

Corporate leverage and speculative cycles

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Outline

- Motivation
- Financial Crisis
 - Boom-bust cycles
- “Stability is destabilizing...”
- Literature Review
- Model of Corporate Leveraging
- Methodology
- Findings
 - Optimal versus Actual Debt
 - Excess Debt
- Recommendations



Motivation and Research Questions

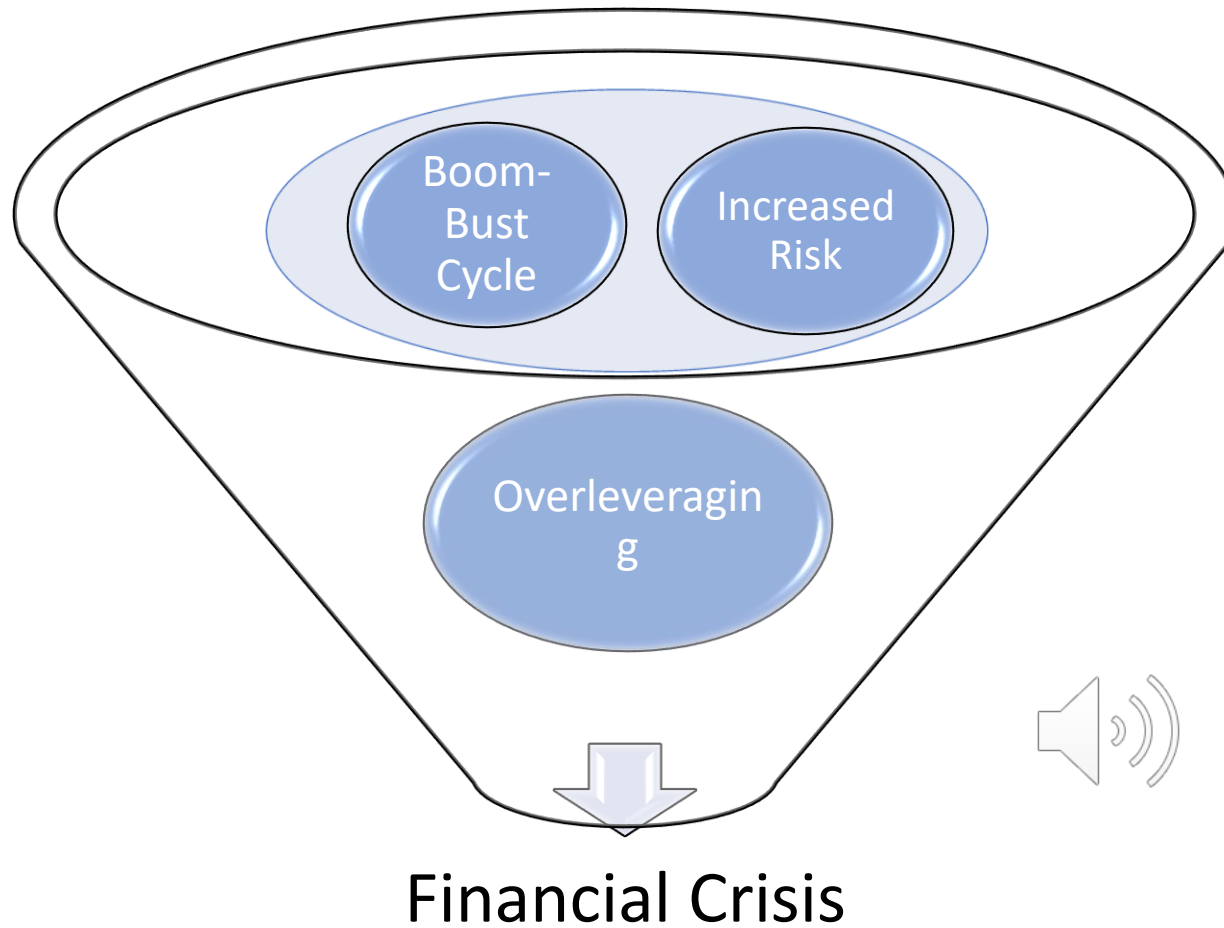
Overleveraging of the corporations exposes the companies to high risk and the macroeconomy to vulnerabilities

➤ ***So, is leverage bad?***



- Leverage helps companies grow, but excess debt is risky.
- What level of leverage can be considered an Early Warning Signal?
- How can optimal debt level be measured?
- How relevant are either the Kaleckian principle of increasing risk and Minskyan financial instability hypothesis and speculative cycles to the on the ground situation in the corporate sector?

