# Corporate Governance and Cost of Equity: Theory and Evidence

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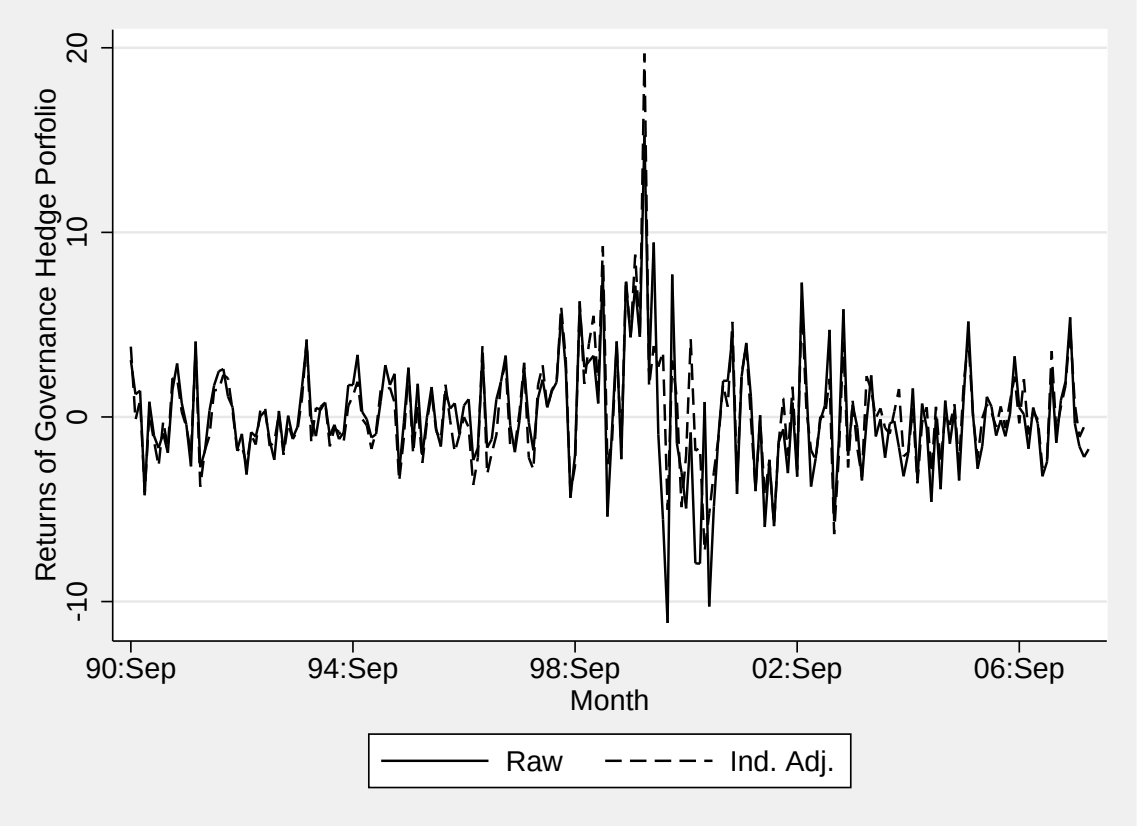
# Does Governance Affect Stock Returns?

- Origin: Gompers, Ishii, and Metrick (2003)
- Governance-return relation: Mixed findings
  - Gompers, Ishii, and Metrick (2003): Positive, 1990-1999
  - Core, Guay, and Rusticus (2006): Negative, 2000-2003
  - Bebchuk, Cohen, and Wang (2013): None, post 2001
  - No coherent explanation for all these findings
- This paper: Alternative and coherent explanation
  - Yes, governance affects cost of equity
  - How? In a subtle way
  - Procyclical relation
    - Positive during booms
    - Negative during busts

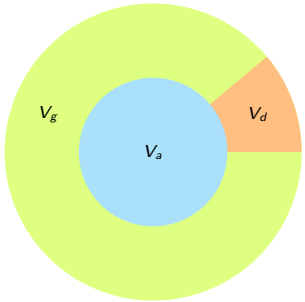
# Governance and Stock Returns – A Quick Look



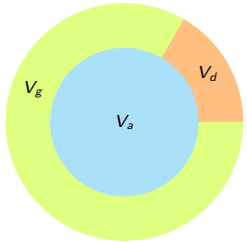

- Concentrated in the end of 1990's and the beginning of 2000's
- Positive during the end of 1990's
- Negative during the beginning of 2000's

