

FIRM QUALITY DYNAMICS AND THE SLIPPERY SLOPE OF CREDIT INTERVENTIONS

Authors:

Wenhao Li (USC)

Ye Li (Ohio State)

Discussion:

Fabrice Tourre (Copenhagen Business School)

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THE PAPER IN ONE SLIDE

Motivating question

- Distortions arising from capital injections by government onto firm quality distribution during crisis times

What the paper does

- “GE” model where main focus is on AK firms (type “H” and “L”)
- investment as in Q-theory , subject to collateral constraint
- Crisis: aggregate shocks, with heterogeneous destruction of capital
- Government support via equity funding w/o price discrimination

Key take-aways

- Two sources of “cleansing” effects in laissez-faire
- Government intervention:
 - beneficial effect onto *aggregate* capital stock;
 - detrimental effect onto *composition* of capital
- Government distortion amplified via GE impact on capital prices

THE SETUP

- Representative risk-neutral household consuming and investing
- AK Firms of two types: $A^H > A^L$; investment technology $F(\cdot)$
- Investment opportunities @ (idiosyncratic) Poisson rate λ_I
- Ideal investment $\bar{z}_t^j := (F')^{-1}(1/q_t^j)$; actual investment x_t^j
- Friction $x_t^j \leq \chi q_t^j$ not binding in normal times
- Number of shares issued to private sector $R_{M,t}^j(x_t^j) = x_t^j/q_t^j$
- Crisis @ (aggregate) Poisson rate λ ; $u_t \sim G(\cdot)$ capital destroyed
- Crisis investment: $\iota_t^j(u_t) = x_t^j(u_t) + g_t^j(u_t)$
- Friction $x_t^j \leq \chi q_t^j(1 - \tilde{u})$ binding for some firms during crisis
- Number of shares issued to government $R_{G,t}^j(g_t^j(u_t)) = g_t^j(u_t)\gamma_t$

PRELIMINARY COMMENTS ON THE SETUP

- Title: “credit interventions”; in model, firms financed with equity only
- Crisis
 - Infinitesimally short crisis duration
 - Investment “boom” during crisis as all firms get to invest
 - How about Markov switching model with 2 states (“G” and “B”)?
- Government capital pricing is not type-specific;
 - Legit to assume cannot observe firm type
 - However, quantity of funding demanded by firms reveals firm type
 - Intervention where pricing is function of funding requested?
- Non-stationary equilibrium; in the long run, L firms “die”
 - Welfare analysis tricky to interpret, as dependent on the Markov state
 - Depending on speed of dynamic system, policy analysis not relevant in the long-run

CLEANSING EFFECT

- Law of motion for capital K_t and quality distribution $\omega_t = \frac{K_t^H}{K_t^H + K_t^L}$

$$\frac{dK_t}{K_{t-}} = \lambda_I (\omega_{t-} F(\bar{l}_{t-}^H) + (1 - \omega_{t-}) F(\bar{l}_{t-}^L)) dt + (\omega_{t-} \Delta_t^H + (1 - \omega_{t-}) \Delta_t^L) dN_t$$

$$\frac{d\omega_t}{\omega_{t-}} = \underbrace{\lambda_I (1 - \omega_{t-}) (F(\bar{l}_{t-}^H) - F(\bar{l}_{t-}^L)) dt}_{\text{Cleansing during normal time}}$$

$$+ \underbrace{\left[\frac{1 + \Delta_t^H}{\omega_{t-} (1 + \Delta_t^H) + (1 - \omega_{t-}) (1 + \Delta_t^L)} - 1 \right] dN_t}_{\text{Cleansing during crisis times}}$$

- Cleansing effect (1) via $q_t^H > q_t^L \Rightarrow x_t^H > x_t^L$
- Cleansing effect (2) via $\uparrow u \Rightarrow x_t(u) \downarrow$ (remember $x^j \leq \chi q^j (1 - \tilde{u})$)
- Cleansing $\Rightarrow \omega_t$ drifts up (normal times) and jumps up (crisis times)

GOVERNMENT INTERVENTION

- With government, investment optimization is (typo in (23)?)

$$\begin{aligned} & \max_{x,g} \left[q_t^j F(x+g) - x - q_t^j \gamma_t g \right] k_{t-}^j \\ \text{s.t.} \quad & x \leq \chi q_t^j (1 - \tilde{u}) \end{aligned}$$

- Investment depends on pricing of government funding $\gamma_t \leq 1/q_t^j$
 - under-priced: no private sector funding and investment $>$ laissez-faire
 - fairly-priced: investment = laissez-faire
 - over-priced:
 - low \tilde{u} : only private sector funding and investment = laissez-faire;
 - intermediate \tilde{u} : only private sector funding and investment $<$ laissez-faire;
 - high \tilde{u} : both types of funding and investment $<$ laissez-faire.

DISTORTION INTRODUCED BY GOVERNMENT INTERVENTION

- With intervention $\gamma \in [1/q^H, 1/q^L]$, government funding is:
 - underpriced for L firms \Rightarrow investment 100% funded by government
 - overpriced for H firms \Rightarrow investment funded by mix of private and public sector (depending on shock \tilde{u})
- Government funding reduces cleansing effect:
 - L firms rely 100% on gvt funding so collateral constraint non-binding
 - increase in $q^L >$ increase in q^H
- Cheaper funding ($\downarrow \gamma$) leads to
 - $\uparrow \Delta^K$ (i.e. higher aggregate capital) *but*
 - $\downarrow \Delta^\omega$ (i.e. worse capital quality)
 - \Rightarrow trade-off, optimal policy depends on firm quality distribution ω
- Government can price-discriminate:
 - As if collateral constraint is eliminated
 - First best achieved
 - Cleansing effect weaker

Welfare

- Welfare $W(\omega)K$ – depends on the initial firm quality distribution ω ; ideally, build a stationary model so that you can evaluate $\mathbb{E}[W(\omega)K]$
- Dynamic interventions with $\gamma_t = \gamma(\omega_t)$: government pricing is conditional on the firm quality distribution
 - How does that work when the government cannot observe types?
 - Dynamic γ optimization not too different from static optimization. Why?
 - Welfare improvements are minuscule. Why?
 - Why not focusing on $\gamma(g_t)$?

Cash holdings

- Decision to hold cash depends on costs/benefits
 - Cash incurs a carry cost
 - Cash relaxes the investment collateral constraint
- Only H firms store cash (during crisis, L firms rely on government)
- Accumulation of cash? Capital convertible into cash?
- Sensitivity to the return on cash r_c vs. discount rate r

CONCLUSION

- The good stuff
 - Elegant, “pencil and paper” model whose economics is clear
 - Some clear existence, analytical and comparative static results
 - Exploring a topic that is otherwise under-explored: the GE impact of the “Fed put” onto prices and firm’s behavior (what the authors refer to as the “expectations effect”)
- The stuff I would re-think
 - The title
 - Some of the modelling choices (crisis for instance)
 - The last 2 sections (liquidity and banks)
 - More discussion on how to map model and data
 - More discussion on $x^j \leq \chi q^j$ (micro-foundation? what happens if $x^j \leq \chi$?)