Boom-Bust Cycles



Bust period triggers:

- Undervaluation of asset prices
- High borrowing costs
- Insolvencies and deleveraging
- Decrease in consumption and investment spending



Slows economic growth

Boom-bust cycles are driven by linkages between leveraging and asset prices. Overleveraging of the corporations exposes the companies to high risk and the macroeconomy to vulnerabilities.

Our Novelty

- Theoretical model of firm capital structure
- Methodology used to estimate optimal debt ratios in the broader corporate sector
- Estimation of optimal and excess debt for 89 companies, in six sectors: Technology, Financial, Pharmaceutical, Airline, Auto, and Energy, for the time span 2000-2018
- Micro and macro implications from the empirical estimations



“stability is destabilizing”...

- Kaleckian principle of increasing risk
 - Michal Kalecki - The Principle of Increasing Risk
 - Rising cost of debt service (required returns vs. profit)
 - Rising probability of emerging crisis due to overleveraging with implications for a macro economy
- Minskyan financial instability hypothesis
 - Trend in rising indebtedness and fragility of new securitized assets
 - Asymmetric information on risk and unregulated competitive pressures
 - Hedging → speculative finance → Ponzi finance



Literature Review

- Stein (2011) derived an optimal debt ratio for households and identified excess debt as the deviation of this ratio from an actual debt ratio.
- Brunnermeier and Sannikov (2012): shock to asset prices creates a vicious cycle through the banks' balance sheets
- The main cause for banking sector instability, according to Mittnik and Semmler (2012a, 2013), is the unconstrained growth of capital assets through excessive borrowing facilitated by the lack of financial regulations
- Brunnermeier and Krishnamurthy (2020) offer an initial glimpse into the growing literature on the COVID-19 pandemic's impact on corporate debt and its significance for the broader economy



Optimal Leverage

- Optimal leverage is given by: $f^*(t) = [(r - i) + \beta - \alpha y(t) - \frac{(\frac{1}{2})(\sigma_p^2 - \sigma_i \sigma_p \rho)}{\sigma^2}]$

$$\text{Such that: } Risk = \sigma^2 = \sigma_i + \sigma_p - (2\rho_{ip}\sigma_i\sigma_p)$$

- where r is the bank's capital gain (or loss); i is the credit cost of banks; β is the productivity of capital; $y(t)$ is the deviation of capital gain from its trend; $\alpha y(t)$ is the variance of β (the productivity of capital); σ^2 is the variance; and ρ represents the negative-correlation coefficient between interest rate and capital gain.



Excess Leverage

- $\psi(t) = EXCESS\ DEBT = N[\mathcal{F}(t)] - N[\mathcal{F}^{**}(t)]$
- Where $N[\mathcal{F}^{**}(t)] =$ An upper bound on the optimal debt ratio
- Excess leverage (debt) is the deviation of the optimal ratio from the actual debt ratio.
- The actual debt ratio of the firms is equal to long-term debt divided by total assets.