# Governance, Firm Values, and Risk

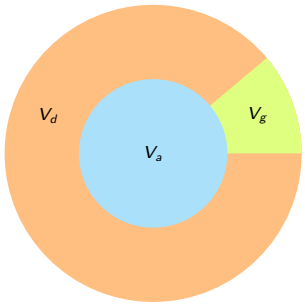
- Three elements of firm value
  - Investment options ($V_g$): Call options, riskier
  - Assets-in-place ($V_a$)
  - Divestiture options ($V_d$): Put options, less risky
- Governance mitigates investment distortion
  - $V_g$ and $V_d$ increases in governance quality
- Strong vs. weak governance
  - higher value of $V_g$ during booms
  - higher value of $V_d$ during busts
  - riskier during booms
  - less risky during busts



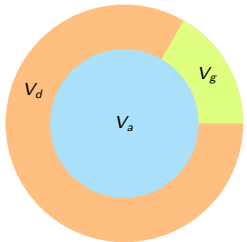

(a) Strong governance stock during booms




(b) Weak governance stock during booms




(c) Strong governance stock during busts




(d) Weak governance stock during busts

# Preview of Empirical Findings

- Classify business cycles using Tobin's $Q$: Aggregate and industry level
- Methods: Portfolio & factors approach, characteristics regression
- Findings
  - Strong governance stocks outperform during booms
  - Weak governance stocks earn higher returns during busts
  - Magnitude of differences: Dozens of basis points monthly
  - More significant with more precise business condition classification
  - Robust to regression methods, industry adjustment, business cycles classification, alternative governance measure, and alternative explanation for negative governance-return relation during busts

# Model Settings

- Real options model (Dixit and Pindyck, 1994)
- Assumptions
  - Assets-in-place: $N$ units of capital
  - Cash flow per unit $y_t$: $dy_t = \pi y_t dt + \sigma y_t dz_t$
    $\pi$: constant drift; $\sigma$: std. dev.; $dz_t$: standard Wiener process
  - Return of assets-in-place (CAPM): $r_a = r_f + \phi\sigma\rho_{ym}$
    $r_f$: risk-free rate; $\phi$: constant market price of risk; $\rho_{ym}$: correlation
  - Investment option: Invest $I$ to increase cash flow to $(N+1)y$
  - Divestiture option: Sell one unit at $I$, reducing cash flow to $(N-1)y$
  - Managerial agency and governance
    - Personal benefits (costs) $B$ per unit of investment/divestiture
    - Empire building ($B > 0$) or shirking ($B < 0$)
    - Governance quality *decreasing* in $|B|$, perfect alignment when $B = 0$

# Model Predictions

## Lemma 1

*Expected return increases (decreases) in the share of investment (divestiture) option in total firm value.*

$$r_s = r_f + \phi\sigma\rho_{ym}\left[\left(\frac{V_a}{V}\right) + \left(\frac{V_g}{V}\right)\beta_1 + \left(\frac{V_d}{V}\right)\beta_2\right],$$

*where* $\beta_1 > 1$ *and* $\beta_2 < 0$.

## Lemma 2

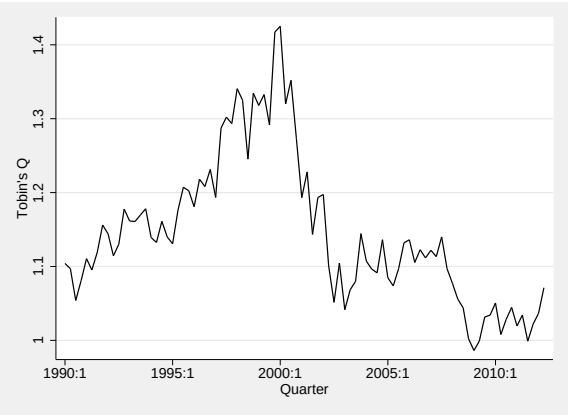
$V_g$ *and* $V_d$ *both decrease in* $|B|$.

- Implications on governance-return relation
  - When $V_g$ dominates (boom), returns increases in governance quality
  - When $V_d$ dominates (bust), returns decreases in governance quality

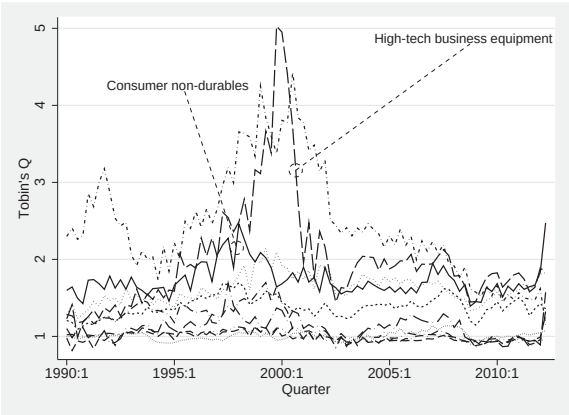
## Hypothesis 1

*Governance-return relation is procyclical, i.e., positive during booms and negative during busts.*

