Financial Policy in a Liquidity Trap

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What is a Liquidity Trap?

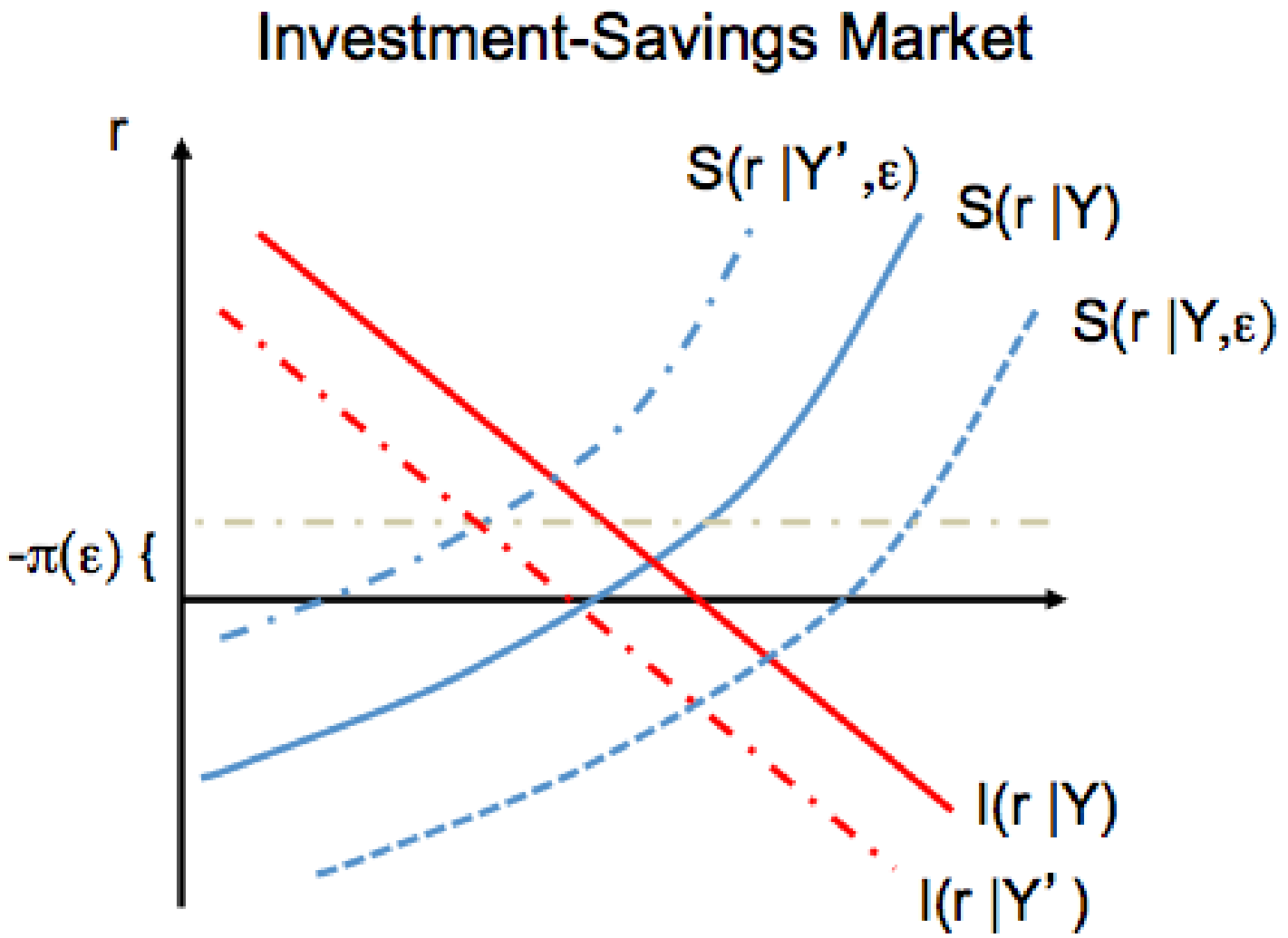
- Central bank is unable to reach the target rate implied by its usual rule

$$R_t^{nom} = \max\left\{\text{LB}, \bar{R} + \rho\pi_t\right\}$$

- High real interest rate

$$R_t^{real} \approx R_t^{nom} - \pi_t$$

The Classic Story



The Role of Policy

Objective

- Avoid or soften a Liquidity Trap.

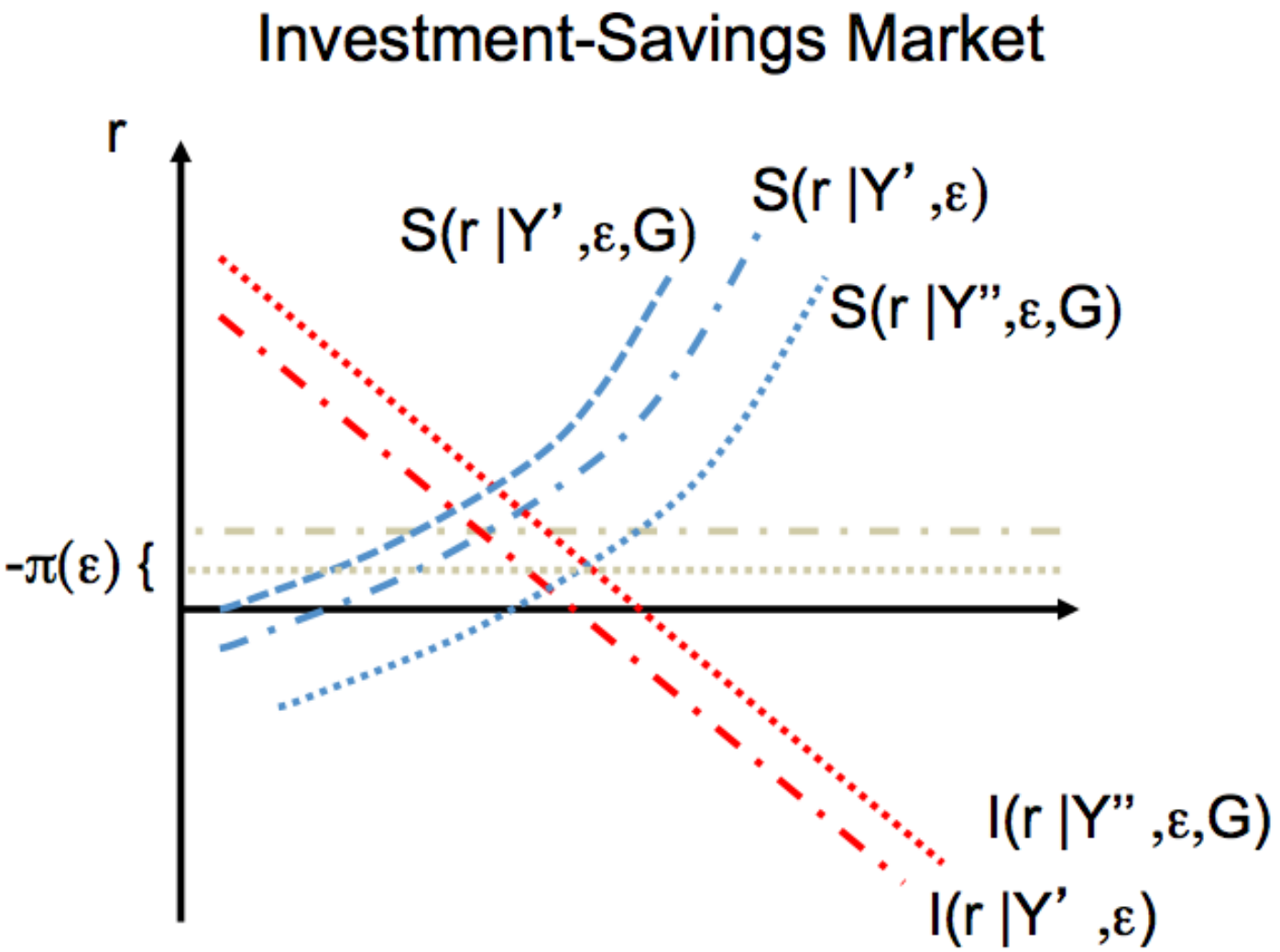
Solution others have suggested

- Fiscal stimulus (e.g. Christiano, Eichenbaum, Rebelo (2011))

