SMB | HML | UMD | BCTn | HHI | IM_6 | MKT | SMB | HML | UMD | BCTn | HHI | IM_6 |
| -0.028 | | | | | 0.808 | | -0.108 | | | | | 0.230 | |
| *-0.095* | | | | | *2.374* | | *-0.337* | | | | | *0.962* | |
| 0.348 | | | | 0.518 | 0.060 | | 0.095 | | | | 0.458 | 0.089 | |
| *1.114* | | | | *2.105* | *0.155* | | *0.290* | | | | *1.861* | *0.369* | |
| 0.036 | 0.056 | -0.078 | 0.482 | | 0.853 | | 0.188 | -0.276 | -0.039 | 0.337 | | 0.321 | |
| *0.100* | *0.293* | *-0.459* | *0.821* | | *2.500* | | *0.516* | *-1.420* | *-0.220* | *0.575* | | *1.415* | |
| 0.343 | 0.048 | -0.106 | 0.223 | 0.458 | 0.176 | | 0.363 | -0.249 | -0.088 | 0.154 | 0.480 | 0.212 | |
| *0.943* | *0.249* | *-0.627* | *0.384* | *1.957* | *0.489* | | *0.971* | *-1.300* | *-0.497* | *0.258* | *1.925* | *0.909* | |
| -0.069 | | | | | 0.698 | 0.023 | -0.206 | | | | | 0.178 | 0.026 |
| *-0.237* | | | | | *2.052* | *1.600* | *-0.670* | | | | | *0.770* | *2.036* |
| 0.336 | | | | 0.618 | -0.147 | 0.026 | 0.041 | | | | 0.458 | 0.066 | 0.028 |
| *1.113* | | | | *2.462* | *-0.383* | *1.783* | *0.129* | | | | *1.808* | *0.276* | *2.194* |
| 0.030 | 0.033 | 0.034 | 0.401 | | 0.685 | 0.015 | 0.126 | -0.223 | 0.017 | 0.337 | | 0.263 | 0.015 |
| *0.085* | *0.169* | *0.196* | *0.712* | | *2.017* | *1.145* | *0.348* | *-1.170* | *0.099* | *0.587* | | *1.157* | *1.357* |
| 0.326 | 0.035 | 0.019 | 0.130 | 0.558 | -0.065 | 0.022 | 0.261 | -0.198 | -0.020 | 0.155 | 0.487 | 0.156 | 0.018 |
| *0.907* | *0.179* | *0.111* | *0.234* | *2.311* | *-0.178* | *1.664* | *0.705* | *-1.050* | *-0.111* | *0.267* | *1.925* | *0.665* | *1.600* |

# Table 9 Alternative Explanations

The risk premiums are provided for the narrow (upper panel) and broad (bottom panel) boycott factors, in model variants with the FF4 (Carhart) factors and the Pastor-Stambaugh systematic liquidity factor (SLQ) together with the premiums attributed to industry characteristics: litigation (LTG), neglect (NGL), and idiosyncratic liquidity (ILQ). The estimates are generated from Black-Jensen-Scholes cross-sectional regressions with factor loadings estimated from time-series regressions for the 1999.01 - 2012.12 period. $R^2$ is the adjusted R-squared for the cross-sectional fit between predicted and realized mean returns. Constants are omitted because the variables are not all tradable assets. The *t*-statistics are in italics.

