The Financial (In)Stability Real Interest Rate, $r^{**}$

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Financial Stability Considerations for Monetary Policy

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Why do we need another *?

• The *natural rate of interest* $r^*$ is associated with the notion of *macroeconomic* stability: the rate consistent with output equaling its natural rate and constant inflation (Wicksell, Woodford, ..., Laubach & Williams, ...)

• This paper introduces $r^{**}$, the *financial stability interest rate*: the *threshold real rate above which financial instability arises*

• Goal of $r^{**}$: Map the notion of financial stability onto the interest rate space, and complement $r^*$ as a guide to policy
Outline

1. Illustrate $r^{**}$ in the context of a simple macrofinance model with an occasionally binding financing constraint

2. Discuss the drivers and dynamics of $r^{**}$
   - e.g., “financial dominance”: persistently low real interest rates trigger financial vulnerability and an eventual drop in $r^{**}$, which may constrain monetary policy

3. Provide an empirical measure of $r^{**}$
   - Show that the Fed effectively tracked $r^{**}$ in periods of financial stress
A Model With Financial (In)Stability Regimes
A Model With Financial (In)Stability Regimes

- Dynamic macrofinance model with financial intermediaries that face *agency frictions* in raising funds \( \rightarrow \) (Gertler & Kiyotaki ’10)

- Occasionally binding leverage constraint \( \rightarrow \)
  - *Tranquil times*: dynamics resemble run-of-the-mill DSGE
  - *Financial instability*: financial accelerator, asset fire-sale dynamics

- \( r^{**} \) is the threshold real rate above which financial instability arises:
  \( \rightarrow \) *the real interest rate that makes the financial constraint just bind*

- Use \( r^{**} \) as a *summary statistic for financial stability*, just like \( r^* \) is for macro conditions
The Economy

- Bankers
  - Hold (risky) capital $s_t$ and safe asset $b_t$

- Households
  - Consume, supply labor, save through bank deposits $d_t$ (interest $R_t^d$)

- The real interest rate on the safe asset, $R_t$, follows an exogenous process

→ In the background we will be thinking of monetary policy as determining $R_t$
Bankers’ Problem

\[ V_t(n_t) = \max_{s_t, b_t, d_t} \mathbb{E}_t \Lambda_{t+1} \left[ (1 - \sigma) n_{t+1} + \sigma V_{t+1}(n_{t+1}) \right] + \zeta_t b_t \]

\[ \zeta_t \rightarrow \text{utility from holding safe asset (KVJ exogenous safety/liquidity shocks/preferences)} \]

subject to

1. **Evolution of net worth:**
   \[ n_t = (R_{Kt} - R_{d t-1}) Q_{t-1}s_{t-1} + (R_{t-1} - R_{d t-1}) b_{t-1} + R_{d t-1} n_{t-1} \]

2. **Incentive Constraint:**
   \[ V_t(n_t) \geq \Theta(x_t) \left( Q_t s_t + b_t \right), \text{where } x_t = \frac{b_t}{Q_t s_t + b_t} \text{ and } \Theta' < 0, \Theta'' > 0 \]

→ **Occasionally binding** leverage constraint:
   \[ \underbrace{\frac{Q_t s_t + b_t}{n_t}}_{\text{leverage}} \leq \underbrace{\frac{V'_t}{\Theta(x_t)}}_{\text{max. leverage}} \]
Financial frictions become more severe when the bankers' portfolio is tilted toward risky assets $\rightarrow$ vulnerabilities $\uparrow$
Financial (In)Stability Regimes

• When the constraint does not bind (financial stability):
  \[ E_t(R_{Kt+1}) \approx R_t + \zeta_t: \text{Spreads are low (mostly determined by the safety/liquidity preference shock)} \]
  • The economy resembles frictionless RBC

• When the constraint binds (financial instability):
  • \( E_t[\Omega_{t+1}(R_{Kt+1} - R_t)] > \zeta_t \rightarrow \text{spreads are large and volatile} \)
  • Responses of the economy to shocks reflect the nonlinear financial accelerator effect:
    \[ N_t(\equiv \int n_t) \downarrow \Rightarrow Q_t \downarrow \Rightarrow N_t \downarrow \]
Constructing r**

• If the economy is in the unconstrained/constrained regime: increase/decrease $R_t$ such that the constraint just binds/ceases to bind, given the other state variables

  $\Rightarrow$ $r^{**}$ is a threshold: real interest rate below $r^{**}$ ensures the economy remains in the financial stability regime

• Financial stability rate gap, $r^{**} - r$, depends on the evolution of other state variables, e.g., leverage and the share of risky assets in banks’ portfolio
State dependent IRFs

Financial stability rate gap, $r_t^* - r_t$

Credit spread, $E_t[r_{t+1} - r_t]$
- Shock arrives in tranquil period
- Shock arrives in vulnerable period

Investment, $I_t$

GDP, $Y_t$

Real interest rate, $r_t$

TFP, $\log(A_t)$
Credit spreads and economic activity

- Model captures asymmetries in the relationship between output and credit spreads
Average financial crisis in the model

Credit spread, $E_t[r_{k,t+1} - r_t]$

Safe assets ratio, $x_t = B_t/(Q_t K_t + B_t)$

Investment, $I_t$

GDP, $Y_t$

Real interest rate, $r_t$

TFP, log($A_t$)
Dynamics of r**
Dynamics of $r^{**}$: Impulse responses to low interest rates

- Persistently low rates today cause vulnerabilities to build up → reduce monetary policy space for maintaining "financial stability" in the future
• Low real interest rates today predict search for yield and vulnerabilities (low r**-r) in the future
Measuring r**
The financial stability interest rate $r_t^{**}$ in the data
“Greenspan’s put”
Global Financial Crisis

spreads
effective FFR
r and r**
Conclusion

- Introduce a new concept: $r^{**}$
  - threshold real interest rate above which the tightness of financial conditions may generate financial instability
  - enables us to translate financial vulnerabilities into an object comparable to the monetary policy rate and to the natural real interest rate

- Thank you for your attention!