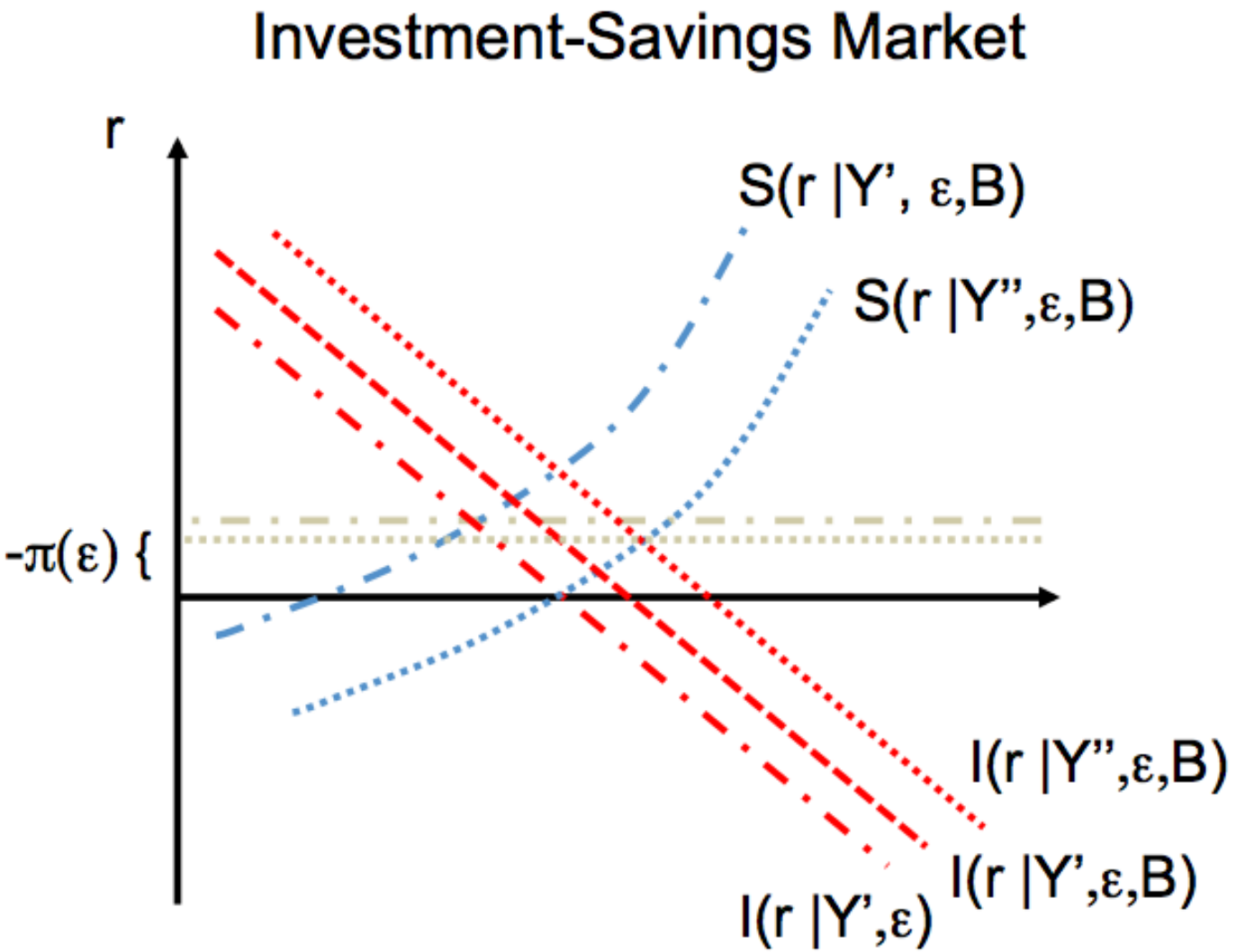
Our advice

- Recapitalize leverage-constrained investors
  - In a NK model with financial frictions

Fiscal Stimulus



Recapitalization



New Keynesian DSGE model

- Households
  - Risk averse
  - Infinitely lived
- Capital producers
  - Risk neutral
  - Financial friction
- New Keynesian Phillips Curve (Calvo-type monopolists)
- Taylor rule that respects the lower bound:

$$R_t^{nom} = \max\left\{\text{LB}, \bar{R} + \rho\pi_t\right\}$$

Financial Friction

- Capital producers own intertemporal capital accumulation projects
  - Can abscond with a fraction ϕ of project revenues.

Contracting problem

$$\max_{n_t, d_t} q_t i_t - d_t \text{ such that}$$

$$q_t i_t - d_t \geq \phi q_t i_t \tag{1}$$

$$d_t + n_t = i_t \tag{2}$$

Incentive-compatible leverage ratio:

$$L_t \equiv \frac{i_t}{n_t} = \left[1 - (1 - \phi) q_t\right]^{-1}$$

- This ties investment to capital producers' net worth.