| | **FF30** | | | | **1999-2012** | | | | | | **FF48** | | | | **1999-2012** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | UMD | BCTn | LTG | NGL | ILQ | SLQ | $R^2$ | MKT | SMB | HML | UMD | BCTn | LTG | NGL | ILQ | SLQ | $R^2$ |
| RP | 0.065 | | | | | 5.483 | | | | 0.083 | 0.087 | | | | | 4.297 | | | | 0.096 |
| *t-stat* | *0.139* | | | | | *2.053* | | | | | *0.192* | | | | | *2.030* | | | | |
| RP | 0.573 | | | | 1.291 | 0.704 | | | | 0.463 | 0.470 | | | | 1.358 | 1.967 | | | | 0.412 |
| *t-stat* | *1.095* | | | | *2.135* | *0.321* | | | | | *1.004* | | | | *2.272* | *1.016* | | | | |
| RP | 0.142 | | | | | | -0.177 | | | 0.153 | 0.107 | | | | | | -0.128 | | | 0.091 |
| *t-stat* | *0.302* | | | | | | *-1.992* | | | | *0.236* | | | | | | *-1.880* | | | |
| RP | 0.607 | | | | 1.375 | | 0.014 | | | 0.462 | 0.549 | | | | 1.347 | | -0.016 | | | 0.441 |
| *t-stat* | *1.180* | | | | *2.184* | | *0.195* | | | | *1.022* | | | | *2.191* | | *-0.288* | | | |
| RP | 0.102 | | | | | | | -0.306 | | 0.024 | 0.098 | | | | | | | -0.216 | | 0.033 |
| *t-stat* | *0.218* | | | | | | | *-1.180* | | | *0.217* | | | | | | | *-1.258* | | |
| RP | 0.575 | | | | 1.288 | | | -0.084 | | 0.467 | 0.559 | | | | 1.358 | | | -0.025 | | 0.439 |
| *t-stat* | *1.140* | | | | *2.291* | | | *-0.360* | | | *1.080* | | | | *2.483* | | | *-0.103* | | |
| RP | -0.156 | | | | | | | | 1.453 | 0.560 | -0.119 | | | | | | | | 1.314 | 0.444 |
| *t-stat* | *-0.333* | | | | | | | | *1.933* | | *-0.261* | | | | | | | | *1.902* | |
| RP | 0.239 | | | | 0.957 | | | | 1.146 | 0.759 | 0.237 | | | | 0.942 | | | | 1.064 | 0.638 |
| *t-stat* | *0.510* | | | | *1.959* | | | | *1.612* | | *0.532* | | | | *1.856* | | | | *1.598* | |
| RP | -0.142 | | | | | 2.693 | -0.066 | 0.025 | 1.332 | 0.604 | -0.036 | | | | | 2.453 | -0.082 | -0.047 | 1.132 | 0.551 |
| *t-stat* | *-0.301* | | | | | *1.168* | *-0.850* | *0.114* | *1.805* | | *-0.078* | | | | | *1.059* | *-1.070* | *-0.283* | *1.674* | |
| RP | 0.238 | | | | 1.041 | 1.519 | 0.044 | 0.119 | 1.221 | 0.747 | 0.203 | | | | 0.765 | 1.823 | -0.032 | -0.012 | 1.033 | 0.650 |
| *t-stat* | *0.505* | | | | *1.970* | *0.651* | *0.649* | *0.561* | *1.693* | | *0.459* | | | | *1.488* | *0.809* | *-0.427* | *-0.070* | *1.568* | |
| RP | -0.216 | 0.418 | 0.139 | 0.746 | | 3.382 | -0.024 | 0.058 | 1.067 | 0.604 | 0.145 | 0.021 | 0.151 | 0.564 | | 2.201 | -0.074 | -0.052 | 0.840 | 0.570 |
| *t-stat* | *-0.425* | *0.860* | *0.423* | *0.796* | | *1.378* | *-0.378* | *0.310* | *1.666* | | *0.330* | *0.056* | *0.456* | *0.669* | | *0.990* | *-1.080* | *-0.367* | *1.384* | |
| RP | 0.139 | 0.141 | 0.028 | -0.065 | 1.052 | 1.587 | 0.047 | 0.194 | 1.319 | 0.733 | 0.241 | 0.077 | 0.078 | 0.330 | 0.781 | 2.057 | -0.031 | 0.026 | 0.903 | 0.643 |
| *t-stat* | *0.280* | *0.297* | *0.083* | *-0.074* | *2.026* | *0.664* | *0.745* | *1.098* | *2.054* | | *0.552* | *0.200* | *0.235* | *0.399* | *1.591* | *0.927* | *-0.427* | *0.179* | *1.478* | |
| | MKT | SMB | HML | UMD | BCTb | LTG | NGL | ILQ | SLQ | $R^2$ | MKT | SMB | HML | UMD | BCTb | LTG | NGL | ILQ | SLQ | $R^2$ |
| RP | 0.001 | | | | 0.835 | 2.172 | -0.001 | 0.070 | 0.803 | *0.707* | 0.114 | | | | 0.817 | 1.657 | -0.025 | -0.031 | 0.651 | 0.679 |
| *t-stat* | *0.002* | | | | *1.893* | *0.938* | *-0.012* | *0.325* | *1.156* | | *0.257* | | | | *1.746* | *0.724* | *-0.363* | *-0.184* | *1.008* | |
| RP | -0.230 | 0.144 | -0.083 | -0.328 | 1.006 | 2.033 | 0.009 | 0.186 | 0.830 | *0.723* | 0.082 | -0.095 | 0.027 | -0.180 | 0.979 | 1.705 | -0.029 | 0.027 | 0.533 | 0.683 |
| *t-stat* | *-0.453* | *0.296* | *-0.244* | *-0.358* | *2.298* | *0.852* | *0.153* | *1.056* | *1.257* | | *0.186* | *-0.247* | *0.079* | *-0.218* | *2.168* | *0.758* | *-0.449* | *0.199* | *0.883* | |