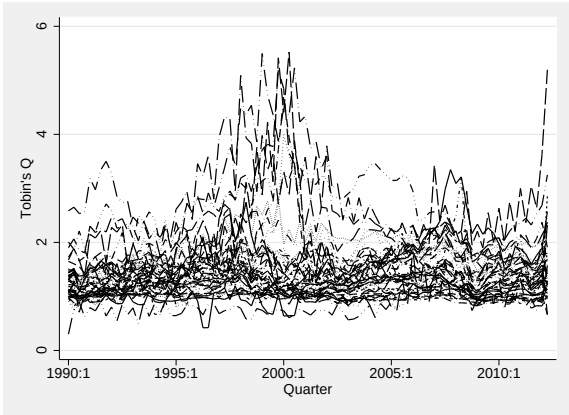
# Business Cycles Classifications




(a) Aggregate $Q$




(b) FF 10 $Q$



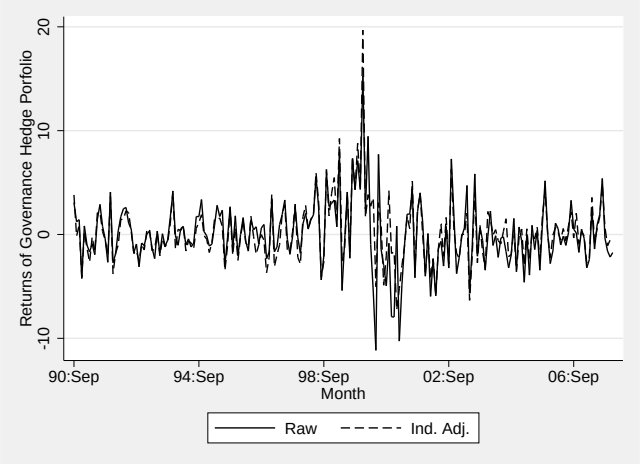

(c) FF 48 $Q$

- Based on Tobin's $Q$ of assets: 1990-2012
- Cutoffs
  - Boom: Top 20%
  - Bust: Bottom 20%
  - Normal: Rest
- Both aggregate cycles and industry-level cycles

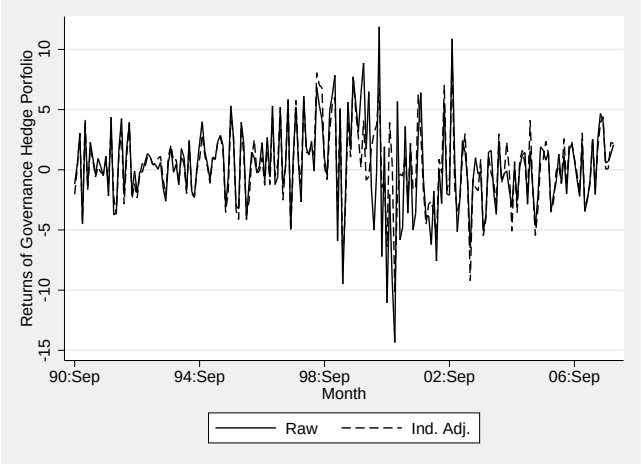
# Data and Sample

- Main sample from RiskMetrics based on IRRC/ISS releases (eight volumes, Sept. 1990 to Dec. 2007)
- Use G-index (Gompers, Ishii, and Metrick, 2003) and E-index (Bebchuk, Cohen, and Ferrell, 2009) as governance measures
- Monthly stock returns from CRSP
- Annual financial data from COMPUSTAT

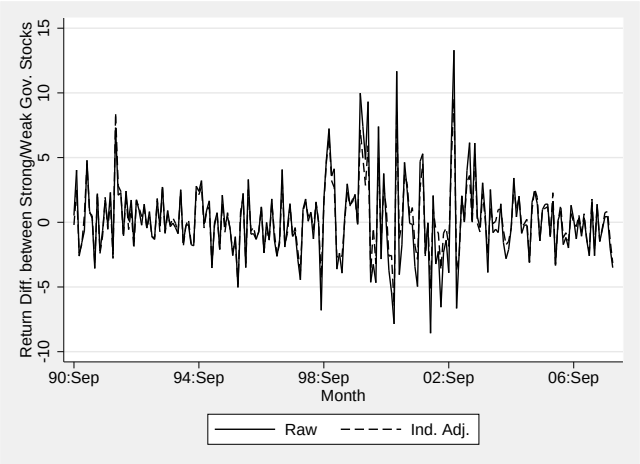
# Governance-Return along Business Cycles