Solution method

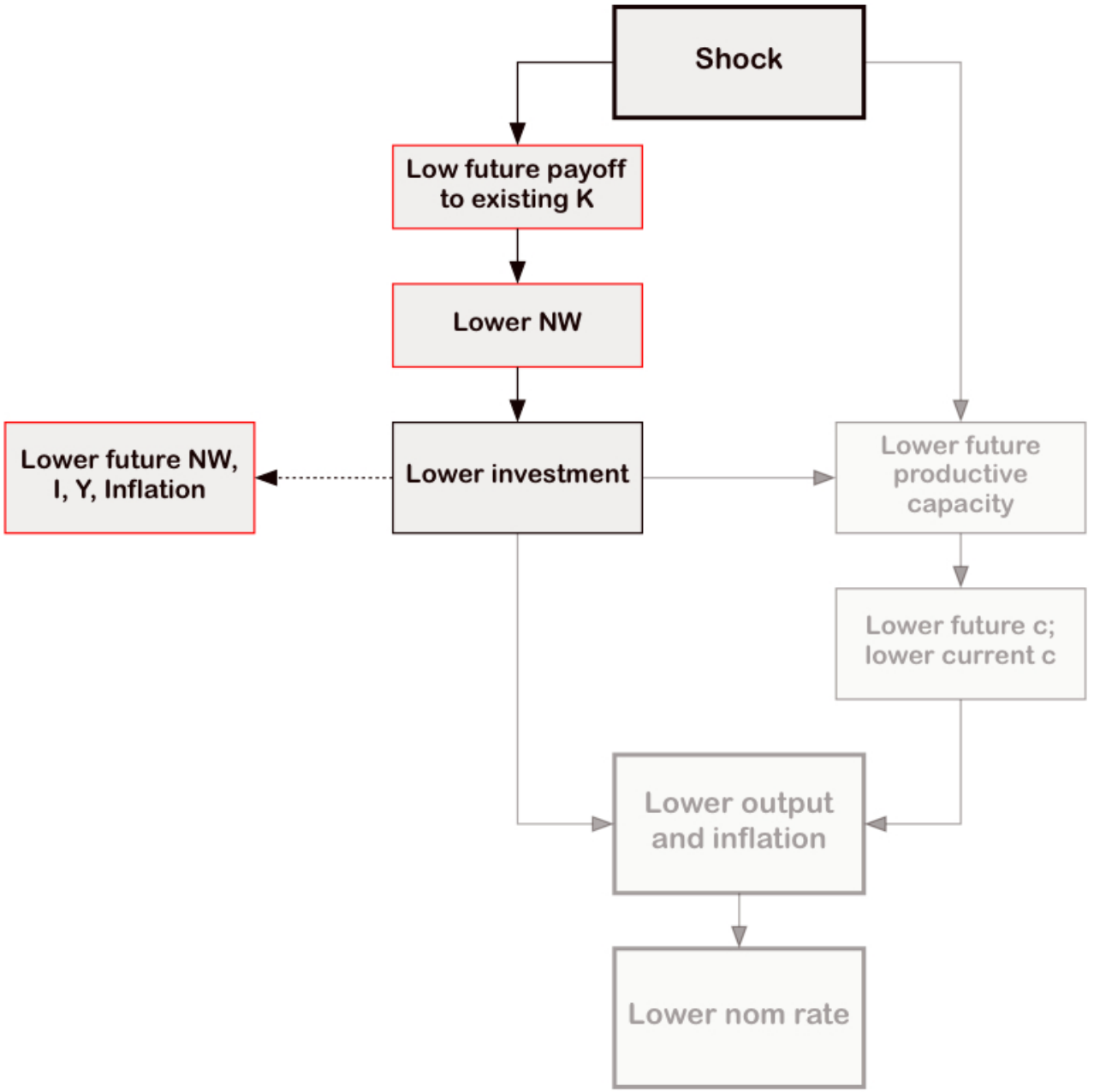
- Find the unique steady state
- Calibrate steady state to macroeconomic aggregates
- Linearly approx. dynamic equations about the steady state
- Assume agents perfectly foresee shocks and regime changes

Shock Specification

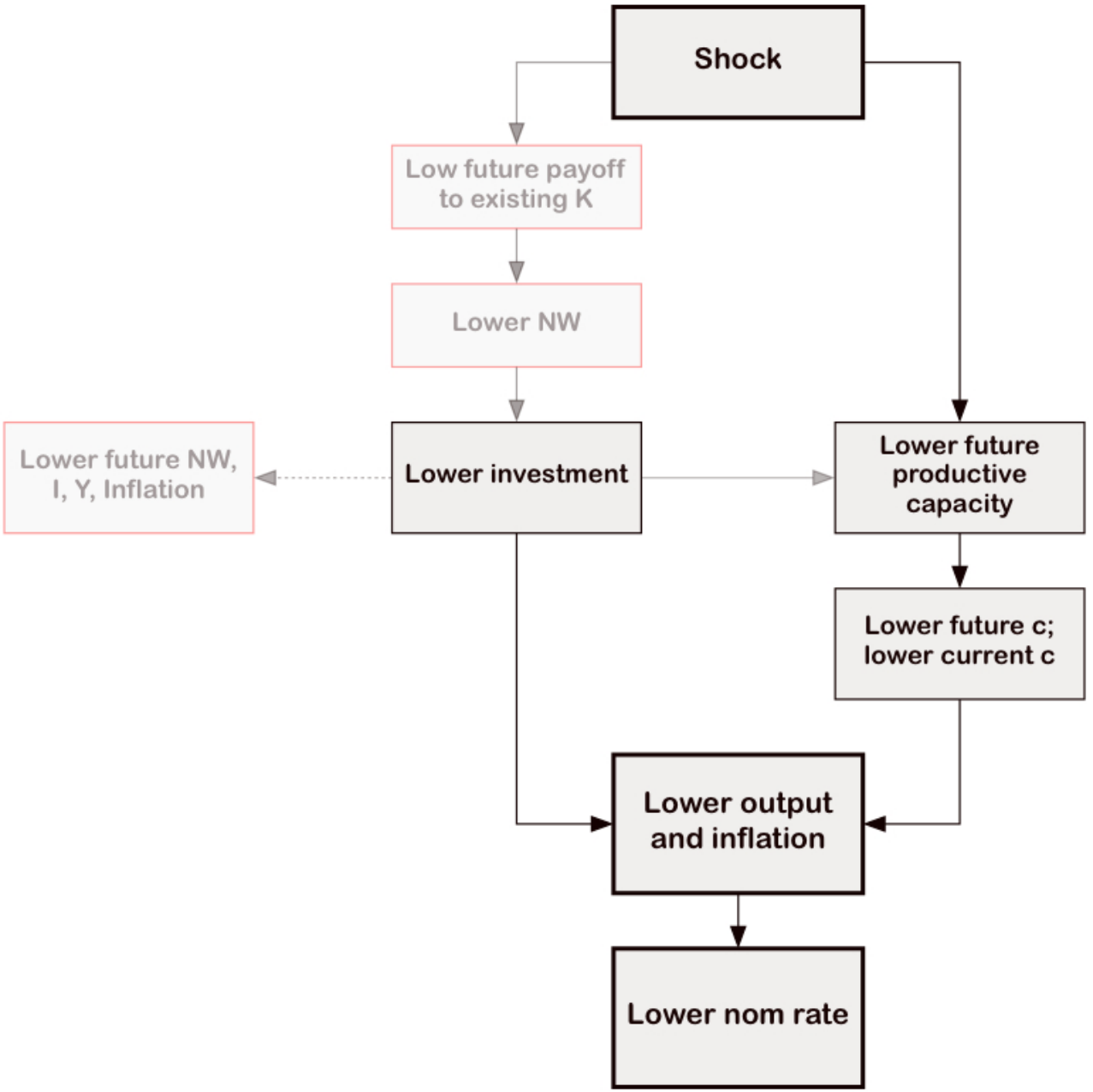
- Shock to capital depreciation
  - Capital stock entering period 1 depreciates by 11% more than expected.