## Table 10 Excess Returns of Portfolios Sorted by Boycott Factor Loadings

**Panel A.** Starting with all NYSE/AMEX/NASDQ stocks we remove all stocks that have any sin characteristics: all stocks that, either by SIC or NAICS code, are classified in any one of the eight screens listed in Table 3, as well as the industry classifications of the stocks that were at any point in time included in the Vice Fund. The remaining stocks are sorted based on their boycott factor loadings. The boycott loadings are obtained by regressing the individual non-sin stock returns on the FF3 factors plus the narrowly defined boycott factor or on the FF4 factors plus the narrowly defined boycott factor for the period 1999.01-2012.12. All non-sin stocks are assigned to five portfolio in order of these boycott factor loadings. Similarly, all sin stocks from the (narrow) boycott factor are assigned to five portfolios by their boycott factor loadings. The numbers provided are boycott betas based on either the augmented FF3 or augmented FF4 model (BCT β) and the equal-weighted average monthly excess returns of each portfolio (FF3 or FF4).

| **BCT Loading Ranked** | **Sin Stocks** | | | | **Non-Sin Stocks** | | | |
|---|---|---|---|---|---|---|---|---|
| | BCT β | FF3 | BCT β | FF4 | BCT β | FF3 | BCT β | FF4 |
| Average | 0.569 | 1.074 | 0.602 | 1.108 | -0.058 | 0.840 | -0.054 | 0.833 |
| 1 (Least) | -0.676 | 0.904 | -0.585 | 1.132 | -1.042 | 0.515 | -1.041 | 0.405 |
| 2 | 0.031 | 0.761 | 0.082 | 0.877 | -0.233 | 0.822 | -0.231 | 0.815 |
| 3 | 0.300 | 0.998 | 0.302 | 0.827 | -0.007 | 0.949 | -0.006 | 0.994 |
| 4 | 0.848 | 1.291 | 0.851 | 1.291 | 0.191 | 0.972 | 0.188 | 0.963 |
| 5 (Most) | 2.341 | 1.415 | 2.361 | 1.415 | 0.800 | 0.943 | 0.819 | 0.986 |
| 5-1 | 3.017 | 0.511 | 2.946 | 0.283 | 1.842 | 0.428 | 1.860 | 0.581 |

**Panel B.** The risk-adjusted return of a zero-investment strategy utilizing only non-sin stocks (using the criteria described in Panel A) is obtained based on equation (7). The time-series regression result is reported. The dependent variable is the return on an equal-weighted portfolio that longs the most boycott-sensitive and shorts the least boycott-sensitive non-sin stocks.

| | Estimate | *t-stat* | Estimate | *t-stat* |
|---|---|---|---|---|
| Alpha | 0.445 | 1.626 | 0.420 | 1.596 |
| MKT | -0.169 | -2.825 | -0.056 | -0.900 |
| SMB | -0.272 | -3.390 | -0.271 | -3.463 |
| HML | 0.009 | 0.114 | 0.090 | 1.155 |
| UMD | | | 0.130 | 2.768 |

