# Return Cross-Predictability in Firms with Similar Employee Satisfaction

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# Employee Satisfaction benefits firms!

According to the human relations theory, employee satisfaction could benefit firms via the following two non-mutually exclusive channels: motivation and retention.

- Motivation: employees are afraid to lose jobs they are satisfied with (Shapiro and Stiglitz, 1984), employee sanitization can motivate effort (Akerlof and Yellen, 1986).
- Retention: the firms associated with a high level of employee satisfaction tend to be more attractive for talented workforce. As the competition for talents is not limited to the rivals within the same industry, a high level of employee satisfaction becomes a universal firm advantage.

# Employee satisfaction increases firm value (benefits > costs)!!

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- Traditionally, employees are treated as a homogeneous and low-skilled labor force (Taylor, 1991). Hence, improvement of employee satisfaction comes at the cost of firm profits.
- However, the revolution of firms and the market over the past century has dramatically changed the role of human capital in firm performance. Employee satisfaction is found to be positively correlated with future firm value and stock returns

  ** Edmans, 2011; Edmans et al, 2017; Green et al. (2019)

# Motivation: Spillover Effects

Firms will learn from each others on good policies of employee satisfaction in order to increase firm value (via retain/attract talents, motivate employees);

- Firms frequently learn from and interact with each other, which leads to consistent knowledge spillovers among firms (Jaffe et al., 1993).

Therefore, good policies of employee satisfaction adopted by one firm will have spill over effects on the rest firms with similar employee satisfaction

-- firms with too different employee satisfaction hard to learn/adopt

Returns of peer firms with SES (+) predict focal firm returns if the spillover effect not incorporate into price fully due to limited attention

# Different from other peer connections:

- Other studies mainly focused on clear or contractual links among firms

  - Cohen and Frazzini (2008, JF) – economic links

  - Cohen and Lou (2012, JFE) – industry information links

  - Cao et al. (2016, JFQA) – alliances links

  - Lee et al. (2018, JFE) – technological links

- In contrast, the link investigated in our study is implicit and less transparent. We focus on the connections among firms with similar employee satisfaction

# Data and Sample

- Stock price, volume, and return data of US firms are collected from CRSP and accounting information from Compustat. For non-US firms, we collect price, volume, and return data from Thomson Reuters Eikon and accounting information from Worldscope.

- We obtain time-varying Glassdoor ratings of top 1000 employee satisfaction ratings' listed firms (financial firms excluded) where are headquartered and primarily listed in the US market at the end of June each year, from 2009 to 2017.

- Institutional ownership data and analyst coverage for all firms in the sample are obtained from Thomson Reuters Institutional Holdings (13F) and Thomson Reuters I/B/E/S, respectively. The sample period is from January 2010 to December 2018 with a total of 108 months.

# Predictors

- For each firm, we use 20 neighbor firms before and after the firm to construct firm peer predictor.
  - Proximity-weighted:

$$SES_{i,t-1} = \sum_{j \neq i} \frac{PWP_{i,j,t-1}}{\sum_{j \neq i} PWP_{i,j,t-1}} \cdot Ret_{j,t-1}$$

  - Equally-weighted:

$$SES_{i,t-1} = \sum_{j \neq i} \frac{EWP_{i,j,t-1}}{\sum_{j \neq i} EWP_{i,j,t-1}} \cdot Ret_{j,t-1}$$

$R_{j,t-1}$ is the gross stock returns of firm $j$ in month $t-1$.

$PWP_{i,j,t-1}$ is the proximity-weighted peer closeness measure between firms $i$ and $j$ at $t-1$; it equals to the total number of neighbor firms minus the absolute value of ranking difference between firms $i$ and $j$.

$EWP_{i,j,t-1}$ is the equally-weighted peer closeness measure between firms $i$ and $j$ at $t-1$.