▸ Interpretation

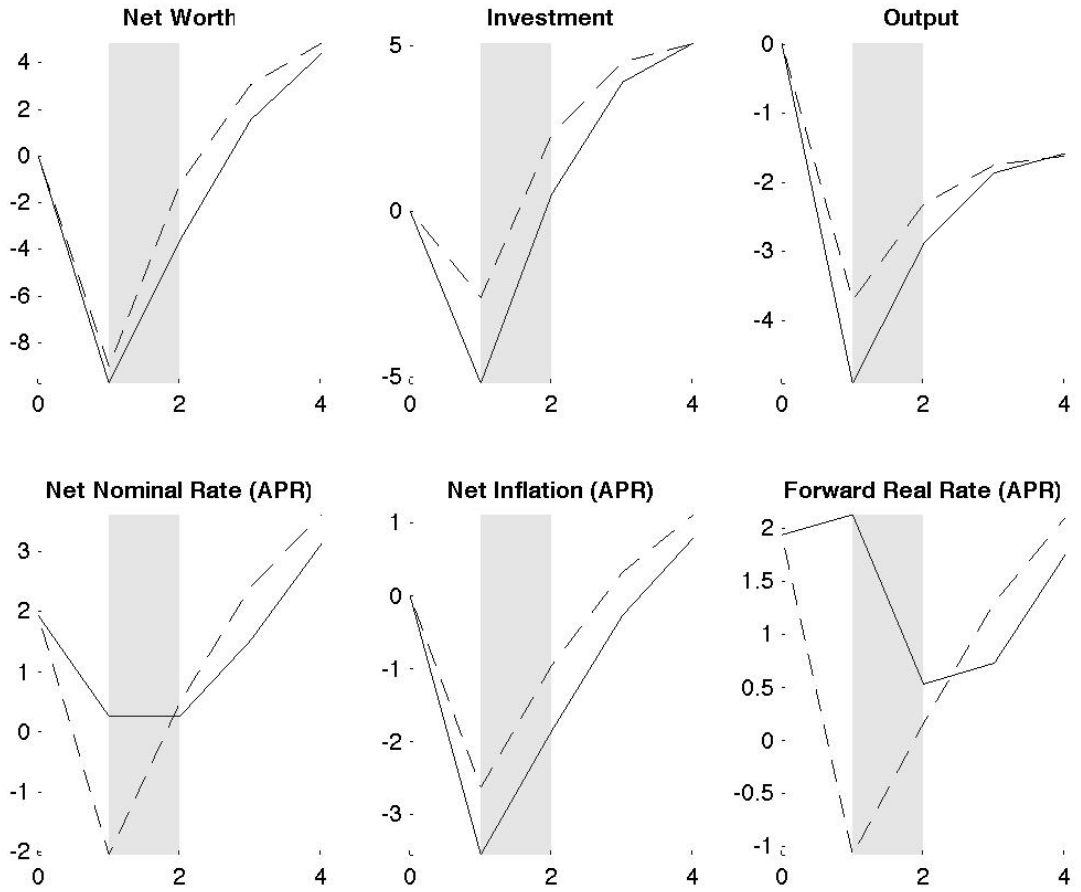
Effect of the shock



Effect of the shock



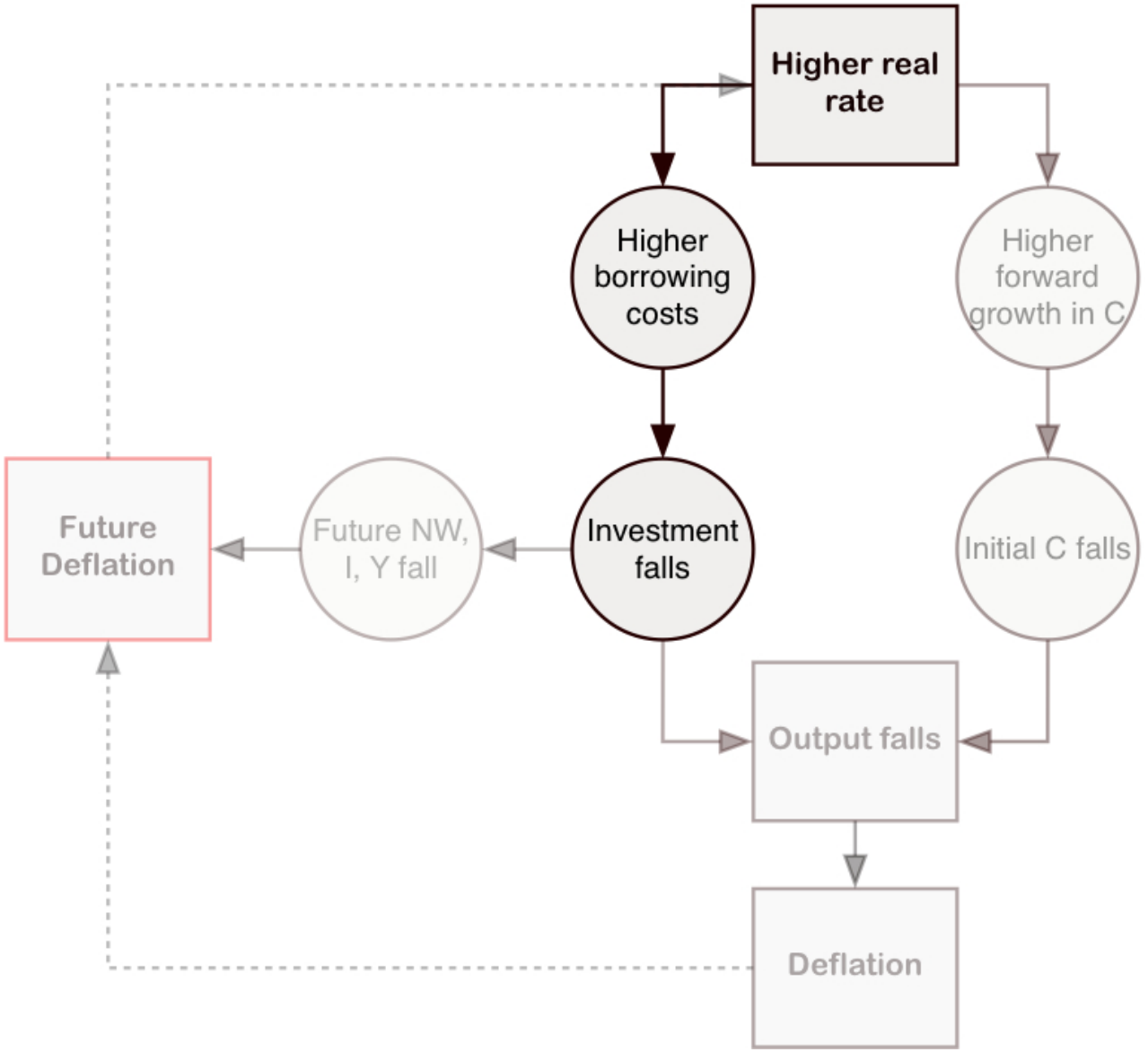
Dynamics with and without a liquidity trap