Assumptions of the Model

- Optimal debt/net worth ratio depends significantly upon the stochastic process concerning the capital gains and interest variables
- Mean interest rate exceeds the long run capital gains
- Expected growth of net worth is maximal when the debt ratio is at the optimal level



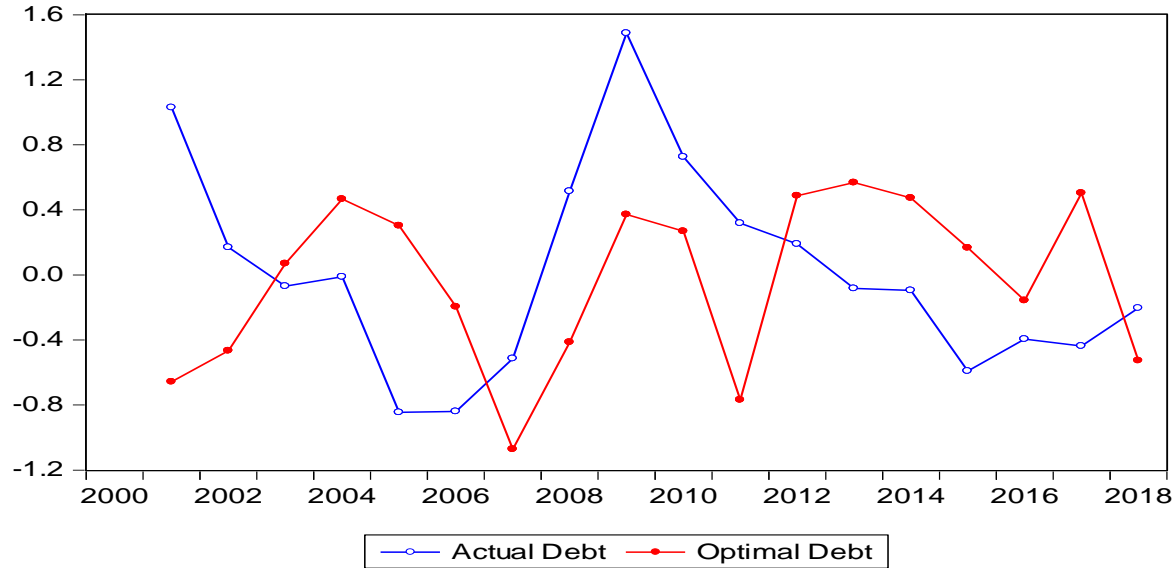
Optimal Debt Calculation

- Columns 1-18
 - 1: r =capital gain/loss= Δ bank's stock market cap/ beginning market cap at each period
 - 2: i =10-year treasury yield was a proxy
 - 3: β productivity of capital=annual gross revenue/Total capital
 - total capital= SE+1/2(STL+LTL)
 - 4: $\alpha y(t) = \beta \text{variance} = \beta_i - \bar{\beta}$
 r
 - 5: $1/2(\sigma_r)^2$; 6: ρ_{ir} ; 7: Var_i ; 8: Var_r ; 9: $\rho_{Var i, Var r}$
 - 10: σ_i ; 11: σ_r ; 12: 2 x (correlation and variances of interest and capital gain) ;13: Risk=col 10+ col 11-col 12;
 - 14: $\mathcal{F}^*(t)=[((\text{col 1} - \text{col 2}) + \text{col 3} - \text{col 4} - \text{col 5} + \text{col 9})/\text{col 13}]$
 - 15: Normalized $\mathcal{F}^*(t)$; 16: $F(t) = \frac{LTL}{TA}$; 17: Normalized $F(t)$;
 - 18: Excess Debt= $F(t) - \mathcal{F}^*(t)$