# Summary Statistics

Panel A: Sample coverage

| | Mean | StD | Min | Med | Max |
|---|---|---|---|---|---|
| % of total number of stocks covered | 0.24 | 0.03 | 0.23 | 0.25 | 0.27 |
| % of total market capitalization covered | 0.65 | 0.02 | 0.54 | 0.61 | 0.69 |
| % SES stocks in the same industry | 0.16 | 0.11 | 0.02 | 0.12 | 0.77 |
| % SES stocks in same U.S. state | 0.07 | 0.13 | 0.00 | 0.05 | 0.64 |

Panel B: Firm characteristics

| | Mean | StD | Min | Med | Max |
|---|---|---|---|---|---|
| Market capitalization ($ bln) | 5.29 | 9.40 | 0.65 | 4.33 | 47.62 |
| B/M | 0.78 | 1.16 | 0.04 | 0.52 | 5.17 |
| Asset growth | 0.23 | 0.43 | -0.73 | 0.21 | 0.99 |
| Gross profitability | 0.42 | 0.27 | -0.96 | 0.40 | 1.07 |
| Momemtum | 0.19 | 0.66 | -0.89 | 0.13 | 8.76 |

# Fundamental Linkages among SES peer firms

| | ΔEmployment | | ΔRevenue | | ΔProfit | |
|---|---|---|---|---|---|---|
| | $t$ | $t+1$ | $t$ | $t+1$ | $t$ | $t+1$ |
| Panel A: Market-adjusted growth | | | | | | |
| $SES\ \Delta Employment_t$ | 0.166*** | 0.038*** | | | | |
| | (10.55) | (2.79) | | | | |
| $SES\ \Delta Revenue_t$ | | | 0.129*** | 0.030*** | | |
| | | | (10.92) | (4.07) | | |
| $SES\ \Delta Profit_t$ | | | | | 0.034*** | 0.007*** |
| | | | | | (11.75) | (4.00) |
| $\Delta Employment_t$ | | 0.085*** | | | | |
| | | (4.98) | | | | |
| $\Delta Revenue_t$ | | | | 0.093*** | | |
| | | | | (8.22) | | |
| $\Delta Profit_t$ | | | | | | 0.018*** |
| | | | | | | (5.11) |
| Controls | Y | Y | Y | Y | Y | Y |
| Industry & Year FE | Y | Y | Y | Y | Y | Y |
| Obs. | 8,640 | 7,680 | 8,640 | 7,680 | 8,640 | 7,680 |
| $R^2$ | 0.16 | 0.05 | 0.14 | 0.05 | 0.13 | 0.04 |
| Panel B: Industry-adjusted growth | | | | | | |
| $SES\ \Delta Employment_t$ | 0.149*** | 0.034** | | | | |
| | (8.96) | (2.37) | | | | |
| $SES\ \Delta Revenue_t$ | | | 0.116*** | 0.027*** | | |
| | | | (9.28) | (3.46) | | |
| $SES\ \Delta Profit_t$ | | | | | 0.030*** | 0.006*** |
| | | | | | (9.98) | (3.41) |
| $\Delta Employment_t$ | | 0.076*** | | | | |
| | | (4.23) | | | | |
| $\Delta Revenue_t$ | | | | 0.084*** | | |
| | | | | (6.98) | | |
| $\Delta Profit_t$ | | | | | | 0.016*** |
| | | | | | | (4.34) |
| Controls | Y | Y | Y | Y | Y | Y |
| Obs. | 8,640 | 7,680 | 8,640 | 7,680 | 8,640 | 7,680 |
| $R^2$ | 0.14 | 0.04 | 0.12 | 0.04 | 0.11 | 0.03 |

# Abnormal returns/Univariate portfolio tests

Two predictors: proximity-weighted (PWP) and equally-weighted (EWP) SES peer firm returns. Quintile 1 (5) focal firms have lowest (highest) SES peer firm returns in the previous month. This table reports the results based on value-weighted (VW) and equally-weighted (EW) portfolio returns of focal firms in Quintile 1, 5, and 5-1 .