Legend- Respects LB: solid; Ignores LB: dashed

Shaded: liquidity trap

Effect of the liquidity trap



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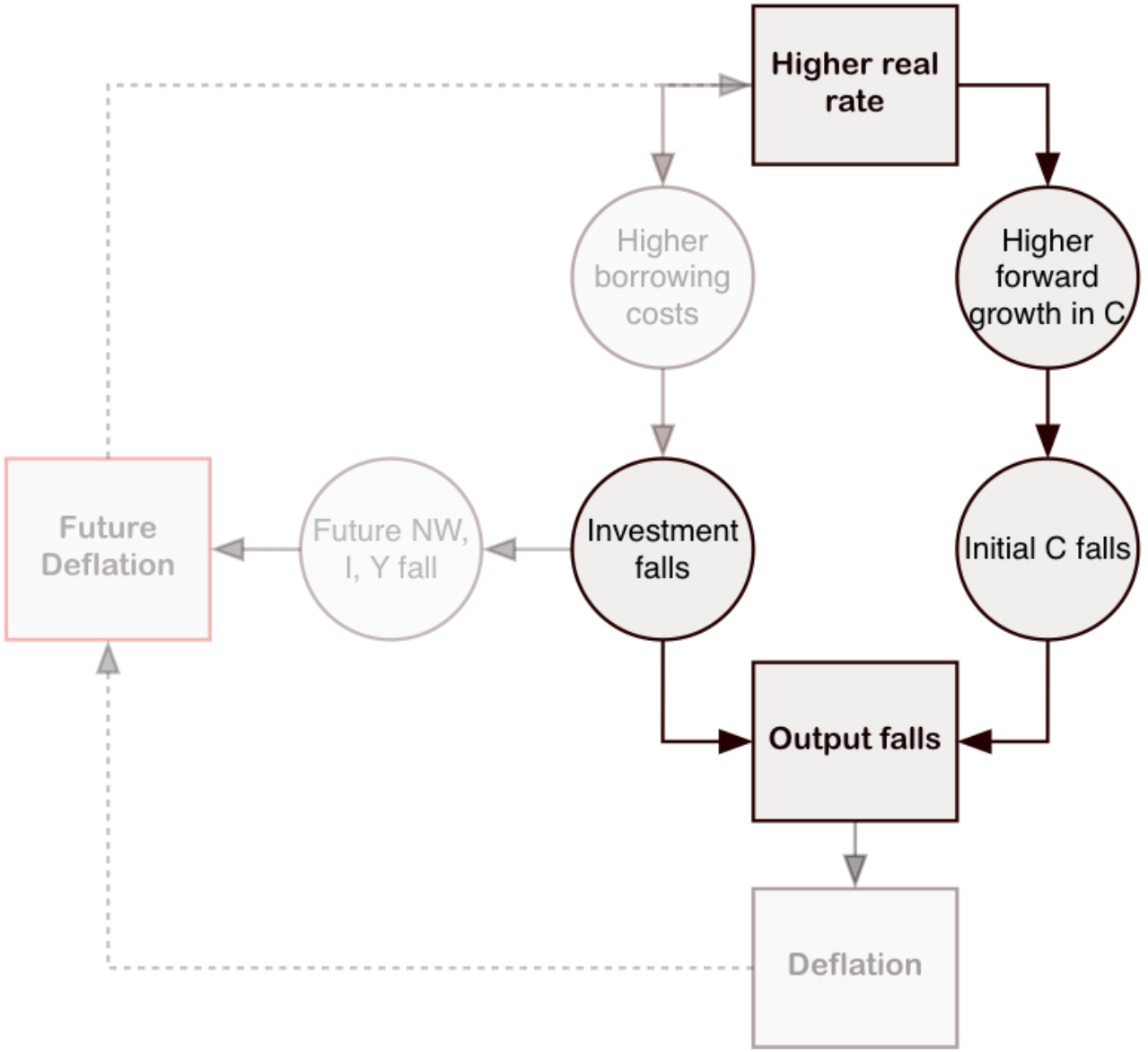

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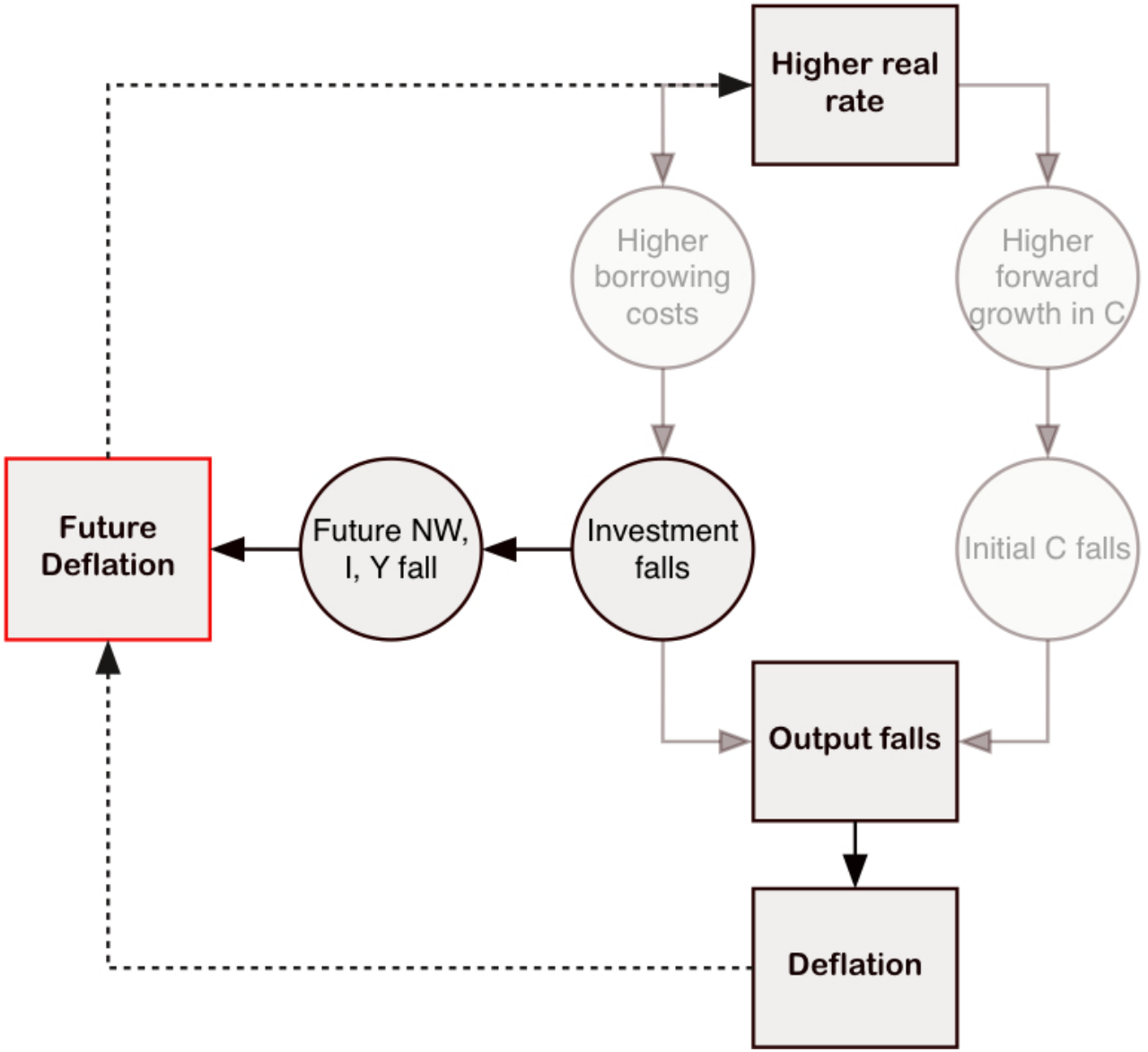

