

Leasing as a Mitigation of Financial Accelerator Effects

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Abstract

We document that leased capital accounts for about 20% of the total physical productive assets used by US public firms, and its proportion is more than 40% among small and financially constrained firms. The leased capital ratio exhibits strong a counter-cyclical pattern over business cycles and a positive correlation with the volatility of cross-sectional idiosyncratic uncertainty. In this paper, we argue that the existing macro models with financial frictions assume that firms do not have an option to rent capital and overlook the effects of leasing activities on business cycle dynamics. We explicitly introduce a buy-versus-lease decision into the Bernanke-Gertler-Gilchrist financial accelerator model setting to demonstrate a novel and quantitatively important economic mechanism: that the increased use of leased capital when financial constraints become tighter in bad states significantly mitigates the financial accelerator mechanism and thus also mitigates the response of macroeconomic variables to negative TFP shocks and risk shocks. We provide strong empirical evidence to support our mechanism.

Motivating Facts: Time Series

- Leasing accounts for a significant fraction of physical productive assets

Table 1: Summary Statistic of Leasing Activities - US Public Firms

Variables	Aggregate		Size			WW Index	
	Mean	S	M	L	C	MC	UC
LCR1	0.16	0.42	0.31	0.15	0.41	0.31	0.15
LCR2	0.26	0.54	0.43	0.25	0.53	0.42	0.25
Rental Share	0.20	0.40	0.33	0.19	0.42	0.33	0.19
Debt Leverage	0.21	0.14	0.23	0.21	0.14	0.24	0.21
Lease Adjusted Leverage	0.32	0.36	0.41	0.32	0.32	0.41	0.32

- Leased capital ratio exhibits a strong counter-cyclical pattern over business cycles