| | *ret* | | α_FF6 | | α_ind | |
|---|---|---|---|---|---|---|
| VW | EWP | PWP | EWP | PWP | EWP | PWP |
| 1 (Low) | -0.20 | -0.21 | -0.67 | -0.79 | -0.42 | -0.45 |
| 5 (High) | 0.82 | 0.96 | 0.49 | 0.56 | 0.67 | 0.80 |
| 5-1 | 1.02** | 1.17*** | 1.16*** | 1.35*** | 1.09*** | 1.25*** |
| | (2.43) | (2.70) | (2.69) | (3.03) | (2.72) | (2.98) |
| EW | | | | | | |
| 1 (Low) | -0.08 | -0.07 | -0.82 | -0.99 | -0.17 | -0.15 |
| 5 (High) | 1.27 | 1.49 | 0.70 | 0.80 | 1.07 | 1.27 |
| 5-1 | 1.35*** | 1.56*** | 1.53*** | 1.79*** | 1.24*** | 1.42*** |
| | (2.84) | (3.22) | (3.17) | (3.64) | (2.71) | (3.03) |

# Long-run cumulative excess returns

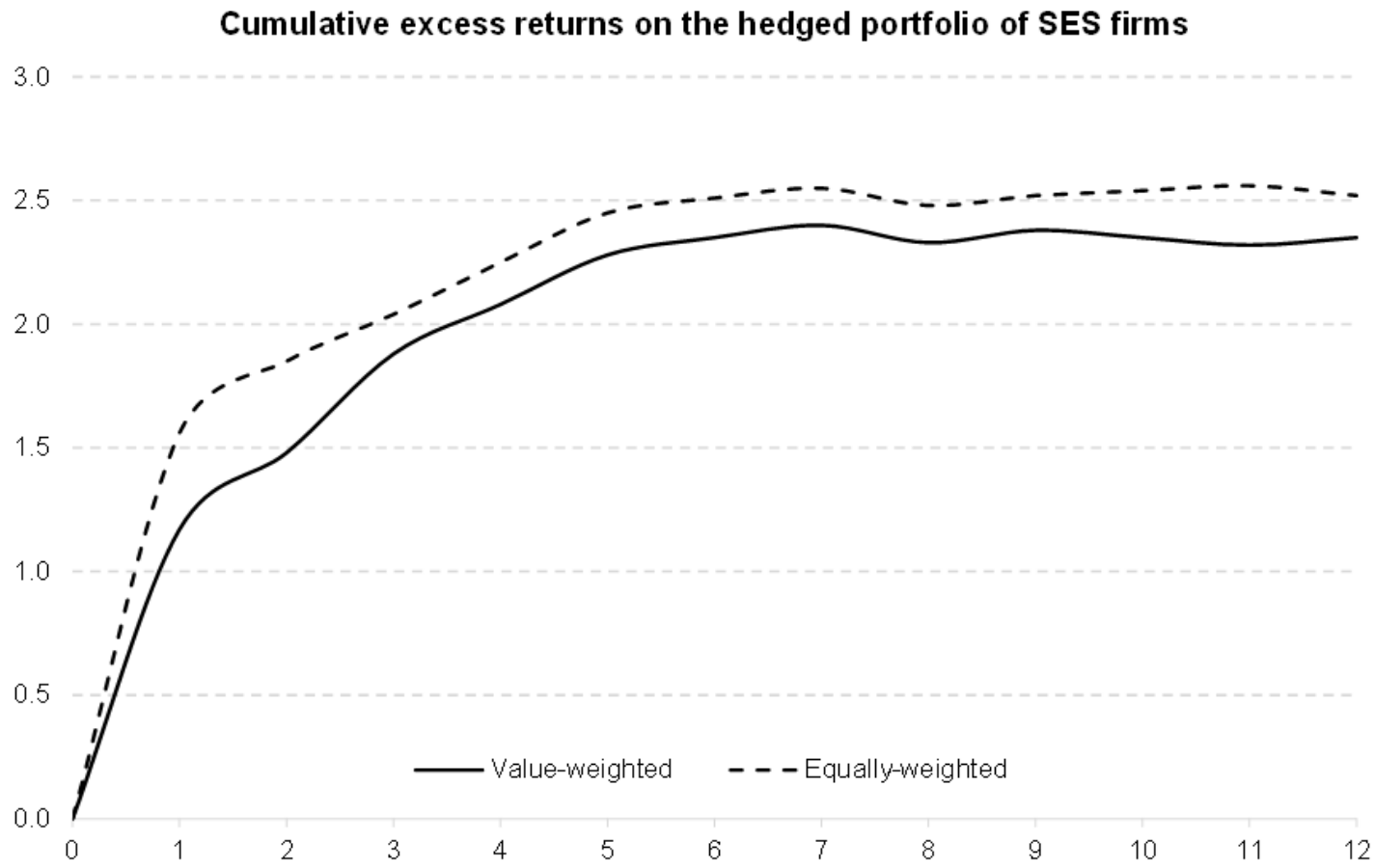


**Figure 1: Long-run cumulative excess returns**

This figure shows cumulative excess returns (CERs) of the hedged 5-1 portfolio in the twelve months after portfolio formation.

# Robustness Check: abnormal returns to FF6

Panel A: Different SES windows

| VW | (1) [-20,-1], [1,+20] | (2) [-40,-21], [+21,+40] | (3) [-60,-41], [+41,+60] | (4) [-80,-61], [+61,+80] | (5) [-100,-81], [+81,+100] |