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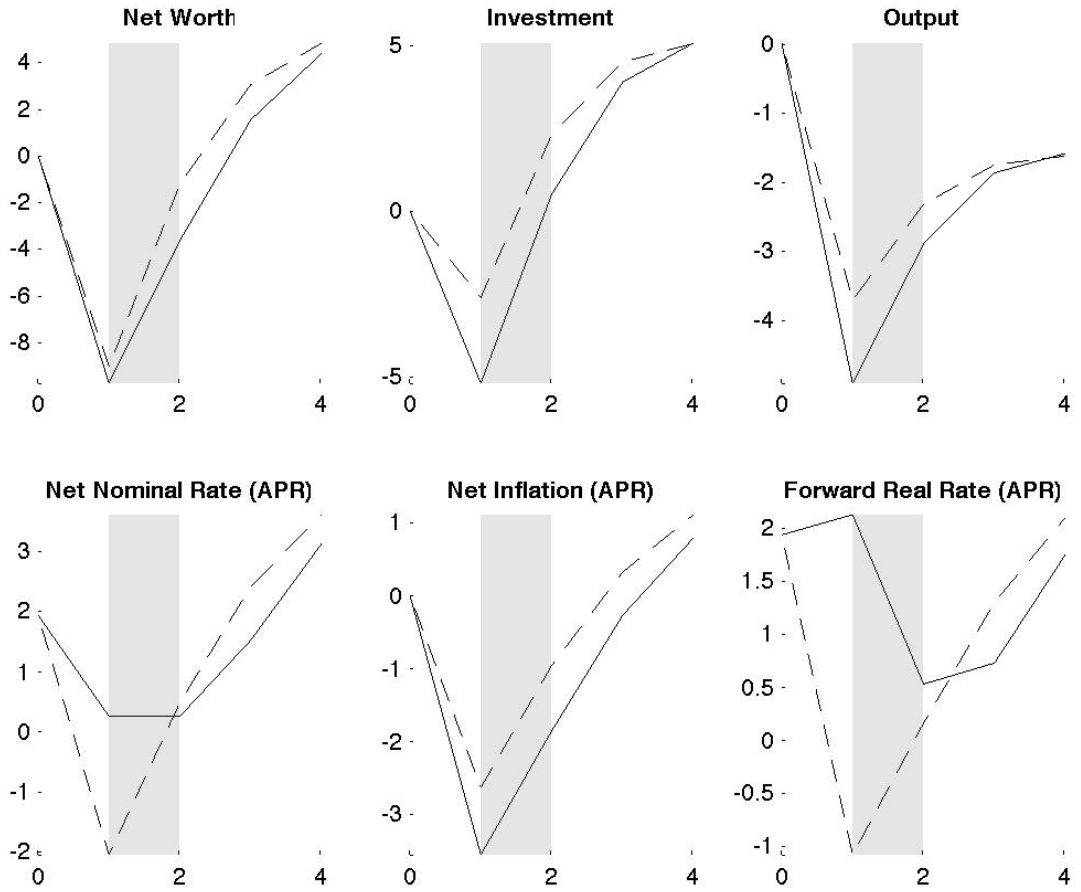


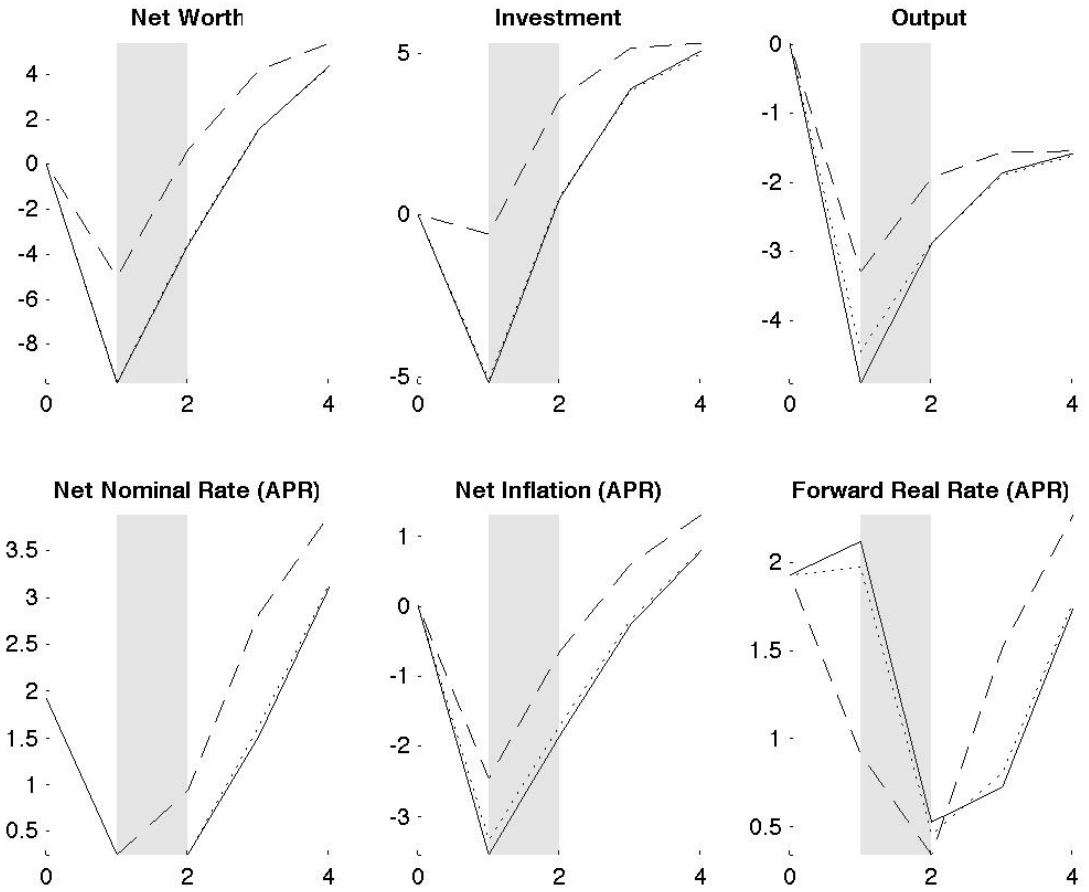
Legend- Respects LB: solid; Ignores LB: dashed

Shaded: liquidity trap

Interventions

- Increase capital producer net-worth in period 1 by 0.4% of steady state output
- Increase neutral government spending in period 1 by 0.4% of steady state output
  - Like a shock to the economy's resource constraint.