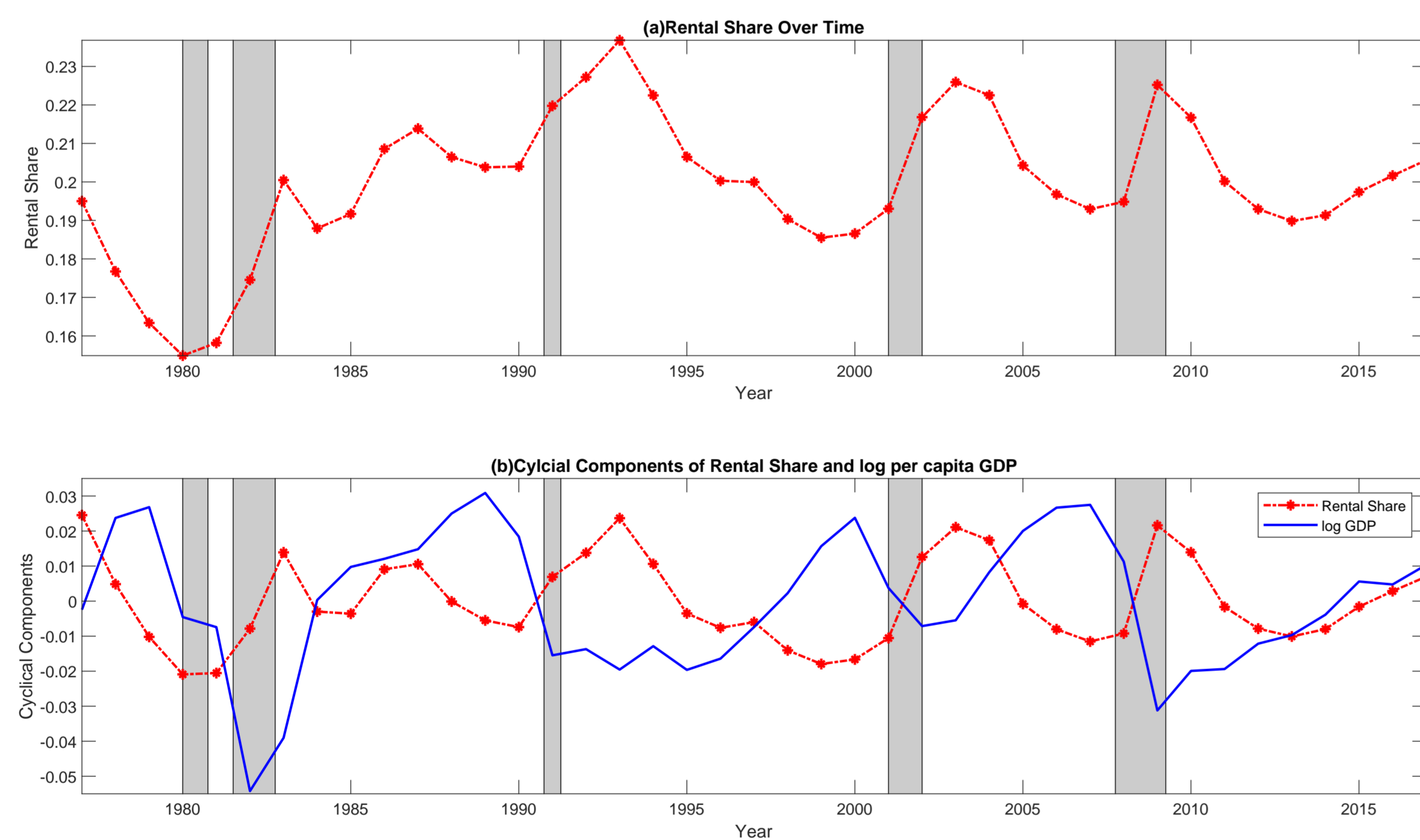


Figure 1: Capital Leasing: Time Series Variations and Cyclical Patterns

- Leased capital ratio has a strong positive correlation with the volatility of cross-sectional idiosyncratic uncertainty

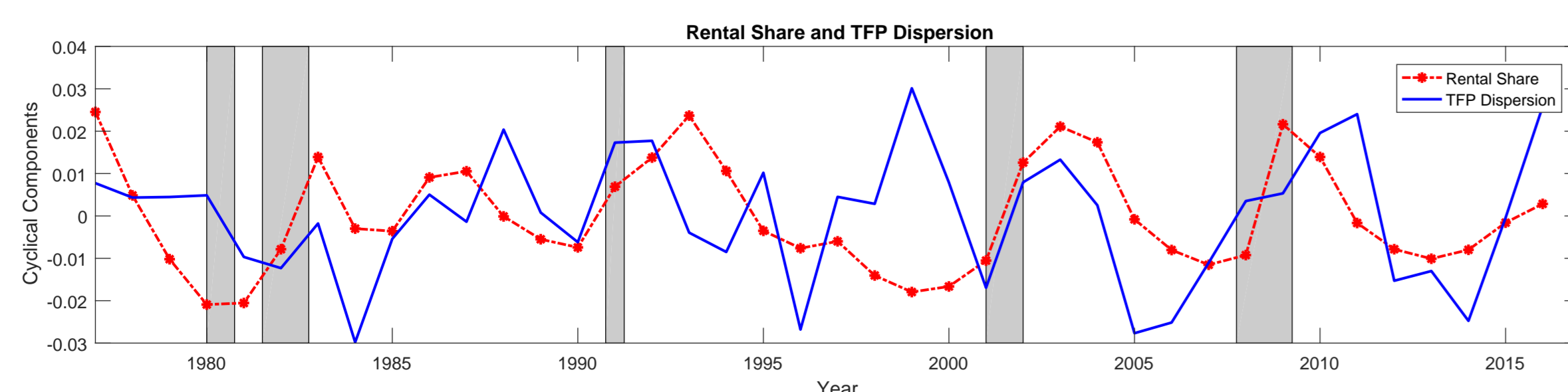


Figure 2: Capital Leasing and the Volatility of Cross-sectional Idiosyncratic Uncertainty

Motivating Facts: Cross Section

- Firms significantly increase their leased capital ratio in response to higher volatility of uncertainty
- Financially constrained firms and firms with more flexible leasing contracts (higher lease commitment duration) increase the use of leasing by more

Table 2: Firm-level Regression: Leasing and TFP Dispersion

	LCR1		LCR2		Rental Share	
	(1)	(2)	(3)	(4)	(5)	(6)
VOL-TFP	0.050*** (0.00)	0.052*** (0.00)	0.040*** (0.00)	0.042*** (0.00)	0.068*** (0.00)	0.069*** (0.00)
GDP Growth	-0.214*** (0.03)	-0.220*** (0.03)	-0.228*** (0.03)	-0.229*** (0.03)	-0.327*** (0.05)	-0.309*** (0.05)
Lag GDP Growth	-0.046 (0.03)	-0.036 (0.03)	-0.164*** (0.03)	-0.153*** (0.03)	-0.661*** (0.05)	-0.665*** (0.05)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R-Squared	0.834	0.839	0.843	0.847	0.691	0.699
Observations	122,573	116,533	132,450	125,796	131,378	124,776

Summary of the Paper

- We explicitly introduce a firm's lease-versus-buy decisions into the Bernanke-Gertler-Gilchrist (BGG) financial accelerator model setting
- We show that the increased use of leased capital when financial constraints become tighter in bad states significantly mitigates
 - the financial accelerator mechanism
 - the response of macroeconomic variables to negative TFP shocks and risk shocks
- We provide strong empirical evidence to support our mechanism.