# Table 11 Boycott Loadings and Payoffs

This table shows the relationship between industry portfolios' estimated boycott factor loadings $\hat{\beta}_{iB}$ and their estimated earning sensitivities $\hat{b}_{iB}$ to the aggregate earnings of boycotted industries: $\hat{\beta}_{iB} = \gamma_0 + \gamma_1 \hat{b}_{iB} + \gamma_2 C_i + \eta_i$, where $C_i$ controls for any industry-specific characteristics. The $\hat{\beta}_{iB}$ and $\hat{b}_{iB}$ are listed in Table 6. The control variables are litigation (LTG), neglect (NGL), idiosyncratic liquidity (ILQ), the Pastor-Stambaugh systematic liquidity factor (SLQ), and the Herfindahl index based on sales (HHI).

| | **FF30** | | | **1999-2012** | | | | **FF48** | | | **1999-2012** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\hat{\beta}_{iB}$ | LTG | NGL | ILQ | SLQ | HHI | $\hat{b}_{iB}$ | $R^2$ | LTG | NGL | ILQ | SLQ | HHI | $\hat{b}_{iB}$ | $R^2$ |
| estim | 3.179 | | | | | | 0.090 | 2.266 | | | | | | 0.072 |
| *t-stat* | *1.963* | | | | | | | *2.162* | | | | | | |
| estim | | -0.146 | | | | | 0.334 | | -0.104 | | | | | 0.217 |
| *t-stat* | | *-3.940* | | | | | | | *-3.740* | | | | | |
| estim | | | -0.163 | | | | 0.027 | | | -0.106 | | | | 0.023 |
| *t-stat* | | | *-1.350* | | | | | | | *-1.440* | | | | |
| estim | | | | 0.217 | | | 0.002 | | | | 0.169 | | | -0.001 |
| *t-stat* | | | | *1.025* | | | | | | | *0.978* | | | |
| estim | | | | | 1.555 | | 0.223 | | | | | 0.494 | | 0.065 |
| *t-stat* | | | | | *3.053* | | | | | | | *2.062* | | |
| estim | | | | | | 0.294 | 0.564 | | | | | | 0.283 | 0.437 |
| *t-stat* | | | | | | *6.210* | | | | | | | *6.127* | |
| estim | 0.301 | -0.116 | -0.141 | -0.008 | 0.395 | | 0.286 | 0.717 | -0.117 | -0.117 | -0.054 | -0.178 | | 0.217 |
| *t-stat* | *0.181* | *-1.650* | *-1.230* | *-0.037* | *0.469* | | | *0.617* | *-2.950* | *-1.600* | *-0.316* | *-0.560* | | |
| estim | -0.356 | -0.092 | 0.079 | 0.306 | -0.596 | 0.312 | 0.687 | 0.497 | -0.072 | -0.009 | 0.130 | -0.168 | 0.249 | 0.503 |
| *t-stat* | *-0.320* | *-1.970* | *0.919* | *1.979* | *-1.020* | *5.625* | | *0.535* | *-2.190* | *-0.147* | *0.927* | *-0.663* | *5.014* | |