|---|---|---|---|---|---|
| 1 (Low) | -0.79 | -0.67 | -0.55 | -0.43 | -0.32 |
| 5 (High) | 0.56 | 0.50 | 0.39 | 0.31 | 0.22 |
| 5-1 | 1.35*** | 1.17*** | 0.95** | 0.74* | 0.54 |
| | (3.03) | (2.60) | (2.12) | (1.69) | (1.21) |
| EW | | | | | |
| 1 (Low) | -0.99 | -0.84 | -0.69 | -0.54 | -0.40 |
| 5 (High) | 0.80 | 0.70 | 0.56 | 0.44 | 0.32 |
| 5-1 | 1.79*** | 1.54*** | 1.25** | 0.98** | 0.72 |
| | (3.64) | (3.09) | (2.55) | (2.00) | (1.46) |

Panel B: Different SES sub-ratings

| VW | (1) Culture & Values | (2) Work/Life Balance | (3) Senior Management | (4) Comp & Benefits | (5) Career Opportunities |
|---|---|---|---|---|---|
| 1 (Low) | -0.66 | -0.69 | -0.73 | -0.89 | -0.77 |
| 5 (High) | 0.46 | 0.49 | 0.52 | 0.63 | 0.54 |
| 5-1 | 1.12*** | 1.18*** | 1.26*** | 1.53*** | 1.31*** |
| | (2.62) | (2.71) | (2.86) | (3.35) | (2.96) |
| EW | | | | | |
| 1 (Low) | -0.81 | -0.85 | -0.92 | -1.12 | -0.97 |
| 5 (High) | 0.67 | 0.70 | 0.75 | 0.90 | 0.79 |
| 5-1 | 1.48*** | 1.56*** | 1.67*** | 2.02*** | 1.76*** |
| | (3.08) | (3.22) | (3.42) | (4.06) | (3.59) |