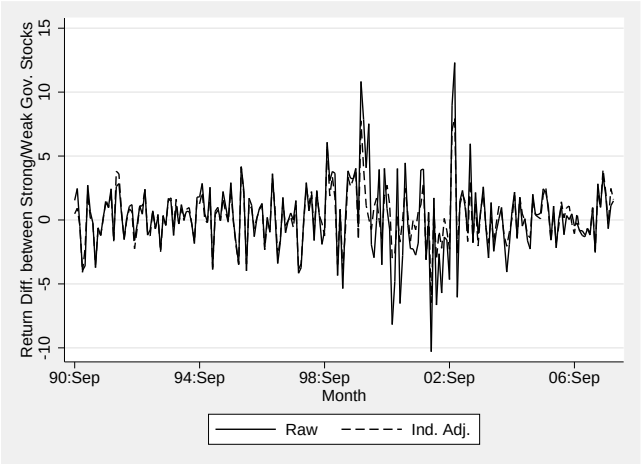

(a) Governance Hedge Portfolio : G-Index




(a) Governance Hedge Portfolio : E-Index




(c) Return Diff., Strong vs. Weak : G-Index




(d) Return Diff., Strong vs. Weak : E-Index

# Summary Statistics

| | Panel A: Aggregate Business Cycles | | | | Panel B: (FF 10) Industry-Specific Business Cycles | | | |
|---|---|---|---|---|---|---|---|---|
| | G-Index | | E-Index | | G-Index | | E-Index | |
| | Raw | Ind. Adj. | Raw | Ind. Adj. | Raw | Ind. Adj. | Raw | Ind. Adj. |
| Boom Periods | | | | | | | | |
| $\bar{r}_p^S - \bar{r}_p^W$ | 0.86 | 1.49** | 1.07 | 1.36** | | | | |
| $\bar{r}_i^S - \bar{r}_i^W$ | 0.28 | 0.45* | 0.57* | 0.43 | 0.37 | 0.54* | 0.17 | 0.54* |
| Bust Periods | | | | | | | | |
| $\bar{r}_p^S - \bar{r}_p^W$ | −0.60 | −0.26 | 0.24 | 0.61 | | | | |
| $\bar{r}_i^S - \bar{r}_i^W$ | −1.33* | −0.64 | −0.62 | 0.17 | −0.50* | −0.38 | −0.23 | −0.11 |

| | Panel C: (FF 48) Industry-Specific Business Cycles | | | |
|---|---|---|---|---|
| | G-Index | | E-Index | |
| | Raw | Ind. Adj. | Raw | Ind. Adj. |
| Boom Periods | | | | |
| $\bar{r}_i^S - \bar{r}_i^W$ | 0.87*** | 0.97*** | 1.01*** | 1.16*** |
| Bust Periods | | | | |
| $\bar{r}_i^S - \bar{r}_i^W$ | −0.13 | −0.09 | 0.08 | −0.06 |

# Portfolio & Factor Model

$$R_t = \alpha_{BM} \times \mathbb{I}_t^{BM} + \alpha_{NM} \times \mathbb{I}_t^{NM} + \alpha_{BT} \times \mathbb{I}_t^{BT} + \beta_1 \times \text{RMRF}_t + \beta_2 \times \text{SMB}_t + \beta_3 \times \text{HML}_t + \beta_4 \times \text{UMD}_t + \epsilon_t$$

Panel A: Raw Returns

| | G-Index | | | E-Index | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\alpha$ | 0.51* | 0.15 | | 0.82*** | 0.66*** | |
| | (0.26) | (0.19) | | (0.24) | (0.20) | |
| $\alpha_{BM}$ | | | 0.71** | | | 1.19*** |
| | | | (0.36) | | | (0.37) |
| $\alpha_{NM}$ | | | 0.03 | | | 0.59** |
| | | | (0.22) | | | (0.23) |
| $\alpha_{BT}$ | | | −1.08 | | | −1.15 |
| | | | (1.00) | | | (1.04) |
| $p$-value: $\alpha_{BM}$ | | | 0.024 | | | 0.001 |
| $p$-value: $\alpha_{BT}$ | | | 0.141 | | | 0.134 |
| Sample Years | 1990-1999 | 1990-2007 | 1990-2007 | 1990-2003 | 1990-2007 | 1990-2007 |

Panel B: FF 48 Industry-Adjusted Returns

| | G-Index | | | E-Index | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\alpha$ | 0.46* | 0.21 | | 0.63*** | 0.48*** | |
| | (0.26) | (0.18) | | (0.20) | (0.17) | |
| $\alpha_{BM}$ | | | 0.95*** | | | 0.96*** |
| | | | (0.33) | | | (0.32) |
| $\alpha_{NM}$ | | | 0.02 | | | 0.39* |
| | | | (0.21) | | | (0.20) |
| $\alpha_{BT}$ | | | −1.05 | | | −0.87 |
| | | | (0.92) | | | (0.89) |
| $p$-value: $\alpha_{BM}$ | | | 0.002 | | | 0.001 |
| $p$-value: $\alpha_{BT}$ | | | 0.129 | | | 0.164 |
| Sample Years | 1990-1999 | 1990-2007 | 1990-2007 | 1990-2003 | 1990-2007 | 1990-2007 |