| | **FF30** | | | **1963-2012** | | | | **FF48** | | | **1969-2012** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\hat{\beta}_{iB}$ | LTG | NGL | ILQ | SLQ | HHI | $\hat{b}_{iB}$ | $R^2$ | LTG | NGL | ILQ | SLQ | HHI | $\hat{b}_{iB}$ | $R^2$ |
| estim | 3.074 | | | | | | 0.102 | 2.072 | | | | | | 0.078 |
| *t-stat* | *2.073* | | | | | | | *2.233* | | | | | | |
| estim | | -0.119 | | | | | 0.253 | | -0.075 | | | | | 0.135 |
| *t-stat* | | *-3.290* | | | | | | | *-2.890* | | | | | |
| estim | | | -0.124 | | | | 0.007 | | | -0.079 | | | | 0.009 |
| *t-stat* | | | *-1.100* | | | | | | | *-1.190* | | | | |
| estim | | | | -0.024 | | | -0.035 | | | | -0.041 | | | -0.020 |
| *t-stat* | | | | *-0.119* | | | | | | | *-0.267* | | | |
| estim | | | | | 1.432 | | 0.222 | | | | | 0.392 | | 0.047 |
| *t-stat* | | | | | *3.048* | | | | | | | *1.826* | | |
| estim | | | | | | 0.395 | 0.815 | | | | | | 0.386 | 0.700 |
| *t-stat* | | | | | | *11.340* | | | | | | | *10.520* | |
| estim | 0.927 | -0.098 | -0.142 | -0.244 | 0.327 | | 0.250 | 1.055 | -0.094 | -0.098 | -0.231 | -0.215 | | 0.161 |
| *t-stat* | *0.588* | *-1.480* | *-1.310* | *-1.190* | *0.411* | | | *0.986* | *-2.570* | *-1.460* | *-1.480* | *-0.738* | | |
| estim | -0.282 | -0.069 | 0.067 | -0.137 | -0.847 | 0.426 | 0.835 | 0.396 | -0.038 | 0.015 | -0.168 | -0.211 | 0.374 | 0.707 |
| *t-stat* | *-0.376* | *-2.220* | *1.207* | *-1.420* | *-2.150* | *9.289* | | *0.622* | *-1.710* | *0.353* | *-1.810* | *-1.220* | *8.909* | |

# Table 12 Determinants of the Boycott Risk Premium

The dependent variable is the boycott risk premium obtained from monthly BJS (constant beta) cross-sectional regressions of the FF30 industry portfolio excess returns on the narrow boycott factor loadings. This monthly boycott risk premium is compounded to quarterly holding period returns. MKT, SMB, HML, and UMD are the four monthly Carhart (1997) factors compounded into quarterly frequency. YMP is the log difference between current seasonally adjusted real GDP and current real Potential GDP, both obtained from the St. Louis Federal Reserve Economic Database, lagged by one quarter. ΔYMP is the future real GDP growth rate, defined as the log difference between four-quarter ahead real GDP and current real GDP. RWR is the restricted wealth ratio lagged by two quarters (one required reporting period). ΔRWR is the difference in the restricted wealth ratio between current and two quarters ago. The last column reports the adjusted R-squares. The *t*-statistics are in italics.

| BCTn | MKT | SMB | HML | UMD | RWR | YMP | ΔRWR | ΔYMP | $R^2$ |
|---|---|---|---|---|---|---|---|---|---|
| estim | | | | | 0.212 | | | | 0.052 |
| *t-stat* | | | | | *2.836* | | | | |
| estim | | | | | | 0.719 | | | 0.021 |
| *t-stat* | | | | | | *1.945* | | | |
| estim | | | | | 0.193 | 0.600 | | | 0.064 |
| *t-stat* | | | | | *2.566* | *1.630* | | | |
| estim | | | | | 0.178 | 0.474 | -0.087 | -0.902 | 0.093 |
| *t-stat* | | | | | *2.354* | *1.283* | *-0.991* | *-1.940* | |
| estim | 0.053 | -0.186 | 0.585 | -0.037 | | | | | 0.099 |
| *t-stat* | *0.441* | *-0.890* | *3.709* | *-0.312* | | | | | |
| estim | 0.059 | -0.207 | 0.586 | -0.001 | 0.207 | | | | 0.151 |
| *t-stat* | *0.499* | *-1.010* | *3.805* | *-0.011* | *2.895* | | | | |
| estim | 0.052 | -0.132 | 0.574 | -0.073 | | 0.694 | | | 0.118 |
| *t-stat* | *0.435* | *-0.634* | *3.672* | *-0.615* | | *1.915* | | | |
| estim | 0.055 | -0.165 | 0.576 | -0.033 | 0.187 | 0.544 | | | 0.160 |
| *t-stat* | *0.468* | *-0.807* | *3.752* | *-0.284* | *2.589* | *1.506* | | | |
| estim | 0.161 | -0.270 | 0.608 | -0.056 | 0.174 | 0.449 | -0.052 | -1.040 | 0.195 |
| *t-stat* | *1.295* | *-1.290* | *3.912* | *-0.482* | *2.414* | *1.243* | *-0.615* | *-2.250* | |