# Cross-sectional regressions

## Fama-MacBeth regressions: key predictor -- proximity-weighted SES peer firm returns

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | *ret* | *ret* | α_FF6 | α_ind |
| $SES_{i,t-1}$ | 7.28*** | 6.61*** | 5.28*** | 5.92*** |
| | (4.63) | (4.34) | (3.57) | (3.92) |
| $Ln(Size)$ | | -1.34*** | -0.52 | -1.28*** |
| | | (3.62) | (1.44) | (3.22) |
| $Ln(B/M)$ | | 0.77** | 0.33 | 0.75** |
| | | (2.30) | (0.94) | (2.11) |
| $ret_{i,t-1}$ | | -3.95*** | -3.15*** | -3.47*** |
| | | (3.23) | (2.64) | (2.84) |
| $Mom$ | | 0.46 | 0.22 | 0.42 |
| | | (1.10) | (0.58) | (1.02) |
| $AG$ | | -1.94*** | -0.81 | -2.18*** |
| | | (3.03) | (1.29) | (3.40) |
| $GP$ | | 1.71* | 0.74 | 1.53 |
| | | (1.68) | (0.68) | (1.44) |
| $BC$ | | 2.39*** | 1.95** | 2.26*** |
| | | (2.88) | (2.27) | (2.69) |
| $EG$ | | -1.75*** | -1.40** | -1.66** |
| | | (2.63) | (2.20) | (2.50) |
| $Ind\_Mom$ | | 3.75*** | 3.04** | |
| | | (2.84) | (2.39) | |
| Industry FE | Y | Y | Y | N |
| Obs. | 103,680 | 103,680 | 103,680 | 103,680 |
| $R^2$ | 0.08 | 0.11 | 0.04 | 0.03 |

# Tests with alternative inter-firm links

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $SES_{i,t-1}$ | 6.61*** | 5.75*** | 5.68*** | 5.56*** | 6.00*** | 6.34*** | 5.62*** | 5.41*** | 6.08*** | 5.12*** | 4.67*** |
| | (4.34) | (3.91) | (3.89) | (3.80) | (3.99) | (4.16) | (3.75) | (3.61) | (4.04) | (3.44) | (3.11) |
| $Sup\_Ind_{i,t-1}$ | | 1.41* | | 1.13 | | | | | | | -0.45 |
| | | (1.90) | | (1.58) | | | | | | | (0.52) |
| $Cus\_Ind_{i,t-1}$ | | | 1.48** | 1.01 | | | | | | | 1.26* |
| | | | (2.19) | (1.56) | | | | | | | (1.96) |
| $Cus_{i,t-1}$ | | | | | 2.19* | | | | | | 1.24 |
| | | | | | (1.89) | | | | | | (1.13) |
| $PC_{i,t-1}$ | | | | | | 2.63* | | | | | 1.36 |
| | | | | | | (1.94) | | | | | (1.01) |
| $SA_{i,t-1}$ | | | | | | | 0.94 | | | | 0.82 |
| | | | | | | | (1.27) | | | | (1.06) |
| $Tech_{i,t-1}$ | | | | | | | | 3.54** | | | 1.75 |
| | | | | | | | | (1.98) | | | (0.99) |
| $Geo_{i,t-1}$ | | | | | | | | | 1.22* | | 0.98 |
| | | | | | | | | | (2.01) | | (1.60) |
| $CS_{i,t-1}$ | | | | | | | | | | 4.46** | 2.67 |
| | | | | | | | | | | (2.43) | (1.49) |
| Controls | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Obs. | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 | 108 |
| $R^2$ | 0.11 | 0.11 | 0.11 | 0.11 | 0.12 | 0.12 | 0.11 | 0.11 | 0.12 | 0.12 | 0.14 |