# Discussion: Factor Model

- Summary of findings
  - Positive abnormal returns during booms; large in magnitude and statistically significant
  - Negative abnormal returns during bust: large in magnitude but statistically insignificant
- Problems with portfolio approach
  - Portfolio approach based on aggregate business cycles; only two bust quarters (eight months)
  - Does not control for other firm characteristics
- Alternative approach: Characteristics regression (Brennan, Chordia, and Subrahmanyam, 1998)
  - Regression at the firm level
  - Allow for variation of business condition among industries
  - Control for firm characteristics

# Implementation

- Control for cross-sectional dependence (Fama and MacBeth, 1973; Petersen, 2009)
- Main method: Clustered ordinary least squares

$$r_{it} = a + \gamma_t + b_{BM}\left(G_{it} \times \mathbb{I}_{it}^{BM}\right) + b_{NM}\left(G_{it} \times \mathbb{I}_{it}^{NM}\right) + b_{BT}\left(G_{it} \times \mathbb{I}_{it}^{BT}\right) + cX_{it} + e_{it}$$

  - Standard error clustered in time (month)
  - Include time (month) fixed effects ($\gamma_t$)
  - Petersen (2009): Equivalent to Fama and MacBeth (1973)
  - Compatible with aggregate business cycles classification
- Alternative method: Fama and MacBeth (1973)

$$r_{it} = a_t + b_{BM,t}\left(G_{it} \times \mathbb{I}_{it}^{BM}\right) + b_{NM,t}\left(G_{it} \times \mathbb{I}_{it}^{NM}\right) + b_{BT,t}\left(G_{it} \times \mathbb{I}_{it}^{BT}\right) + c_t X_{it} + e_{it}$$

  - Repeat for boom, normal, and bust months
  - No power under aggregate business cycles classification

# Clustered OLS

$$r_{it} = a + \gamma_t + b_{BM}\left(G_{it} \times \mathbb{I}_{it}^{BM}\right) + b_{NM}\left(G_{it} \times \mathbb{I}_{it}^{NM}\right) + b_{BT}\left(G_{it} \times \mathbb{I}_{it}^{BT}\right) + cX_{it} + e_{it}$$

Panel A: Raw Return

| | G-Index | | | E-Index | | |
|---|---|---|---|---|---|---|
| | (1) Pool | (2) FF 10 | (3) FF 48 | (4) Pool | (5) FF 10 | (6) FF 48 |
| SG × Boom | 0.26 | 0.39 | 0.69** | 0.29 | 0.45 | 0.66*** |
| | (0.39) | (0.40) | (0.34) | (0.32) | (0.30) | (0.25) |
| SG × Bust | −1.49* | −0.32 | −0.63*** | −0.46 | −0.57** | −0.58*** |
| | (0.87) | (0.37) | (0.24) | (0.52) | (0.24) | (0.15) |
| *p*-value: $b_{BM}$ | 0.249 | 0.170 | 0.022 | 0.182 | 0.070 | 0.005 |
| *p*-value: $b_{BT}$ | 0.044 | 0.188 | 0.004 | 0.192 | 0.009 | 0.000 |

Panel B: Industry-Median-Adjusted Return

| | G-Index | | | E-Index | | |
|---|---|---|---|---|---|---|
| | (1) Pool | (2) FF 10 | (3) FF 48 | (4) Pool | (5) FF 10 | (6) FF 48 |
| SG × Boom | 0.14 | 0.74** | 0.61** | 0.30 | 0.89*** | 0.73*** |
| | (0.33) | (0.29) | (0.27) | (0.21) | (0.17) | (0.14) |
| SG × Bust | −1.36** | −0.64* | −0.74*** | −0.15 | −0.59*** | −0.62*** |
| | (0.67) | (0.36) | (0.23) | (0.44) | (0.21) | (0.12) |
| *p*-value: $b_{BM}$ | 0.341 | 0.005 | 0.012 | 0.076 | 0.000 | 0.000 |
| *p*-value: $b_{BT}$ | 0.021 | 0.038 | 0.001 | 0.363 | 0.003 | 0.000 |

# Fama and MacBeth (1973) Method

$$r_{it} = a_t + b_{BM,t}\left(G_{it} \times \mathbb{I}_{it}^{BM}\right) + b_{NM,t}\left(G_{it} \times \mathbb{I}_{it}^{NM}\right) + b_{BT,t}\left(G_{it} \times \mathbb{I}_{it}^{BT}\right) + c_t X_{it} + e_{it}$$