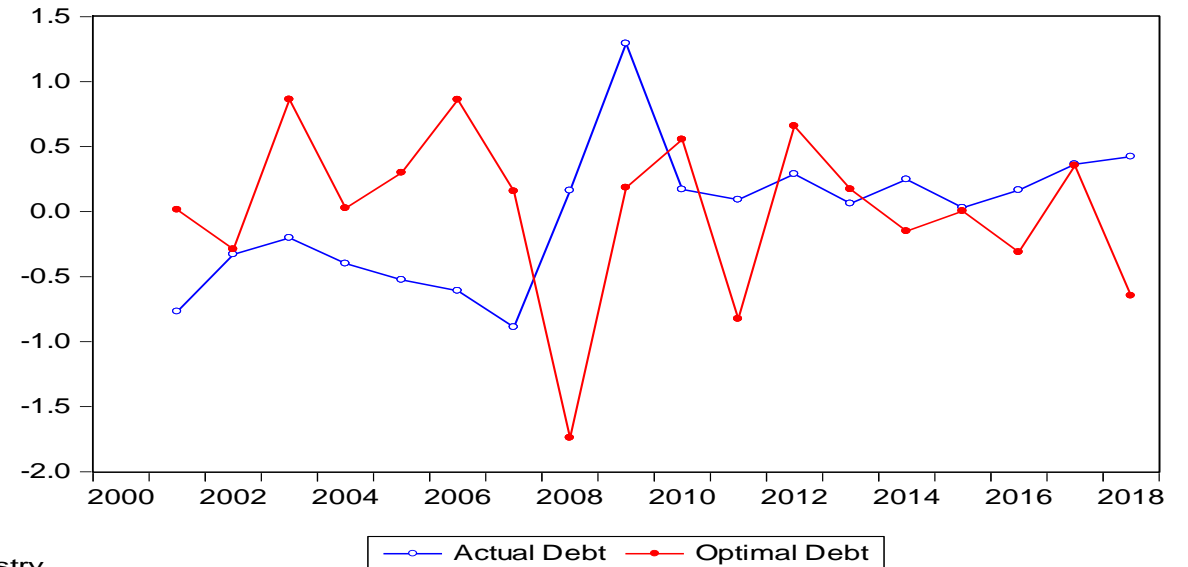


Actual vs. Optimal Debt: Industry Estimation