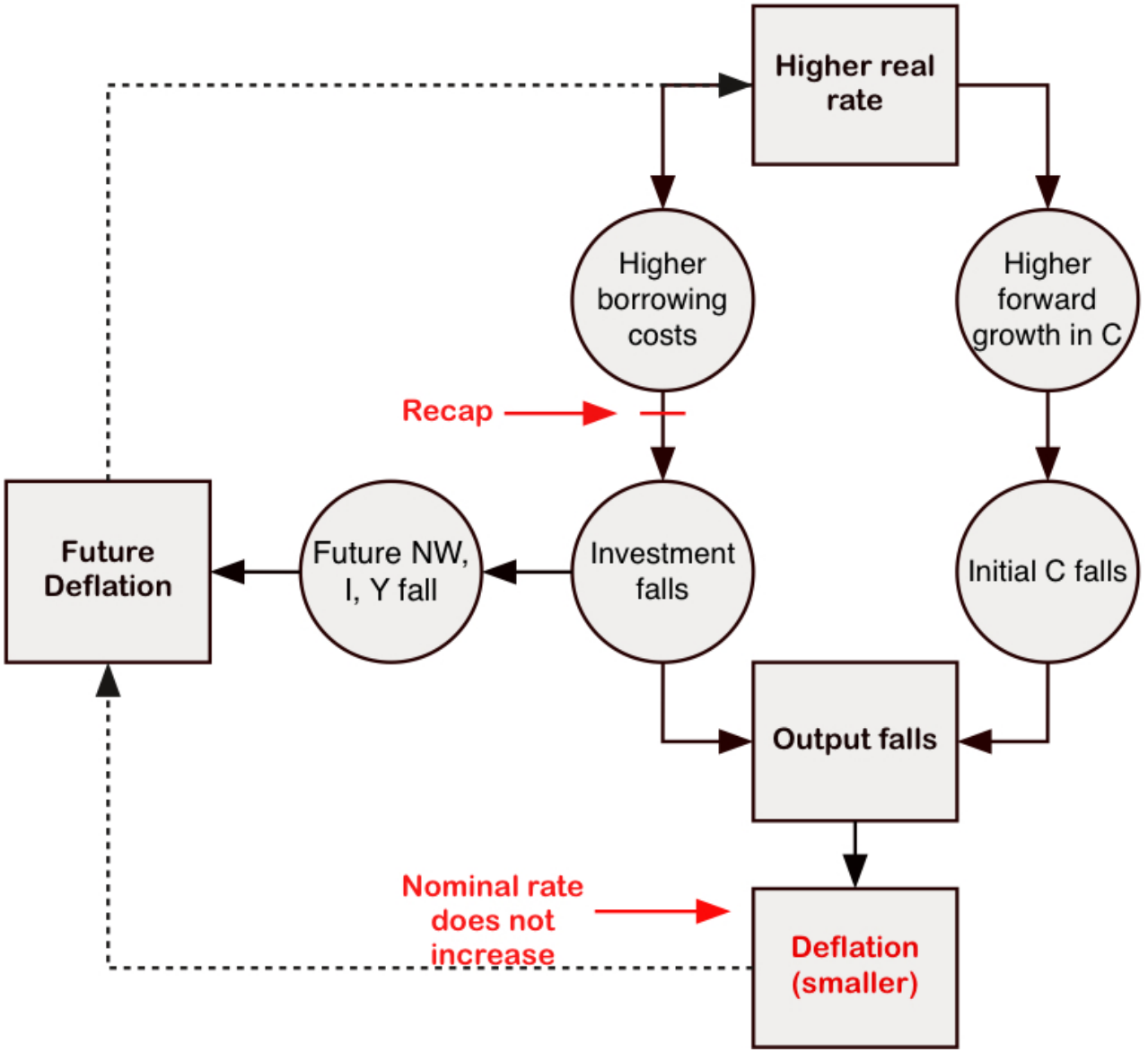
Liquidity trap w/ interventions



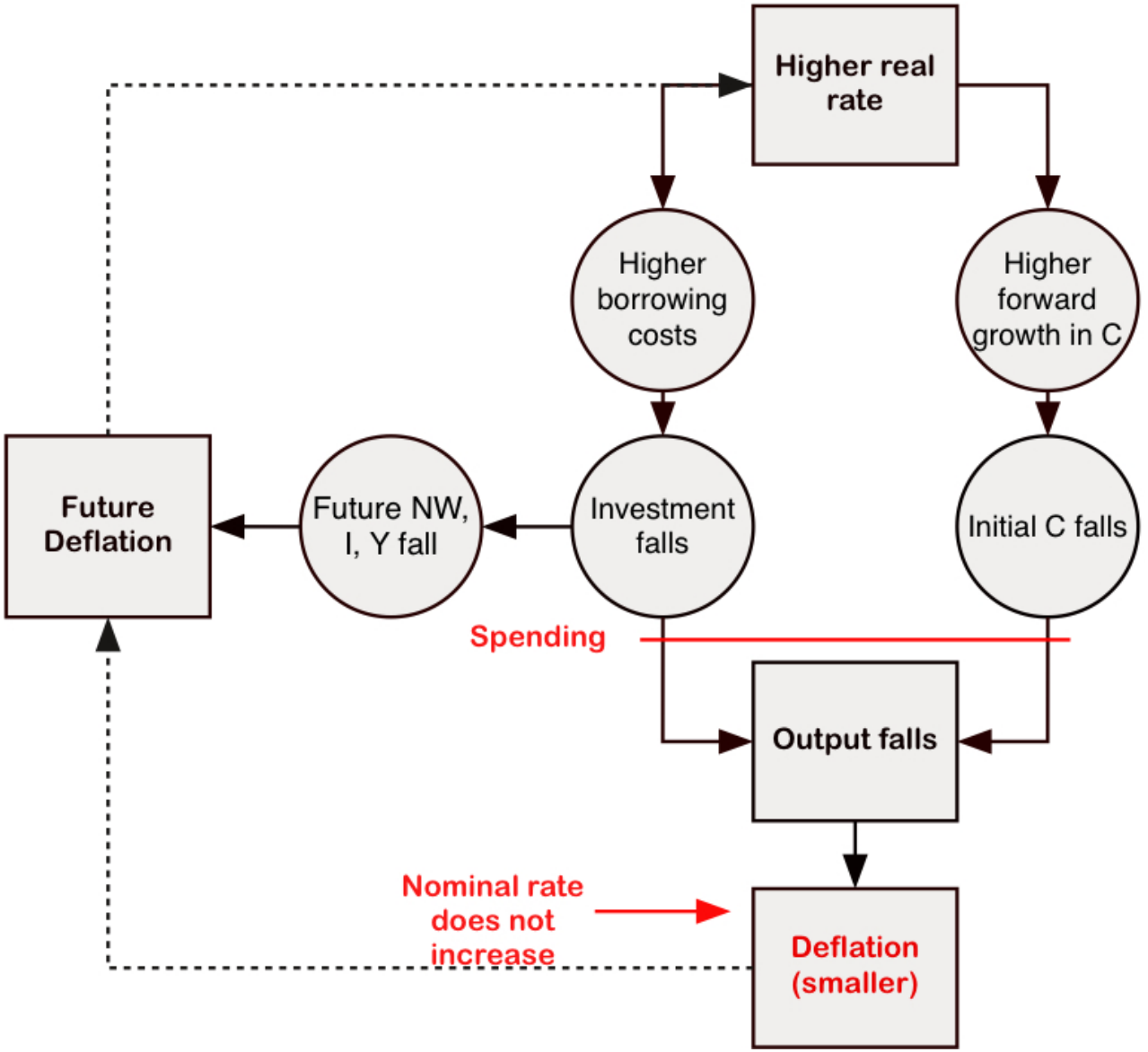
Legend- No Policy: solid; Fiscal: dotted; Recap: dashed

