Monetary Policy and Excessive Bank Risk-Taking

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Introduction

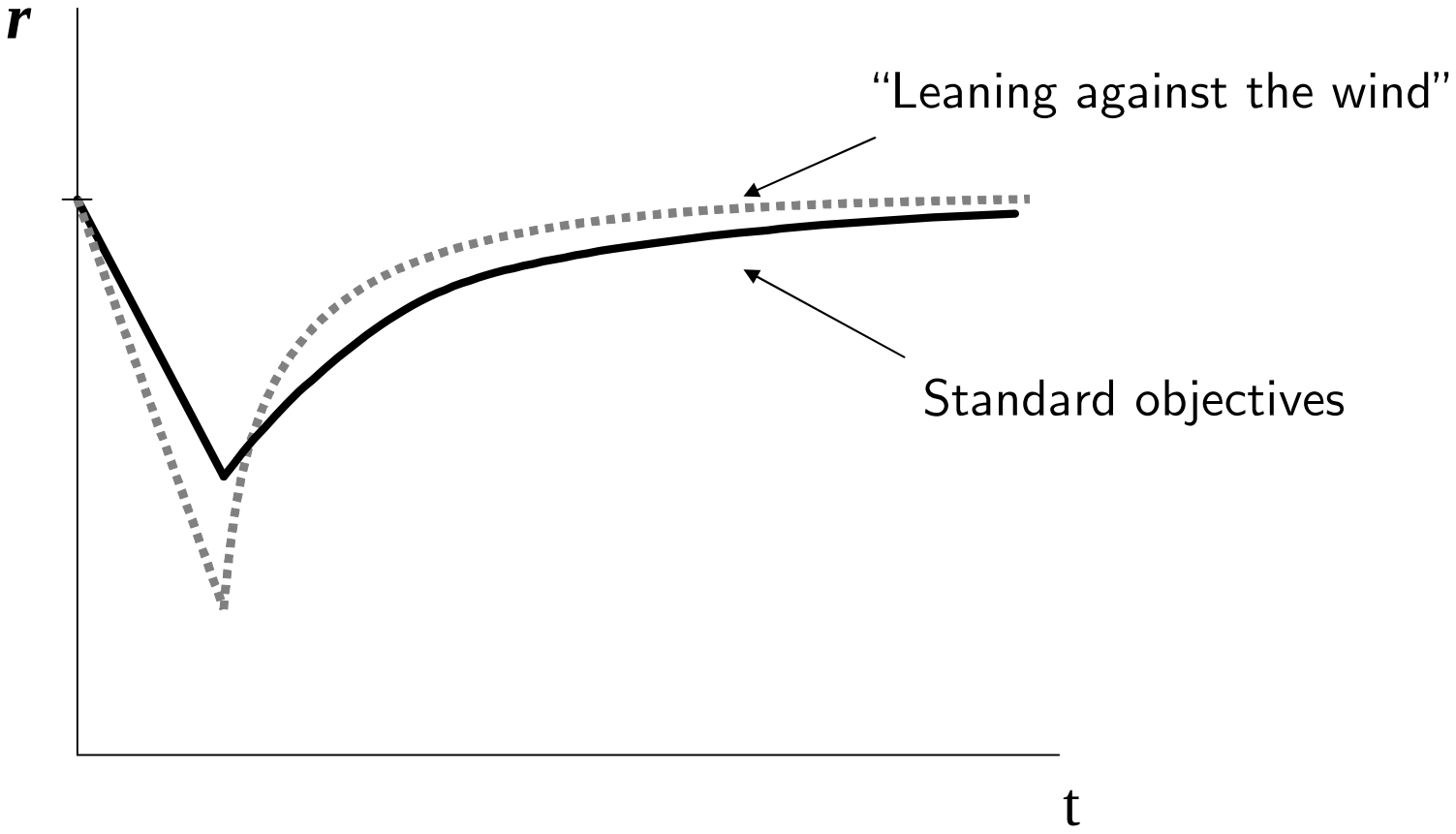
- Lax **monetary policy potential culprit crisis**
- Lower rates raise risk taking
- Especially if rates: **too low for too long**
- Empirical evidence:
  - Maddaloni et al. (2009), Altunbas et al. (2009), Jiménez et al. (2009), Ioannidou et al. (2009)

Introduction

- Calls for monetary policy that **explicitly considers financial imbalances**
  - Bank risk: Borio and White (2004), Borio and Zhu (2008), Adrian and Shin (2008, 2009)
  - Credit growth: Christiano et al. (2007, 2008)
  - Credit spreads: Curdia and Woodford (2009)
- Question: **How does policy change?**
- Different level / timing of rates?