Panel A: Raw Return

| | G-Index | | E-Index | |
|---|---|---|---|---|
| | (1) FF 10 | (2) FF 48 | (3) FF 10 | (4) FF 48 |
| SG × Boom | 0.51 | 0.65 | 0.56** | 0.60*** |
| | (0.44) | (0.44) | (0.25) | (0.21) |
| SG × Bust | −0.42 | −0.40* | −0.57** | −0.44*** |
| | (0.25) | (0.24) | (0.26) | (0.13) |
| $p$-value: $b_{BM}$ | 0.124 | 0.067 | 0.014 | 0.002 |
| $p$-value: $b_{BT}$ | 0.051 | 0.047 | 0.014 | 0.000 |

Panel B: Industry-Median-Adjusted Return

| | G-Index | | E-Index | |
|---|---|---|---|---|
| | (1) FF 10 | (2) FF 48 | (3) FF 10 | (4) FF 48 |
| SG × Boom | 0.69* | 0.66 | 0.88*** | 0.65*** |
| | (0.41) | (0.42) | (0.19) | (0.16) |
| SG × Bust | −0.51* | −0.50** | −0.33 | −0.50*** |
| | (0.27) | (0.24) | (0.21) | (0.12) |
| $p$-value: $b_{BM}$ | 0.047 | 0.057 | 0.000 | 0.000 |
| $p$-value: $b_{BT}$ | 0.029 | 0.022 | 0.059 | 0.000 |

# Summary: Characteristics Approach

- Procyclical governance-return relation: Positive (negative) during booms (busts)
- Large in magnitude
- Statistically significant under finer business cycles classification
- Robustness
  - Alternative business cycles classification criteria
  - Alternative measure of governance
  - Alternative explanation for negative relation during busts

# Alternative Business Cycles Classification

- Use 1970-2012 sample of $Q$ for business cycles classification
- Use alternative cutoffs: Top and bottom 30% for boom and bust
- Results are similar with Fama and MacBeth (1973) approach

Panel A: Raw Returns, OLS with Clustered Variance

| | Cycles Based on Longer Sample | | | | Cycles Based on Wider Range | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | G-Index | | E-Index | | G-Index | | | E-Index | | |
| | (1) FF 10 | (2) FF 48 | (3) FF 10 | (4) FF 48 | (5) Pool | (6) FF 10 | (7) FF 48 | (8) Pool | (9) FF 10 | (10) FF 48 |
| SG×Boom | 0.29 | **0.59**** | **0.45*** | **0.66***** | 0.09 | **0.40** | **0.43** | 0.26 | **0.53**** | **0.55**** |
| | (0.32) | (0.29) | (0.25) | (0.22) | (0.33) | (0.31) | (0.27) | (0.25) | (0.24) | (0.21) |
| SG×Bust | **−1.19**** | **−0.90**** | **−0.65*** | **−0.88***** | −0.45 | −0.15 | **−0.28** | −0.12 | **−0.22** | **−0.25**** |
| | (0.46) | (0.42) | (0.33) | (0.25) | (0.56) | (0.19) | (0.20) | (0.27) | (0.14) | (0.11) |
| $p$-value: Hypothesis I | 0.177 | 0.022 | 0.038 | 0.002 | 0.396 | 0.099 | 0.056 | 0.149 | 0.013 | 0.005 |
| $p$-value: Hypothesis II | 0.005 | 0.016 | 0.027 | 0.000 | 0.214 | 0.224 | 0.076 | 0.327 | 0.061 | 0.009 |

Panel B: Industry-Adjusted Returns, OLS with Clustered Variance

| | Cycles Based on Longer Sample | | | | Cycles Based on Wider Range | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | G-Index | | E-Index | | G-Index | | | E-Index | | |
| | (1) FF 10 | (2) FF 48 | (3) FF 10 | (4) FF 48 | (5) Pool | (6) FF 10 | (7) FF 48 | (8) Pool | (9) FF 10 | (10) FF 48 |
| SG×Boom | **0.53**** | **0.44*** | **0.77***** | **0.68***** | −0.03 | **0.59***** | **0.40*** | **0.27*** | **0.81***** | **0.65***** |
| | (0.23) | (0.23) | (0.15) | (0.13) | (0.29) | (0.23) | (0.21) | (0.16) | (0.14) | (0.12) |
| SG×Bust | **−1.30**** | **−0.70*** | **−0.55**** | **−0.58***** | **−0.67** | **−0.54**** | **−0.49**** | −0.10 | **−0.42***** | **−0.39***** |
| | (0.50) | (0.39) | (0.24) | (0.18) | (0.46) | (0.22) | (0.22) | (0.18) | (0.14) | (0.11) |
| $p$-value: Hypothesis I | 0.012 | 0.027 | 0.000 | 0.000 | 0.542 | 0.005 | 0.029 | 0.049 | 0.000 | 0.000 |
| $p$-value: Hypothesis II | 0.005 | 0.035 | 0.012 | 0.001 | 0.075 | 0.006 | 0.014 | 0.290 | 0.001 | 0.000 |