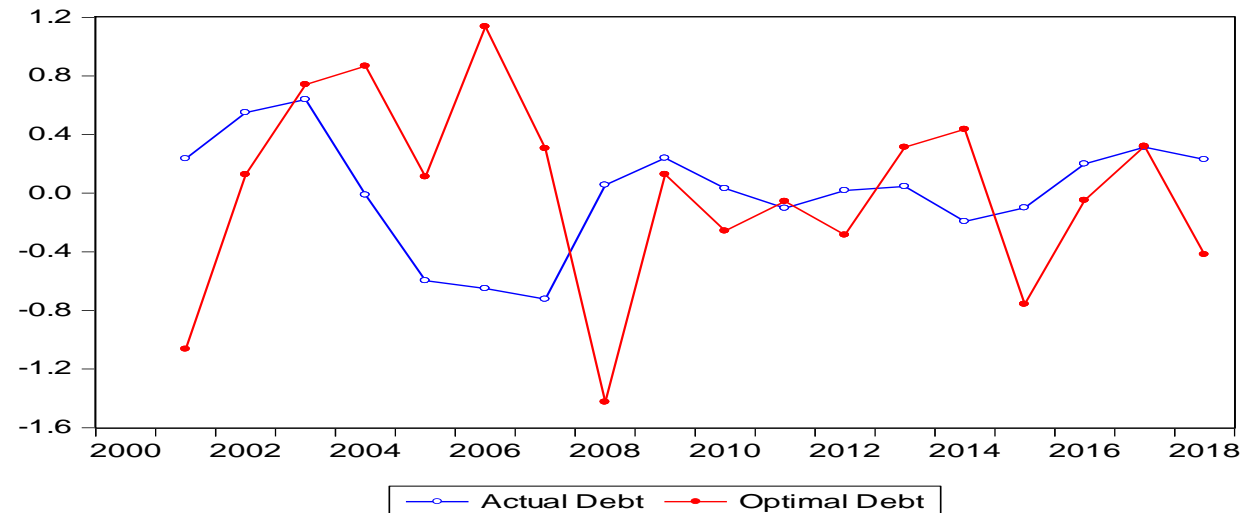
Airline Industry



Auto Industry



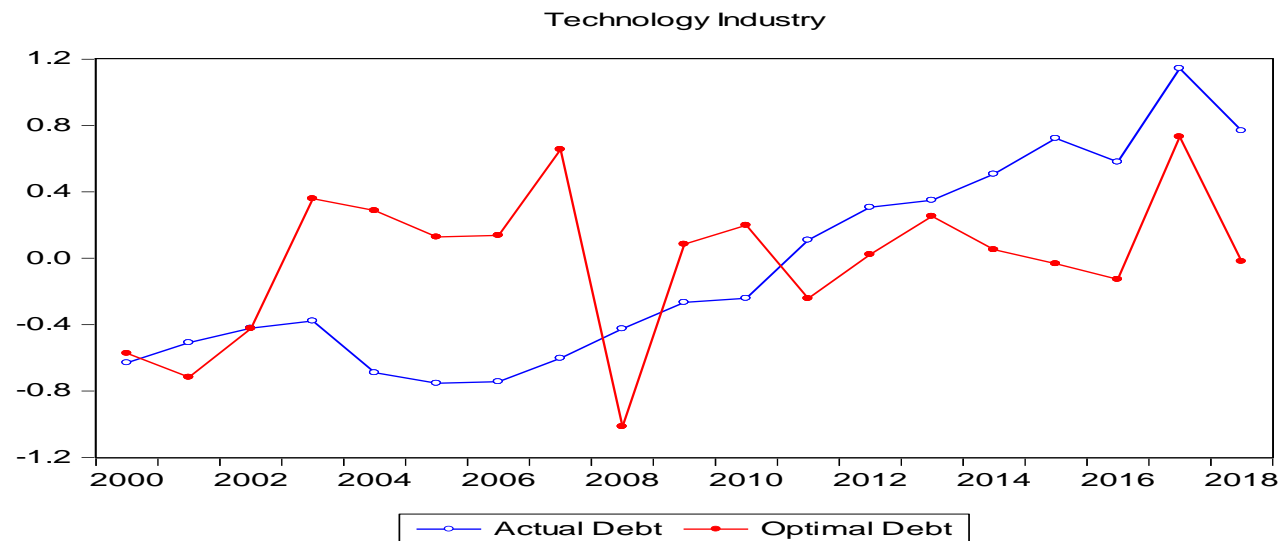