# International tests

| | (1) | (2) | (3) |
|---|---|---|---|
| | *ret* | α_FF6 | α_ind |
| $SES_{i,t-1}$(Canada) | 3.69***<br>(3.25) | 3.04***<br>(2.68) | 3.33***<br>(2.97) |
| Obs. | 103,680 | 103,680 | 103,680 |
| $R^2$ | 0.08 | 0.04 | 0.05 |
| $SES_{i,t-1}$(France) | -1.42<br>(1.04) | -1.14<br>(0.84) | -1.27<br>(0.94) |
| Obs. | 103,680 | 103,680 | 103,680 |
| $R^2$ | 0.04 | 0.02 | 0.02 |
| $SES_{i,t-1}$(Germany) | -0.92<br>(1.12) | -0.72<br>(0.82) | -0.74<br>(0.93) |
| Obs. | 103,680 | 103,680 | 103,680 |
| $R^2$ | 0.04 | 0.02 | 0.02 |
| $SES_{i,t-1}$(United Kingdom) | 2.83**<br>(2.44) | 2.31**<br>(2.03) | 2.55**<br>(2.20) |
| Obs. | 103,680 | 103,680 | 103,680 |
| $R^2$ | 0.06 | 0.03 | 0.04 |
| Controls | Y | Y | Y |
| Industry FE | Y | Y | N |

Employee satisfaction is associated with larger economic values only in more flexible labor markets (e.g., Canada, the UK, and the US).

# Mechanisms of the SES firm predictability-*Limited Attention*

## Abnormal returns to FF6

Panel A: Limited attention

| | (1) | (2) | (3) |
|---|---|---|---|
| VW | Turnover | Analyst coverage | Res. Inst. Ownership |
| High | 0.54 | 0.61 | 0.57 |
| Low | 2.16 | 2.09 | 2.13 |
| High-Low | -1.62***<br>(3.42) | -1.49***<br>(3.17) | -1.57***<br>(3.32) |
| EW | | | |
| High | 0.62 | 0.70 | 0.65 |
| Low | 2.70 | 2.62 | 2.67 |
| High-Low | -2.08***<br>(4.24) | -1.92***<br>(3.95) | -2.01***<br>(4.13) |

# Mechanisms of the SES firm predictability-*Limits to Arbitrage*

## Abnormal returns to FF6

Panel B: Limits to arbitrage

| | (1) | (2) | (3) |
|---|---|---|---|
| VW | MktCap | Price stability | Liquidity |
| High | 0.59 | 0.80 | 0.69 |
| Low | 2.11 | 1.90 | 2.12 |
| High-Low | -1.51***<br>(3.22) | -1.10**<br>(2.49) | -1.43***<br>(2.84) |
| EW | | | |
| High | 0.68 | 0.92 | 0.78 |
| Low | 2.63 | 2.38 | 2.65 |
| High-Low | -1.95***<br>(4.01) | -1.46***<br>(3.13) | -1.87***<br>(3.58) |

# Mechanisms of the SES firm predictability-*Information Complexity*

## Abnormal returns to FF6

Panel C: Information complexity

| | (1) | (2) | (3) |
|---|---|---|---|
| VW | Analysts' alignment | Indus. concentration | Dividend payment |
| High | 0.72 | 0.65 | 0.59 |
| Low | 1.90 | 1.71 | 1.54 |
| High-Low | -1.18***<br>(2.61) | -1.06**<br>(2.35) | -0.95**<br>(2.12) |
| EW | | | |
| High | 0.82 | 0.74 | 0.67 |
| Low | 2.28 | 2.05 | 1.85 |
| High-Low | -1.46***<br>(3.13) | -1.31***<br>(2.82) | -1.18**<br>(2.54) |

# Risk vs Mispricing -*Earnings announcements*

*EDAY* is a dummy variable, which equals to one if the daily observation is within the announcement window, and zero otherwise.

| | 1-day window | 3-day window |
|---|---|---|
| $SES_{i,t-1}$ | 0.004**<br>(2.54) | 0.005***<br>(2.59) |
| $SES_{i,t-1} \times EDAY$ | 0.032***<br>(4.83) | 0.002***<br>(7.48) |
| *EDAY* | 0.002***<br>(6.97) | 0.002***<br>(3.44) |
| Controls | Y | Y |
| Day FE | Y | Y |
| Obs. (days) | 3,218,240 | 3,218,240 |
| $R^2$ | 0.13 | 0.13 |

# Summary

- In this study, we report evidence of return predictability of among firms with similar employee satisfaction (SES) by using a novel firm-ranking data based on employee satisfaction reviews from Glassdoor.