# Alternative Governance Measure

- Giroud and Mueller (2010, 2011)
- Use product market competition as alternative measure (HHI)

Panel A: Cycles in 1990-2012

| | Clustered OLS | | Fama and MacBeth (1973) | |
|---|---|---|---|---|
| | (1) Raw | (2) Ind. Adj. | (3) Raw | (4) Ind. Adj. |
| SG × Boom | 0.33** | 0.34*** | 0.28 | 0.41** |
| | (0.15) | (0.10) | (0.19) | (0.17) |
| SG × Bust | −0.53*** | −0.66*** | −0.34*** | −0.60*** |
| | (0.16) | (0.10) | (0.15) | (0.10) |
| $p$-value: $b_{BM}$ | 0.015 | 0.001 | 0.071 | 0.010 |
| $p$-value: $b_{BT}$ | 0.000 | 0.000 | 0.011 | 0.000 |
| Sample Years | 1990-2011 | | | |

Panel B: Cycles in 1970-2012

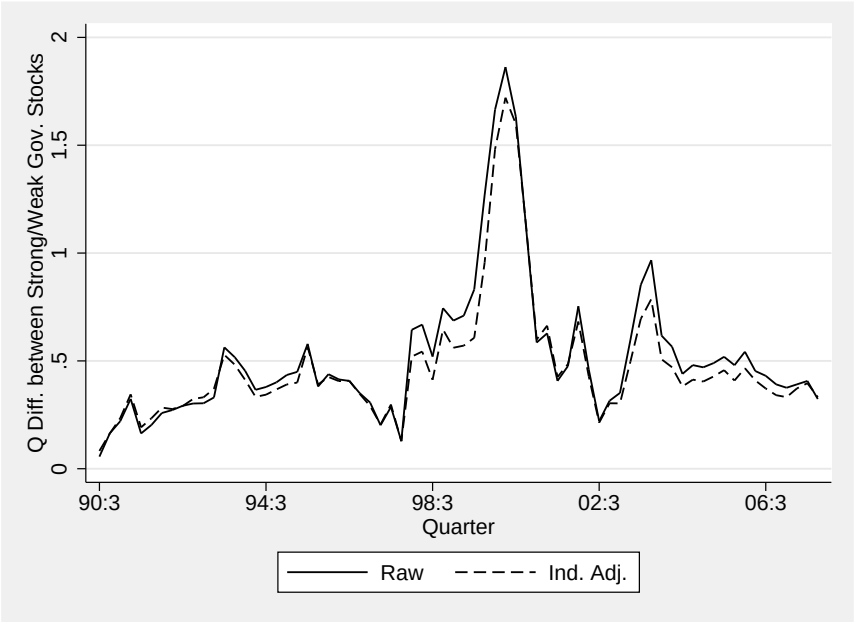
| | Clustered OLS | | Fama and MacBeth (1973) | |
|---|---|---|---|---|
| | (1) Raw | (2) Ind. Adj. | (3) Raw | (4) Ind. Adj. |
| SG × Boom | 0.48*** | 0.27*** | 0.38*** | 0.22** |
| | (0.14) | (0.08) | (0.12) | (0.11) |
| SG × Bust | −0.74*** | −0.58*** | −0.62*** | −0.41*** |
| | (0.21) | (0.08) | (0.13) | (0.09) |
| $p$-value: $b_{BM}$ | 0.000 | 0.000 | 0.001 | 0.023 |
| $p$-value: $b_{BT}$ | 0.000 | 0.000 | 0.000 | 0.000 |
| Sample Years | 1975-2011 | | | |