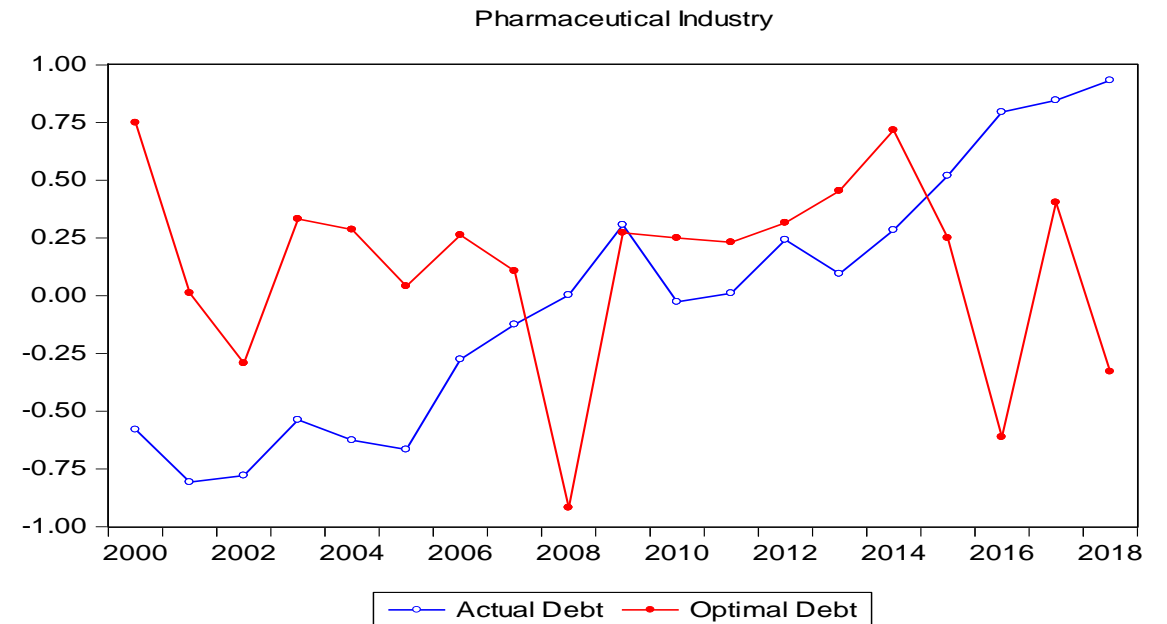
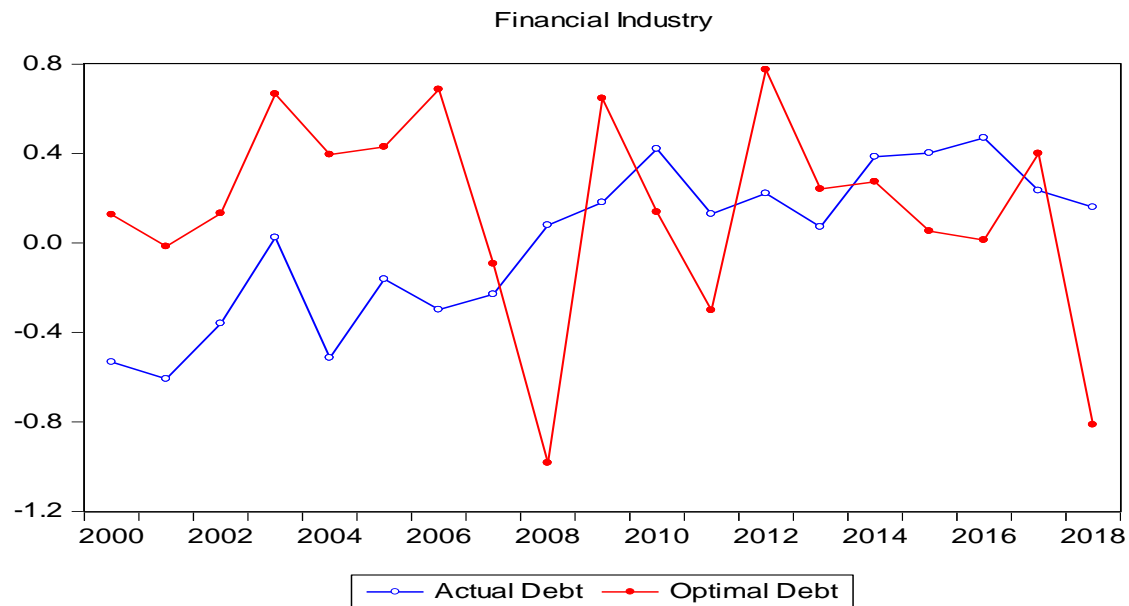
Energy Industry