Our results

- Level effect: higher rates on average
- Dynamic effect: cuts are short and deep



Model: Banks with Limited Liability (1)

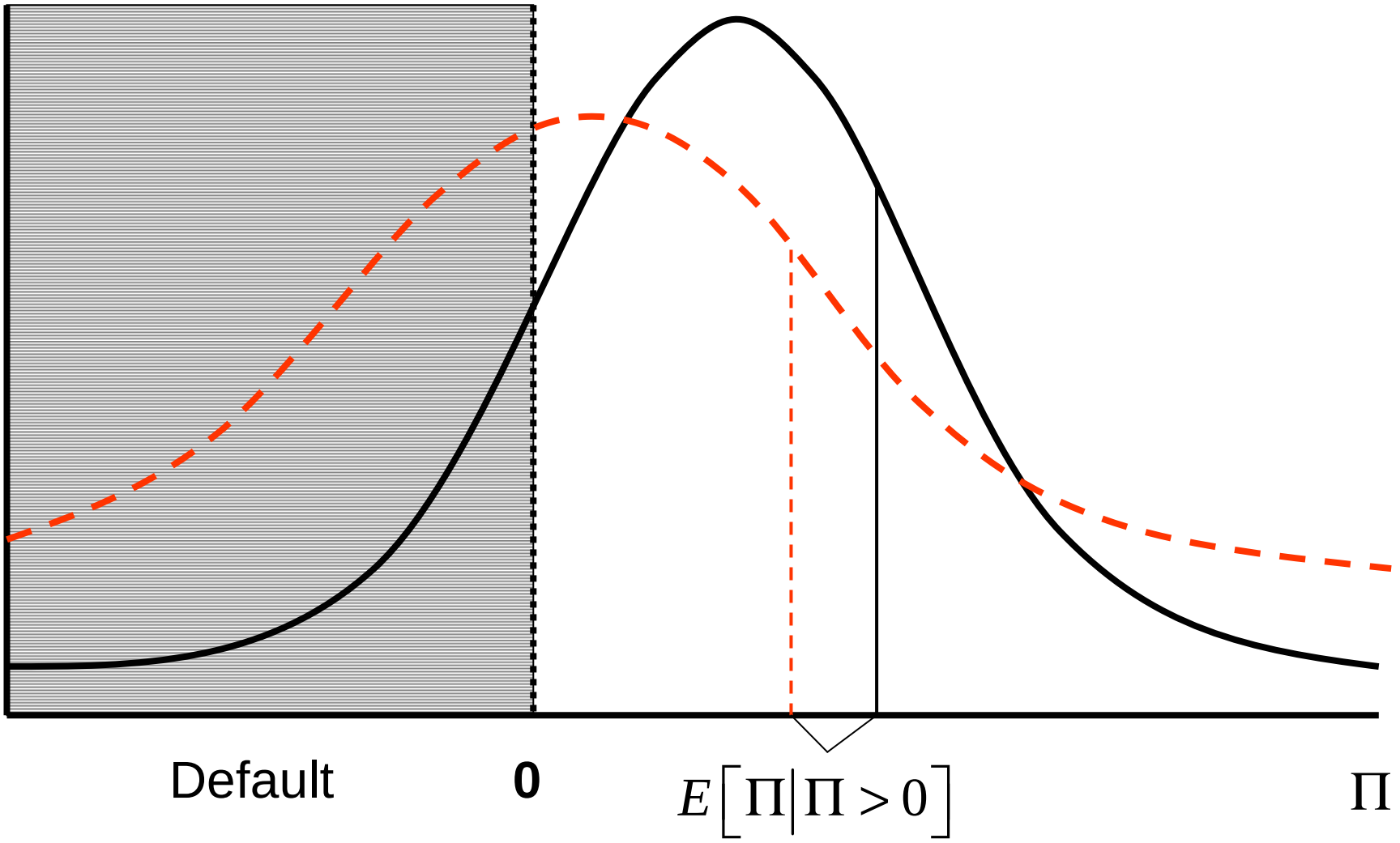
Bank i

$$\max_{k,e,d} E[\Pi_i]$$

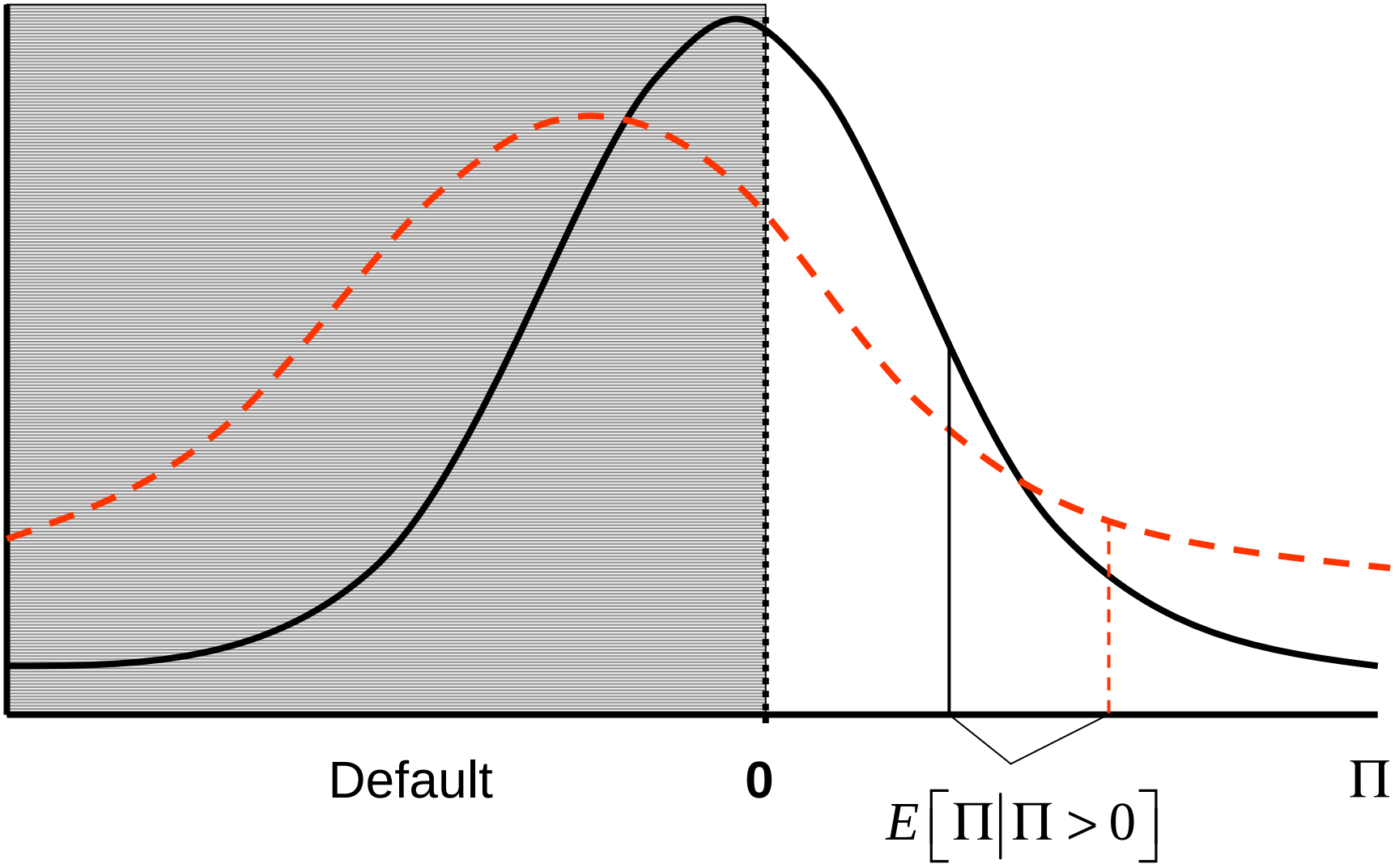
$$\Pi_i = \max\left\{R_i(k) - \left(f(e) + g(d,r)\right), \quad -e\right\}$$

$$k = \{g,b\}, \qquad \mu_g > \mu_b, \quad \sigma_b > \sigma_g$$

Bank with low leverage



Bank with high leverage



Model: Banks with Limited Liability (2)