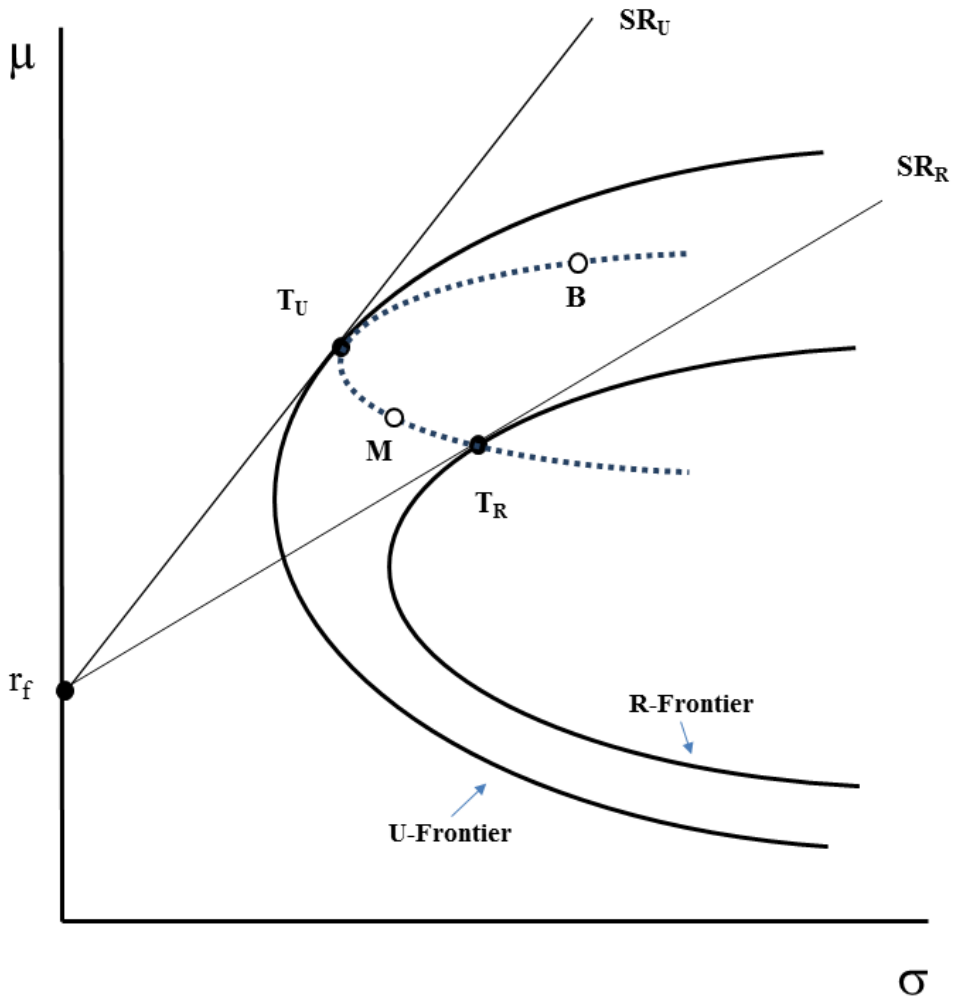


**Figure 1**
The Boycott and Market Factors

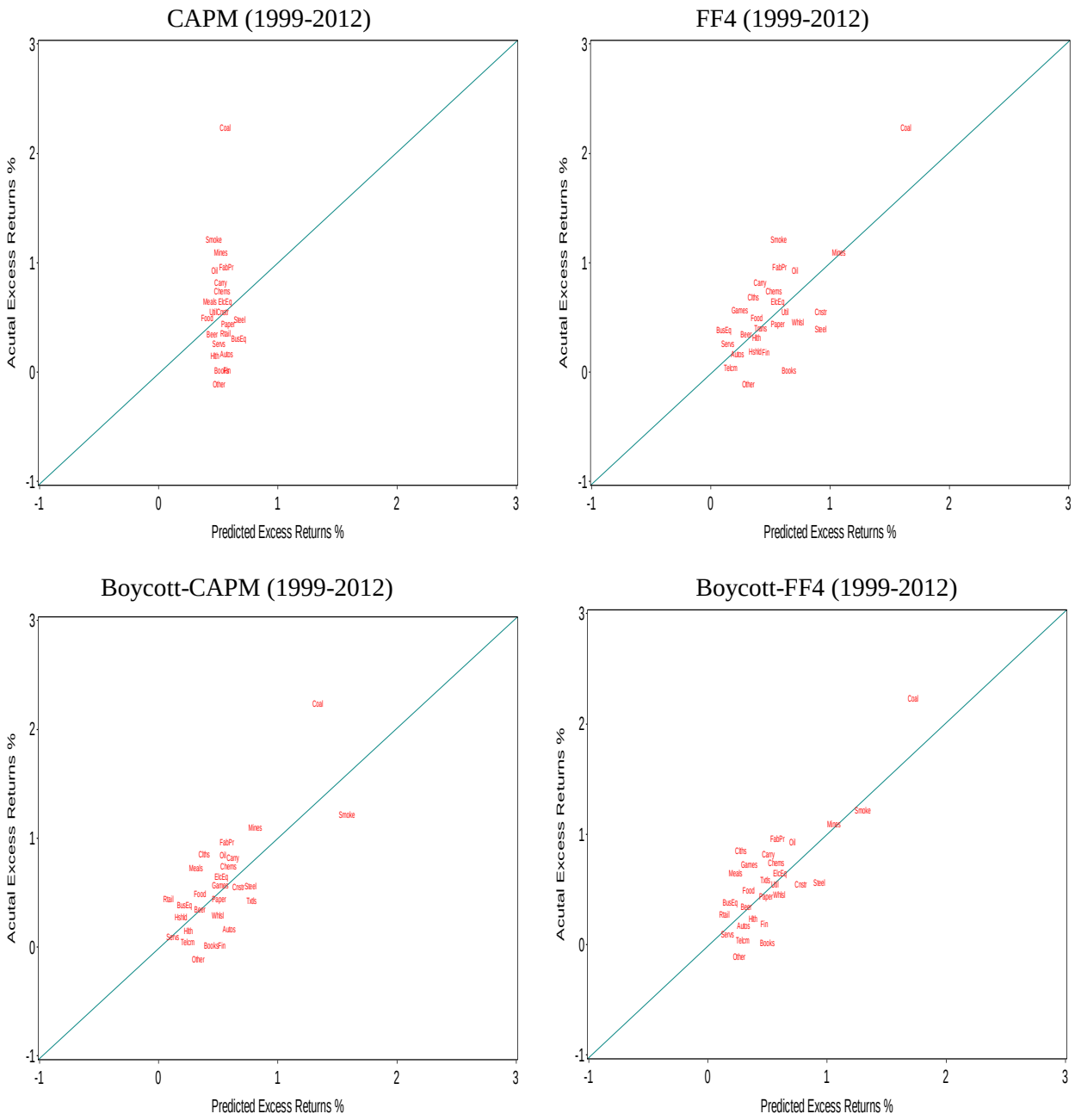
CAPM (1999-2012)
FF4 (1999-2012)
Boycott-CAPM (1999-2012)
Boycott-FF4 (1999-2012)
Acutal Excess Returns %
Predicted Excess Returns %