Source: Author's calculations

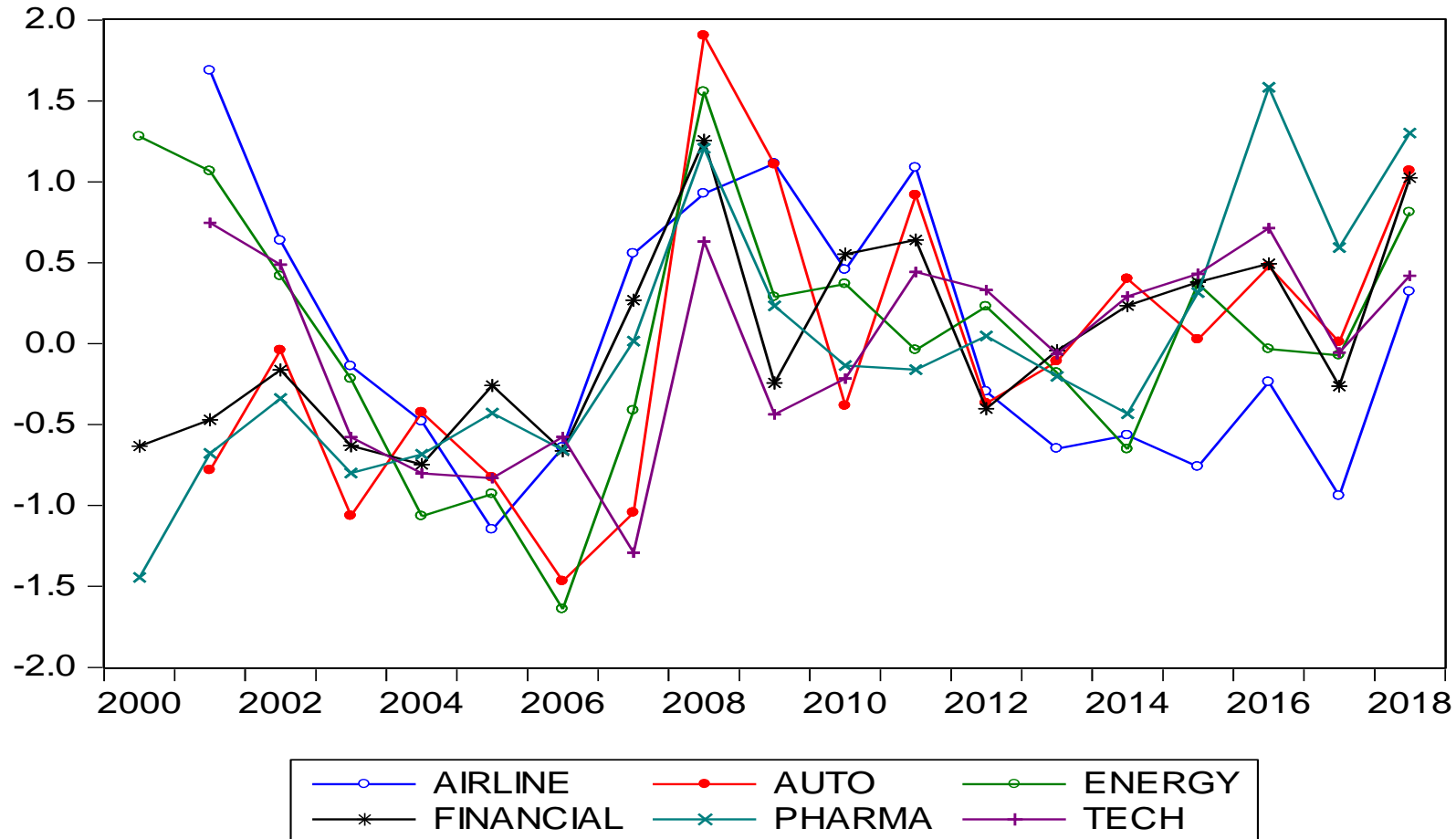


Actual vs. Optimal Debt: Industry Estimation



Industry Weighted Average Excess Debt Ratio

Industry Average Excess Debt



Source: Authors calculations



Key Findings

- Estimated corporate excess debt has largely been moving up, spiking around the crisis period, i.e., the GFC, and then continuing into recovery
- This trend is consistent with an increase in the actual debt across industries
- After 2009, the actual debt levels across the airline, auto and energy industries remained stable, while the trend in the financial, pharmaceutical and technology industries continued to rise, pushing up leveraging
- The technology industry shows the highest level of actual debt in 2018 and is continuously increasing its excess leverage; however, there is no proof that the sector is vulnerable
- Therefore, Excess debt, rather than mere holding of debt, consists of an early warning signal
- Embedded uncertainties of the principle of increasing risk and financial instability hypothesis
- The most vulnerable sectors are pharmaceutical, financial, and technology



Recommendations

- Reduce overall risky debt and develop an optimal-debt structure that needs to be followed in order to avoid the risk of financial instability and default
- Take stability instead of high profit as the driving force, when corporations see that they are suffering from excess debt
- Take a corrective measure by keeping cash flowing, increasing capital requirements and banks can limit lending to high-risk borrowers
- Impose higher collateral requirements on riskier borrowers and for financial institutions exposed to shocks
- Introduce and strengthen risk-weighted capital buffers and the use of collaterals that can quickly turn into liquidity



Questions