- We show that the lagged returns of firm peers with SES can predict focal firm's returns. This effect is distinct from industry and other known inter-firm predictability and is not subsumed by the standard risk-factor models.

- We also illustrate that investors' limited attention and, to a certain extent, the limits to arbitrage could explain the predictability due to underreaction to information from firms with SES.

- We also find that, while this predictability phenomenon is present in the flexible labor markets, such as those of Canada and the UK, it is not observed in the rigid labor markets of France and Germany, which is consistent with the findings of Edmans et al. (2017).

# Risk vs Mispricing -*SUEs*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | $SUE_{i,t}$ | $SUE_{i,t+1}$ | $SUE_{i,t+2}$ | $SUE_{i,t+3}$ |
| $SES_{i,t-1}$ | 10.35*** | 7.26*** | 4.14** | 0.93 |
| | (5.16) | (3.62) | (2.01) | (0.54) |
| Lagged SUEs (four quarters) | Y | Y | Y | Y |
| Industry FE | Y | Y | Y | Y |
| Obs. (quarters) | 36 | 36 | 36 | 36 |
| $R^2$ | 0.23 | 0.23 | 0.23 | 0.23 |

# Prediction by industrial peers in and outside the group

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | *ret* | *ret* | α_FF6 | α_ind |
| Panel A: Within the same group (G) | | | | |
| $Same\_Ind\_ES_{i,t-1}$ | 5.63*** | 5.15*** | 4.03** | 3.31** |
| | (3.70) | (3.32) | (2.55) | (2.26) |
| Controls | N | Y | Y | Y |
| Industry FE | Y | Y | Y | N |
| Obs. | 108,000 | 108,000 | 108,000 | 108,000 |
| $R^2$ | 0.06 | 0.08 | 0.03 | 0.02 |
| Panel B: From group (G) to low group (G+1) | | | | |
| $Same\_Ind\_ES_{i,t-1}$ | -6.69*** | -5.65*** | -4.33*** | -3.62** |
| | (4.22) | (3.54) | (2.75) | (2.45) |
| Controls | N | Y | Y | Y |
| Industry FE | Y | Y | Y | N |
| Obs. | 86,400 | 86,400 | 86,400 | 86,400 |
| $R^2$ | 0.09 | 0.11 | 0.06 | 0.05 |
| Panel C: From group (G) to high group (G-1) | | | | |
| $Same\_Ind\_ES_{i,t-1}$ | -3.35*** | -2.93*** | -2.62** | -2.23** |
| | (3.10) | (2.75) | (2.44) | (2.11) |
| Controls | N | Y | Y | Y |
| Industry FE | Y | Y | Y | N |
| Obs. | 86,400 | 86,400 | 86,400 | 86,400 |
| $R^2$ | 0.07 | 0.09 | 0.05 | 0.04 |

# Value implications of CSR decisions of industry peers

This table reports the regression discontinuity design (RDD) estimates of the focal firms' 3-day cumulative abnormal return (CAR) around the corporate social responsibility (CSR) vote and its market share change (DMktShare) in the same industry one year later after the CSR vote.

| | Pass or Fail | |
|---|---|---|
| RDD estimate | CAR (3-day) | ΔMktShare (year + 1) |
| Within the same group (G) | 0.38***<br>(3.55) | 0.07**<br>(2.34) |
| From group (G) to lower group (G+1) | -0.69***<br>(4.74) | -0.11***<br>(3.07) |
| From group (G) to higher group (G-1) | -0.34***<br>(3.13) | -0.06**<br>(2.11) |