# Alternative Argument for Findings during Busts

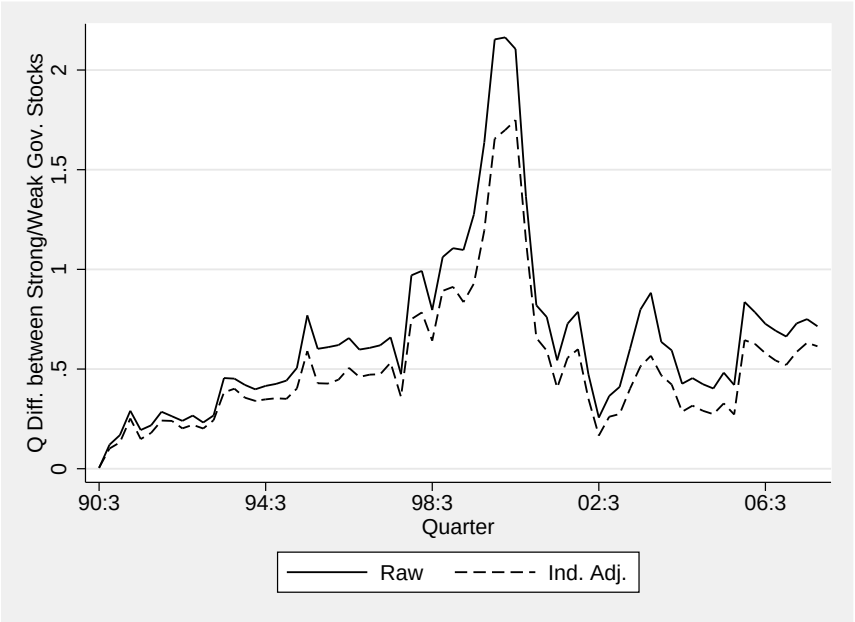
- Argument
  - Governance-return relation is always positive
  - Governance effectiveness reversed during busts
  - Observed spurious negative relation during busts
- Testing idea: If so, strong governance stocks have lower $Q$ than weak governance stocks
- Our model predicts strong governance stocks are always valued higher than weak governance stocks
- Implementation

$$Q_{it} = a + \gamma_t + b_{BM}\left(G_{it} \times \mathbb{I}_{it}^{BM}\right) + b_{NM}\left(G_{it} \times \mathbb{I}_{it}^{NM}\right) + b_{BT}\left(G_{it} \times \mathbb{I}_{it}^{BT}\right) + cZ_{it} + e_{it}$$

# Governance and Stock Valuation: Quick Look




(a) Val. Diff. Strong vs. Weak : G-Index




(b) Val. Diff. Strong vs. Weak : E-Index

# Governance and Stock Valuaiton along Business Cycles

| | Panel A: Tobin's Q | | | | | |
|---|---|---|---|---|---|---|
| | G-Index | | | E-Index | | |
| | (1) Pool | (2) FF 10 | (3) FF 48 | (4) Pool | (5) FF 10 | (6) FF 48 |
| SG × Boom | 0.56*** | 0.37*** | 0.43*** | 0.68*** | 0.41*** | 0.44*** |
| | (0.15) | (0.11) | (0.11) | (0.09) | (0.06) | (0.06) |
| SG × Normal | 0.32*** | 0.40*** | 0.36*** | 0.28*** | 0.39*** | 0.36*** |
| | (0.09) | (0.10) | (0.10) | (0.05) | (0.06) | (0.05) |
| SG × Bust | −0.02 | 0.27*** | 0.32*** | 0.01 | 0.29*** | 0.34*** |
| | (0.10) | (0.09) | (0.10) | (0.05) | (0.05) | (0.06) |
| | Panel B: Tobin's Q Adjusted by Industry Median | | | | | |
| | G-Index | | | E-Index | | |
| | (1) Pool | (2) FF 10 | (3) FF 48 | (4) Pool | (5) FF 10 | (6) FF 48 |
| SG × Boom | 0.53*** | 0.41*** | 0.42*** | 0.56*** | 0.38*** | 0.38*** |
| | (0.15) | (0.10) | (0.11) | (0.09) | (0.05) | (0.06) |
| SG × Normal | 0.33*** | 0.39*** | 0.37*** | 0.24*** | 0.31*** | 0.30*** |
| | (0.09) | (0.10) | (0.09) | (0.04) | (0.05) | (0.05) |
| SG × Bust | 0.01 | 0.31*** | 0.32*** | 0.01 | 0.28*** | 0.29*** |
| | (0.09) | (0.09) | (0.09) | (0.05) | (0.05) | (0.05) |

- Strong governance stocks are always valued higher than weak governance stocks
- Our findings during busts are not driven by reversal of effective governance level

# Conclusion

- We provide an alternative explanation for the existence (late 1990's) and disappearance (post 2001) of governance-stock relation
  - Governance-stock relation is procyclical
  - During booms (late 1990's): Strong governance is associated with higher returns
  - During busts (early 2000's): Strong governance is associated with lower returns
  - Unconditional relation (pooling whole period): The relation might be insignificant
- We provide empirical evidence for the argument
  - In general, consistent with our predictions
  - More significant when business cycles are identified more precisely (industry-level)
  - Robust to regression methods, industry adjustment, alternative criteria of business cycles, and alternative measure of governance