Shaded: liquidity trap

The effects of the recapitalization



The effects of neutral spending



Policy Effectiveness and the Liquidity Trap

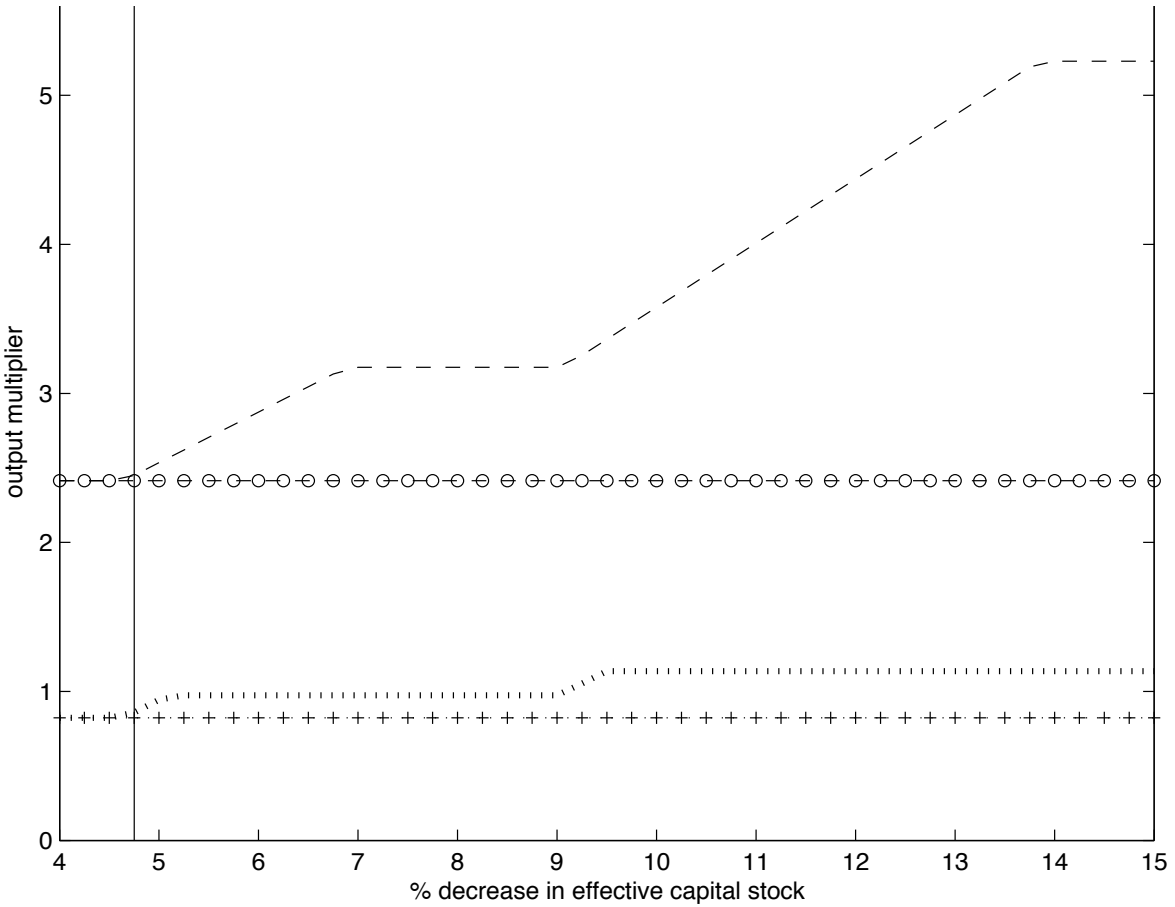
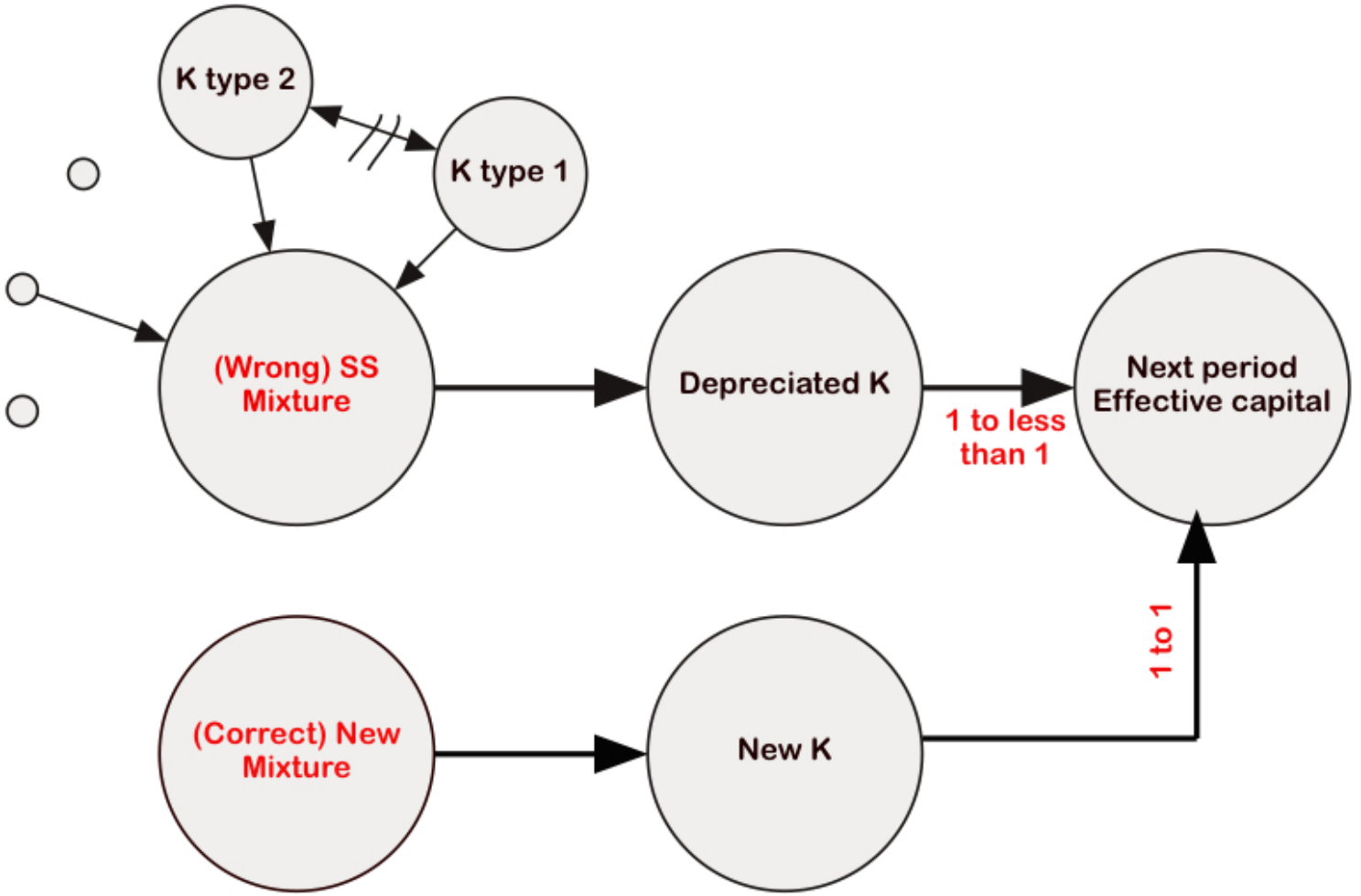


Figure: Output multipliers in the model with a financial friction

Summary

- In a model of financial frictions, recapitalization mitigates the effects of a liquidity trap.
- Recapitalization is much more effective than government spending at doing this.

Shock Interpretation



Back

Leverage and Investment Dynamics

Net Worth:

$$N_{t+1} = \tau^f \left(\phi q_t I_t\right) \left(1 + R^{real}_{t+1}\right) + \text{Recap}_{t+1}$$

Path of Investment:

$$I_{t+1} = L_{t+1} N_{t+1} = L_{t+1} \left\{ \tau^f \left(\phi q_t I_t\right) \left(1 + R^{real}_{t+1}\right) + \text{Recap}_{t+1} \right\}$$

- Recapitalization boosts contemporaneous and future investment