Model Environment and Key Ingredients

- An augmented version of BGG model in which firms have an option to lease capital

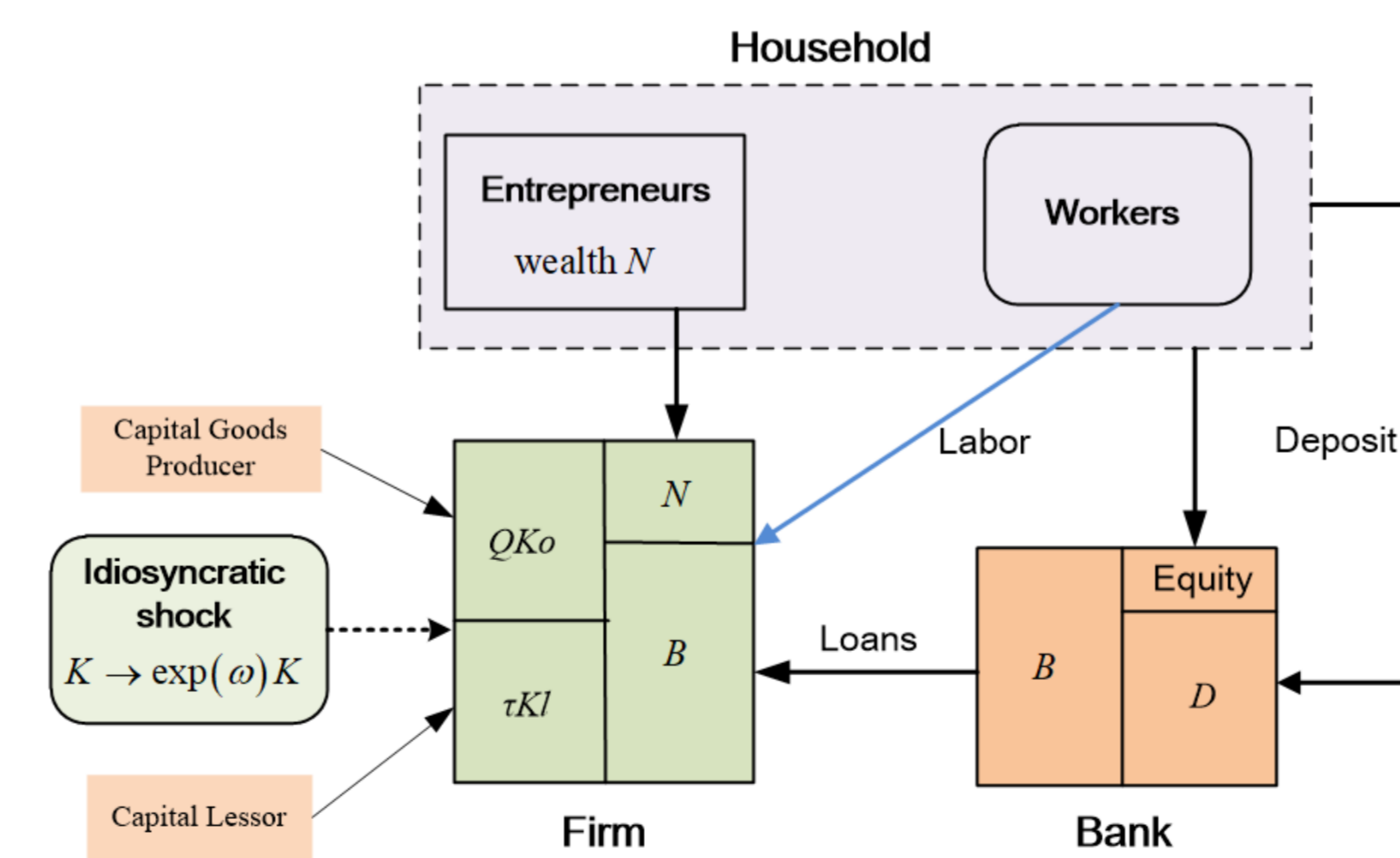


Figure 3: Model Environment

- Repossession advantage of leasing:** Leased capital's resale value is obtained by lessor, thus not subject to verification cost in default