Bank i

$$R_i(k) = h\left[R_i(k), \varphi_i\right], \qquad \frac{\partial R_i(k)}{\partial \varphi_i} > 0,$$

$$e + d = 1,$$

$$f'(e) = \frac{\partial g(d,r)}{\partial d},$$

$$\max_{k,d} E\left[\Pi_i\right] = \max_{k,d} E\left[\max\left\{R_i(k) - \left(f(e) + g(d,r)\right), \quad d - 1\right\}\right],$$

Model: Banks with Limited Liability (3)

Proposition: There exists a φ', such that $\varphi_i < \varphi'$ select $k=b$ and a high leverage, while banks with $\varphi_i > \varphi'$ select $k=g$ and a low level of debt.

Proof:

1. Complementarity between asset funding and quality
2. Higher efficiency better quality

Model: Banks with Limited Liability (4)

$$1.\ \max\left\{R_i(k)-\left(f(e)+g(d,r)\right),\quad d-1\right\}$$

$$\arg\max_d E\left[\Pi_i\right]\Big|_{k=g} < \arg\max E\left[\Pi_i\right]\Big|_{k=b}$$

$$2.\ \varphi_i \uparrow \quad \rightarrow \quad R_i(k)-\left(f(e)+g(d,r)\right) \quad \succ \quad d-1$$

$$\rightarrow \qquad g \succ b \qquad \Rightarrow \quad \exists \quad \varphi',\quad \varphi_i > \varphi' \rightarrow g,\quad \varphi_i < \varphi' \rightarrow b$$

Limited Liability and Monetary Policy

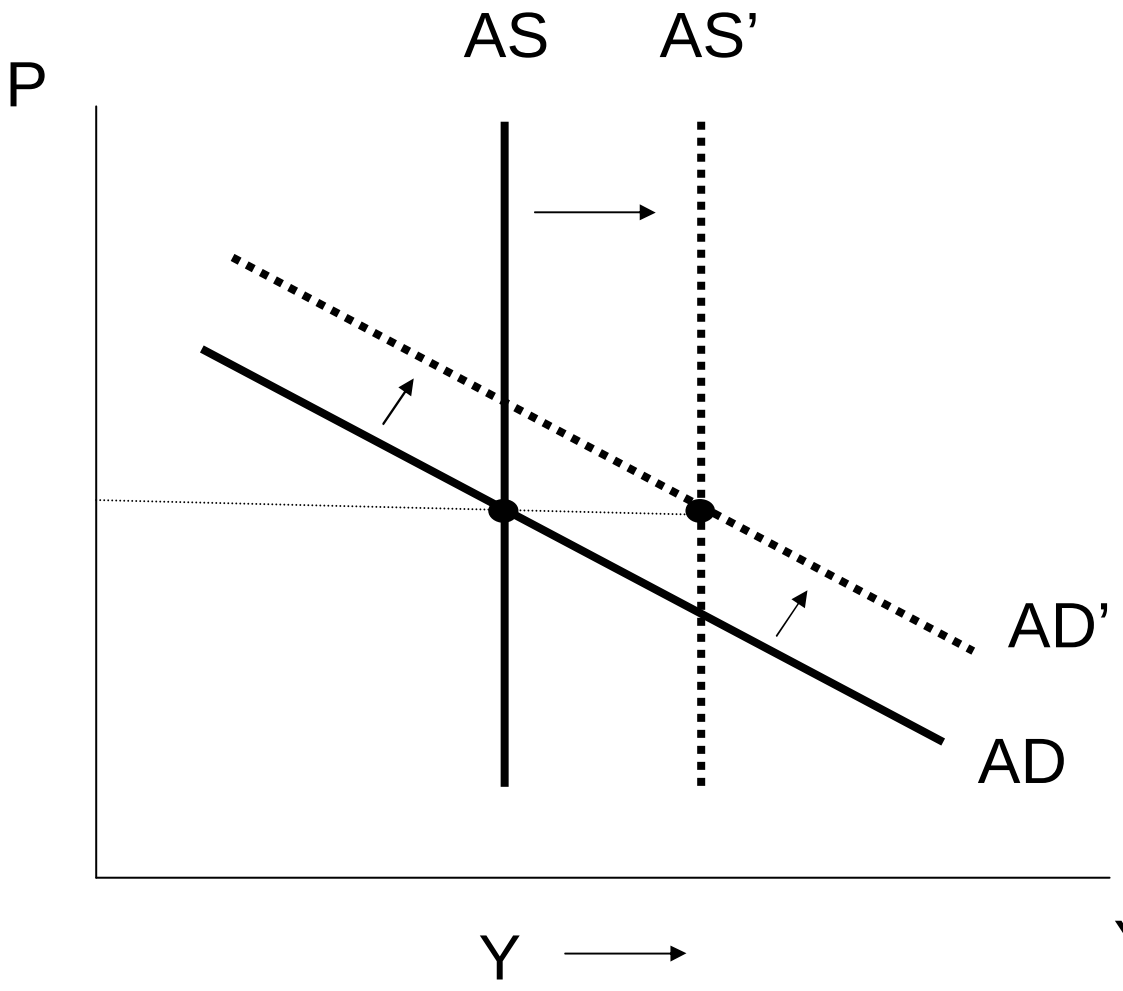
Proposition: Monetary policy can affect the average quality of bank lending activities:

$$\frac{\partial \varphi'}{\partial r} < 0$$

Proof:

$$\frac{\partial g(d,r)}{\partial r} > 0 \quad \rightarrow \quad d \downarrow \quad \rightarrow \quad g \succ b \quad \rightarrow \quad \varphi' \downarrow \quad \rightarrow g \uparrow$$

The Level effect



$$r\uparrow \;\rightarrow\; g \succ b \;\rightarrow\; MPK\uparrow \;\rightarrow\; \left(MPL\uparrow\right) \;\rightarrow\; \frac{r}{P}\uparrow$$

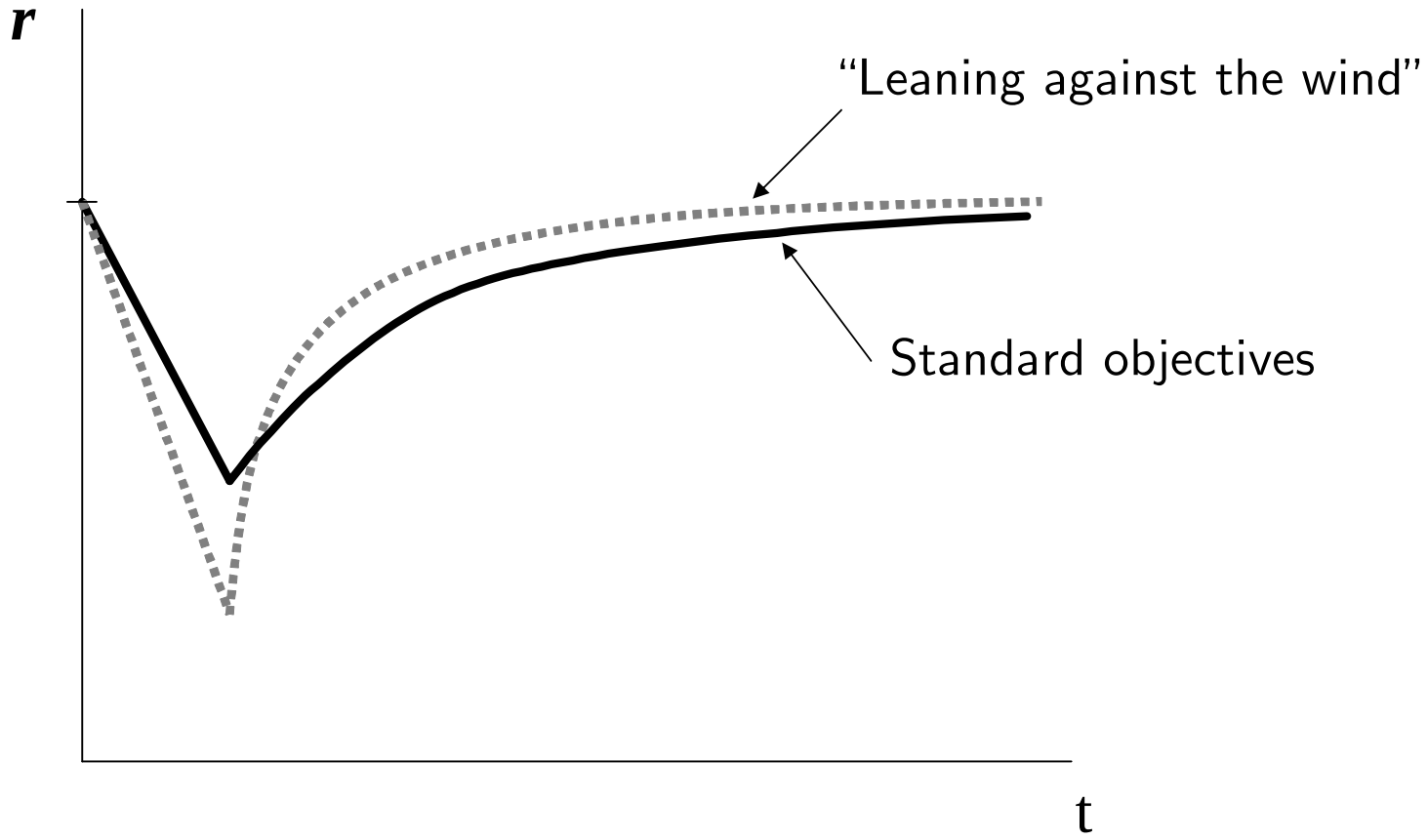
Dynamic Effect

- Bank projects are long term
  - Therefore, risk is persistent
  - Risk profiles can only be gradually adjusted

- Response to negative demand shock
  - **Brief** rate cut
  - Avoids rise in bank risk
  - But then **deep** cut: since short window

- Taken together:

Effects (for a given negative shock)