**Figure 2**

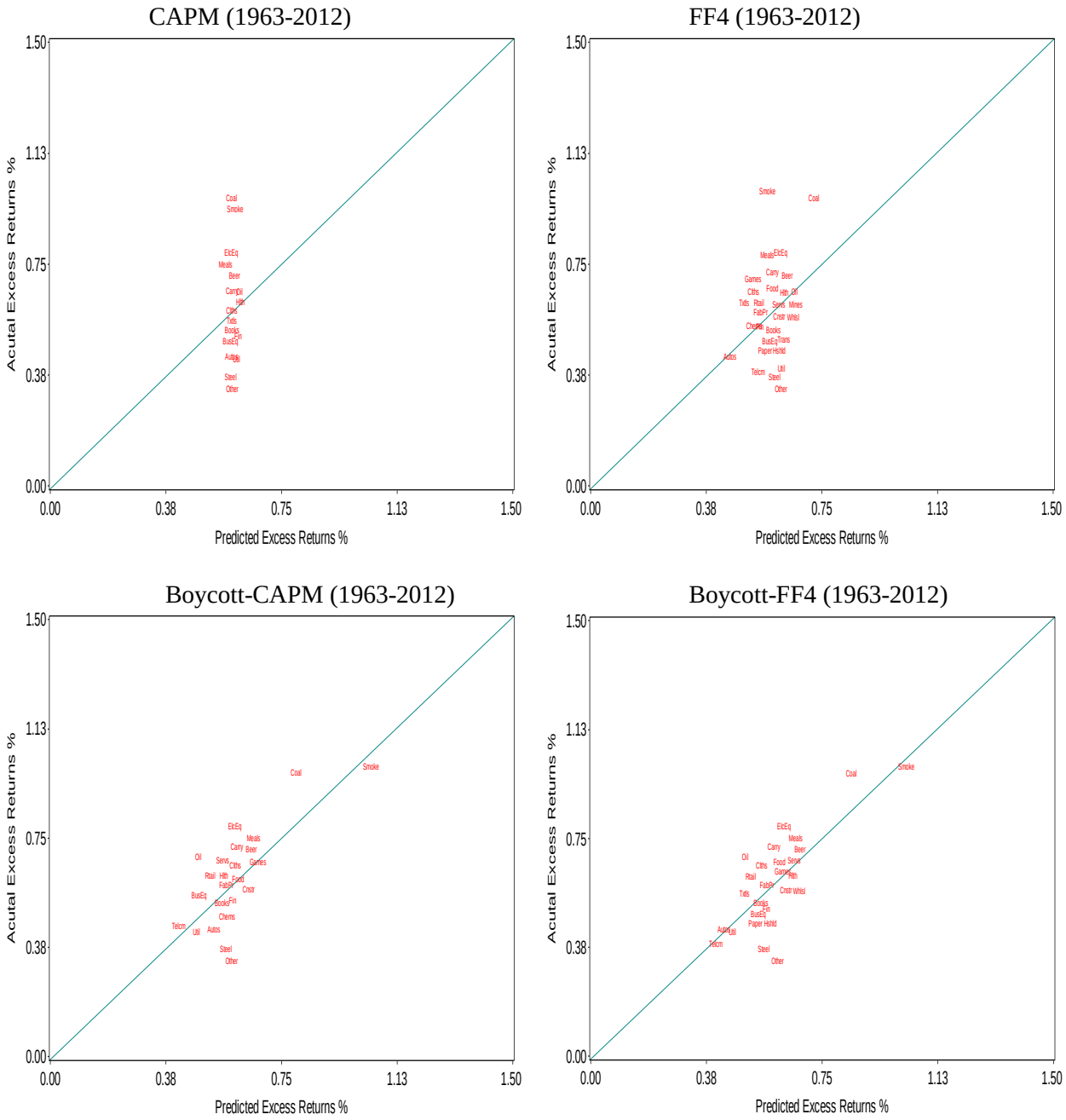
CAPM (1963-2012)
FF4 (1963-2012)
Boycott-CAPM (1963-2012)
Boycott-FF4 (1963-2012)
Acutal Excess Returns %
Predicted Excess Returns %
0.00
0.38
0.75
1.13
1.50

**Figure 3**


**Figure 4 Boycott risk premium and boycott intensity**

This figure shows the one-year moving average of the restricted wealth ratio, *RWR* (dotted black) lagged by two quarters and the one-year moving average of the quarterly boycott risk premium, *BCT* (in solid red) obtained from monthly BJS cross-sectional regressions of the FF30 industry portfolio excess returns on the boycott factor loadings. Shaded areas are NBER-defined recession periods. The left vertical axis is the boycott risk premium scale in percentage terms and the right vertical axis is the restricted wealth ratio scale in percentage terms. *RWR* has a mean value of 44.69% and a standard deviation of 12.25%. BCT has a mean value (annual) of 9.19% and a standard deviation of 17.36%. The correlation coefficient between these two series is 0.363 with $p < 0.0001$.