$$(1 - \mu) \omega_{t+1}^j [MPK_{t+1} K_{t+1}^j + (1 - \delta) Q_{t+1} K_{o,t+1}^j]. \quad (1)$$
- Monitoring cost:** agency problem of leasing due to separation of ownership and control rights

$$\tau_{l,t} = Q_t + \underbrace{Q_t \Theta'(K_{l,t+1}, K_{t+1})}_{\text{Monitoring cost}} - (1 - \delta) E_t [M_{t+1} Q_{t+1}], \quad (2)$$

Quantitative Results of the Model

- Impulse response analysis

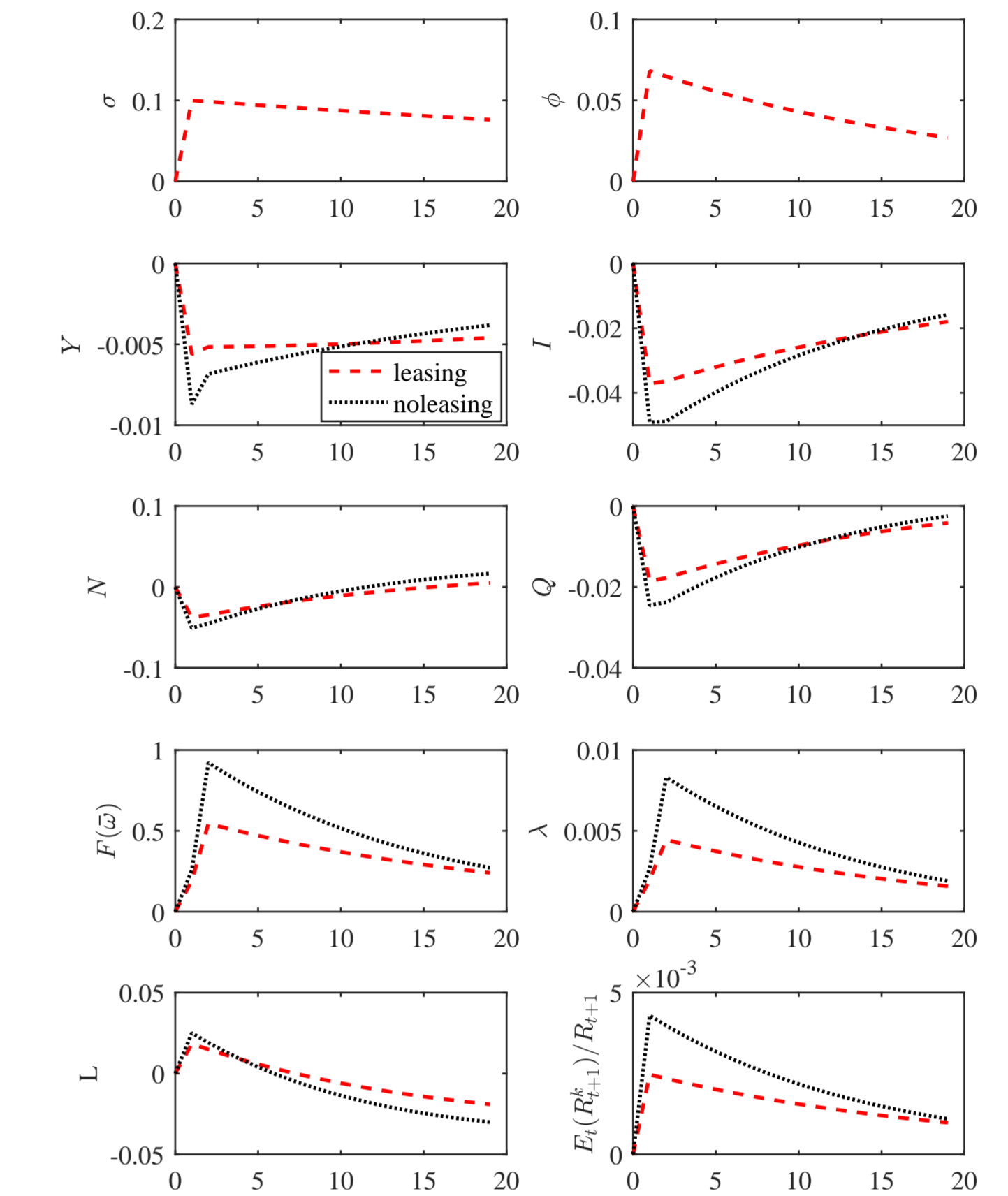


Figure 4: Impulse Responses to a Positive Risk Shock

- Buy-versus-lease decisions: why do firms lease more in bad states?
 - The increase in leased capital ratio $\hat{\phi}$ is due to both the increase in benefits of leasing and the reduction in monitoring cost