# Cross-sectional regressions

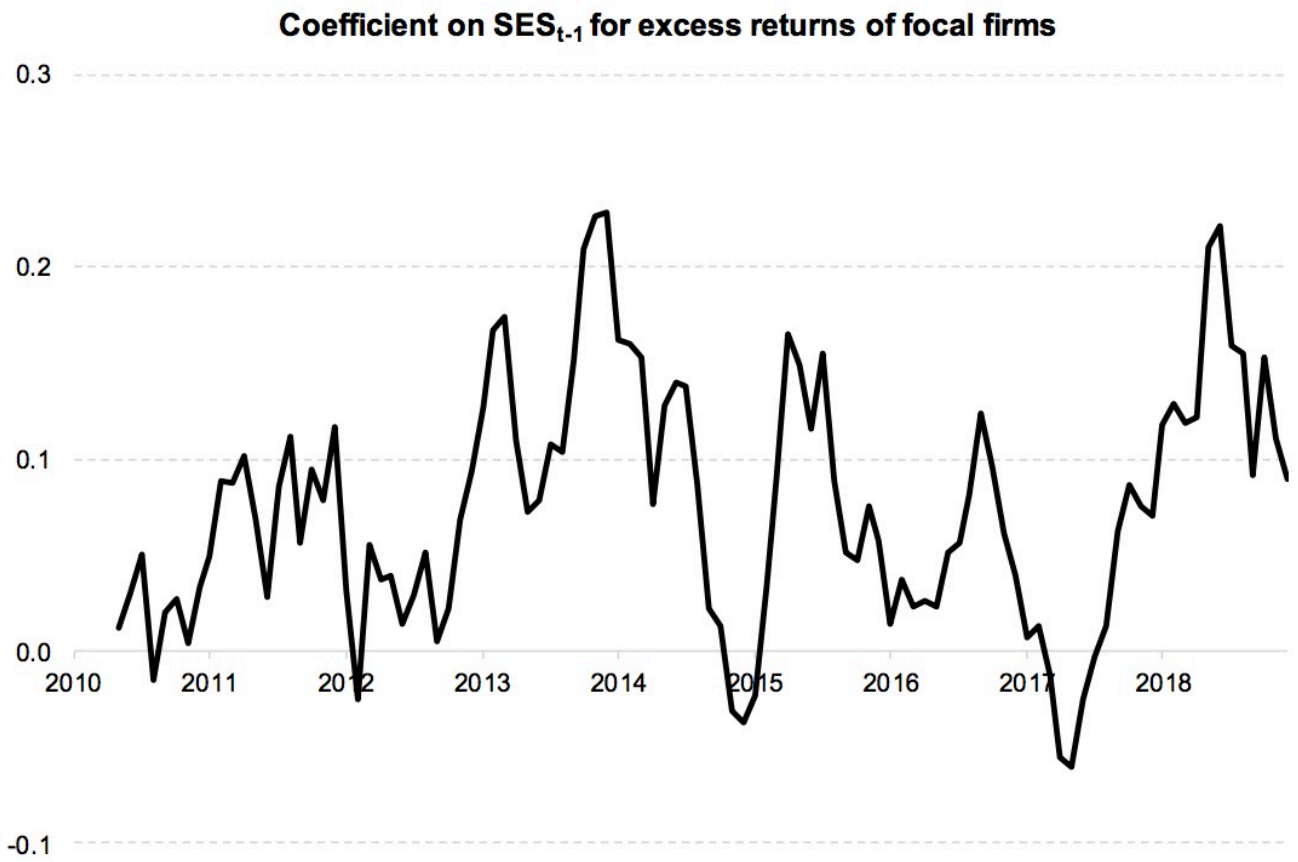


**Figure 2: The time-series of estimated SES coefficients from the Fama-MacBeth regressions**

This figure shows the time-series of estimated SES predictors from the Fama-MacBeth regressions for excess returns of focal firms.