Monetary policy – dynamic set-up

$$\min_{r_t,\, t\geq 0} E(L) = \min_{r_t,\, t\geq 0} \left\{ E \sum_{t=0}^{\infty} \delta^t \left[(1-\rho)\left(Y_t - Y^*\right)^2 + \rho\left(Y_t^* - Y^*\right)^2 \right] \right\}$$

- IS: $y_t\left(\varepsilon_t, r_t^f, r_{t-1}^f, \ldots, r_0^f\right), \qquad \varepsilon_t = \theta\varepsilon_{t-1} + \nu_t$
- AD effects: $\dfrac{\partial y_t\left(\varepsilon_t, r_t^f, r_{t-1}^f, \ldots, r_0^f\right)}{\partial r_{t-s}^f} < 0, \qquad \dfrac{\partial y_t(\bullet)}{\partial \varepsilon_t} > 0$
- Risk is persistent: $Y_t^*(risk)$

Dynamic Effect

Definition Define λ as the profile of the monetary authority's policy response, where a higher λ means a deeper but shorter-lived policy.

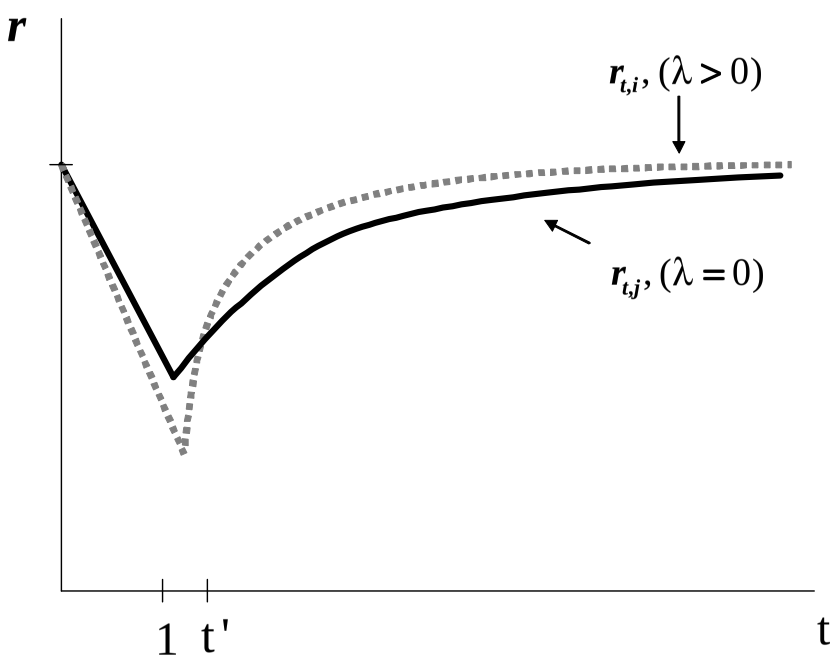
i has a larger λ than *j* *iff*:

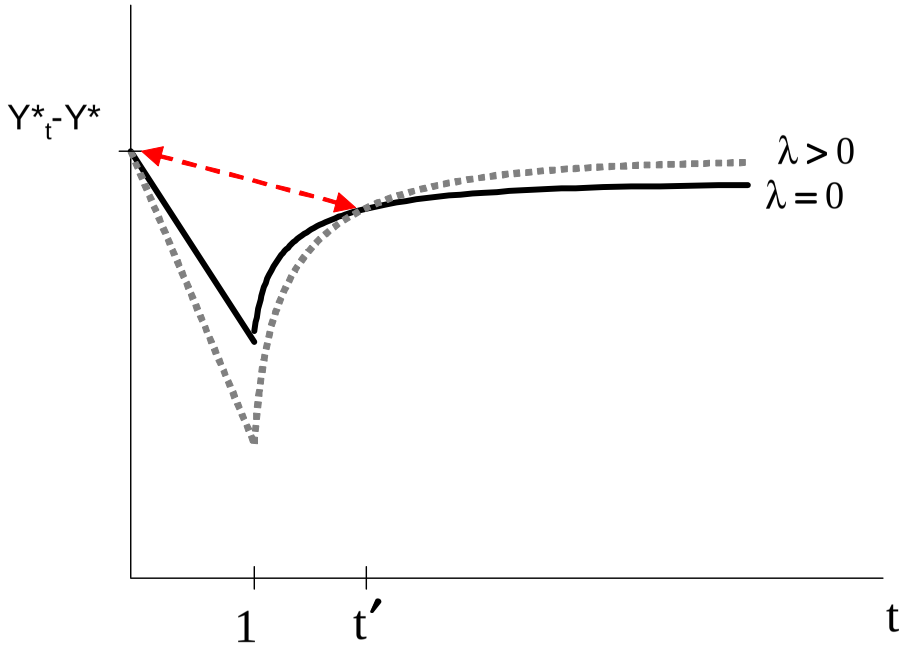
$$\exists t' : \left(\left|r_{t,i} - r^*\right| \geq \left|r_{t,j} - r^*\right| \forall t < t'\right) \wedge \left(\left|r_{t,i} - r^*\right| \leq \left|r_{t,j} - r^*\right| \forall t > t'\right)$$

Let λ=0 be optimal path of ρ=0 authority

Proposition : $\frac{d\lambda}{d\rho} > 0$

Dynamic Effect





Prudential regulation

- Regulation vs. Monetary Policy: a case for policy Coordination?

- Monetary Policy

$$\min_{r_t,\, t\geq 0} E(L) = \min_{r_t,\, t\geq 0} \left\{ E \sum_{t=0}^{\infty} \delta^t \left[\left(Y_t - Y^* \right)^2 \right] \right\}$$

- Regulation

$$\min E(L) = \min \left\{ E \sum_{t=0}^{\infty} \delta^t \left[\left(Y_t^* - Y^* \right)^2 \right] \right\}$$

Conclusions

- Calls for "leaning against the wind"
- How would monetary policy be affected?
- Higher rates and more aggressive:
  short, steep cuts.
- Connected to empirical evidence:
  - High rates ⇒ low bank risk
  - Short cuts ⇒ prevent "too low for too long"

Conclusions

- Justification for targeting financial imbalances:
  - Monetary policy affects leveraging incentives
  - Leveraging affects bank lending quality incentives
  - And thereby economy's productive capacity

- Prudential regulation cannot do job alone if
  - Measures lack adjustment speed
  - Implementation costs convex
  - Monetary policy affects asset side incentives too