$$\frac{\phi_{os} d}{\kappa} \hat{\phi}_t = \widehat{Benefit}_t - \hat{Q}_t, \quad (3)$$
 - The reduction in monitoring cost is due to reduction in capital prices in bad states
 - The increase in benefit comes from two channels when financial constraints are tighter
 - With larger debt capacity, leasing can save a premium on the borrowing cost for entrepreneurs
 - Leasing provide a cheap insurance benefit for entrepreneurs with higher effective risk-aversion in bad states

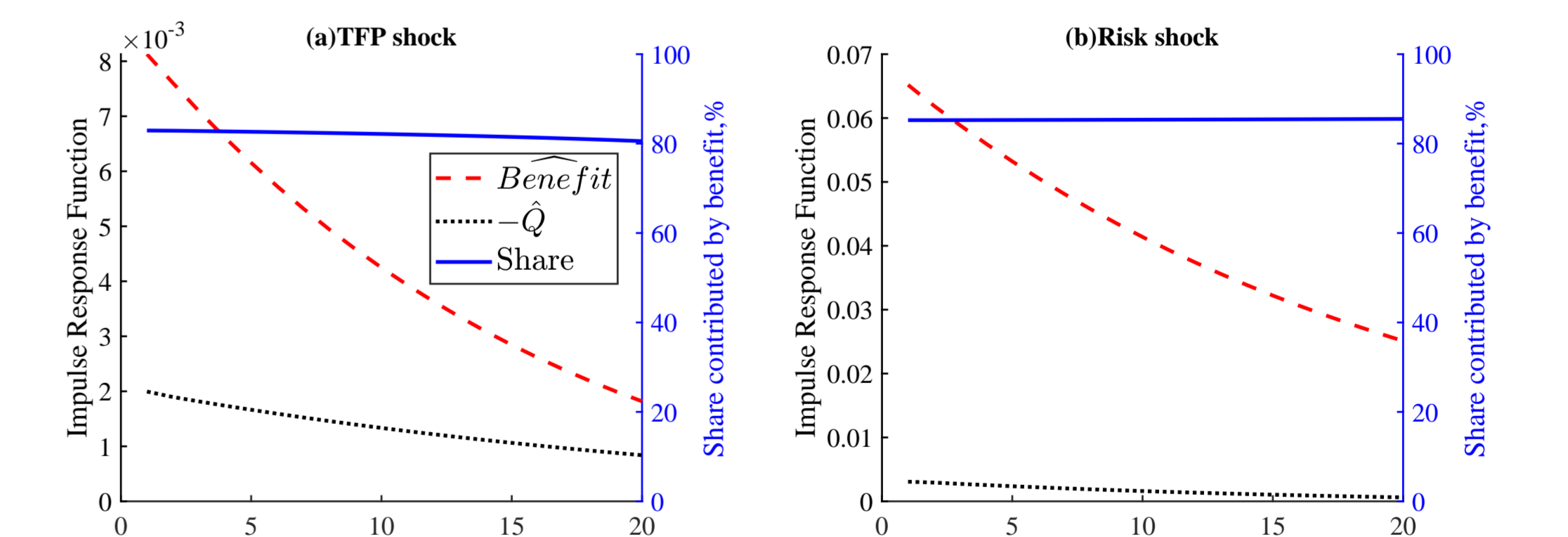


Figure 5: Impulse Responses of Benefit and Capital Price

Conclusions

- Leasing is a quantitatively important source of external finance and productive assets
- Leased capital ratio increase in states with low TFP or high cross-sectional volatility of uncertainty
- We develop a general equilibrium model with leasing and financial frictions to quantitatively show that
 - The increase in leased capital ratio is dominantly driven by the increase of its benefit
 - The increased use of leasing significantly mitigates the financial accelerator mechanism and negative responses of key macro variables

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