The I Theory of Money

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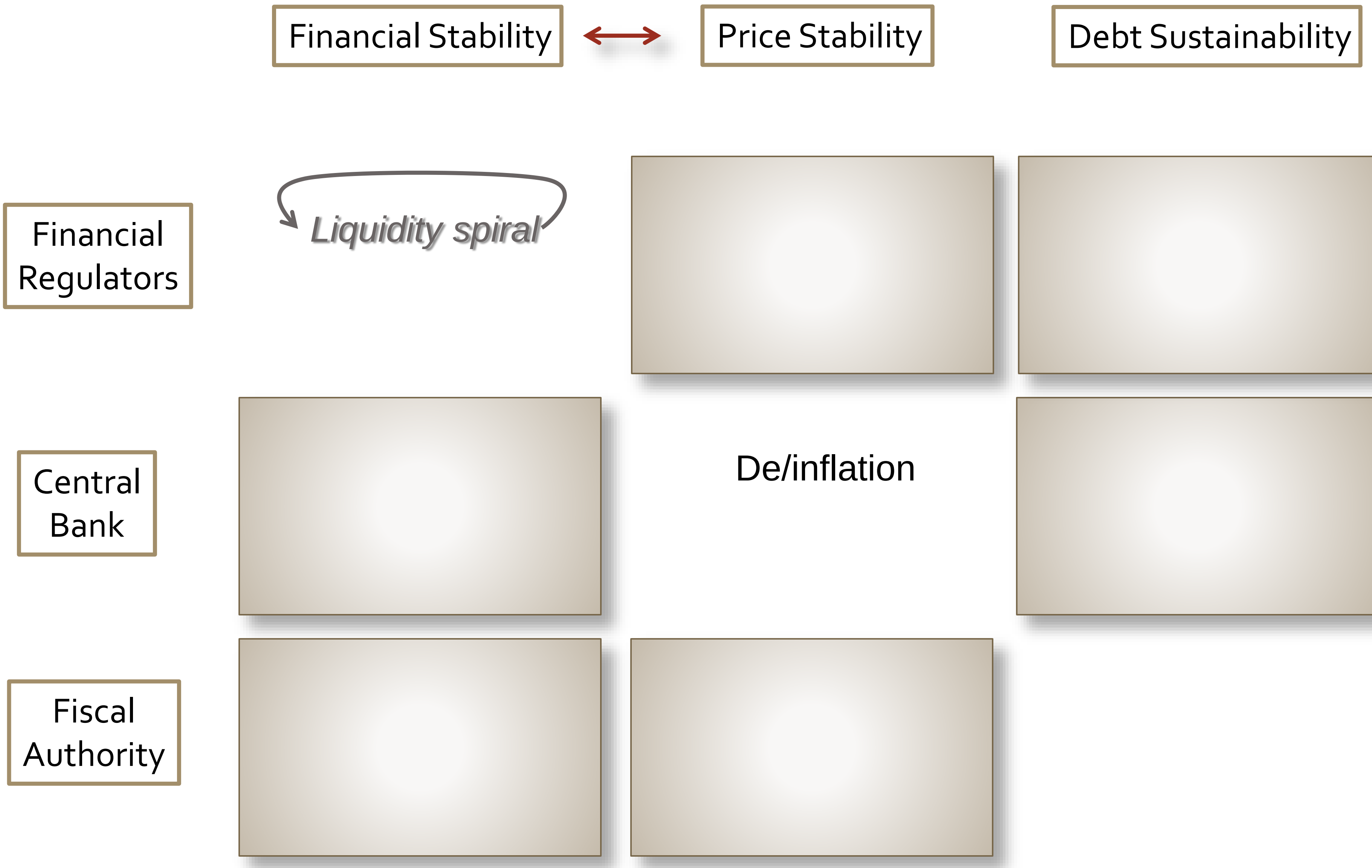
Updates: http://scholar.princeton.edu/markus/files/i_theory_slides.pdf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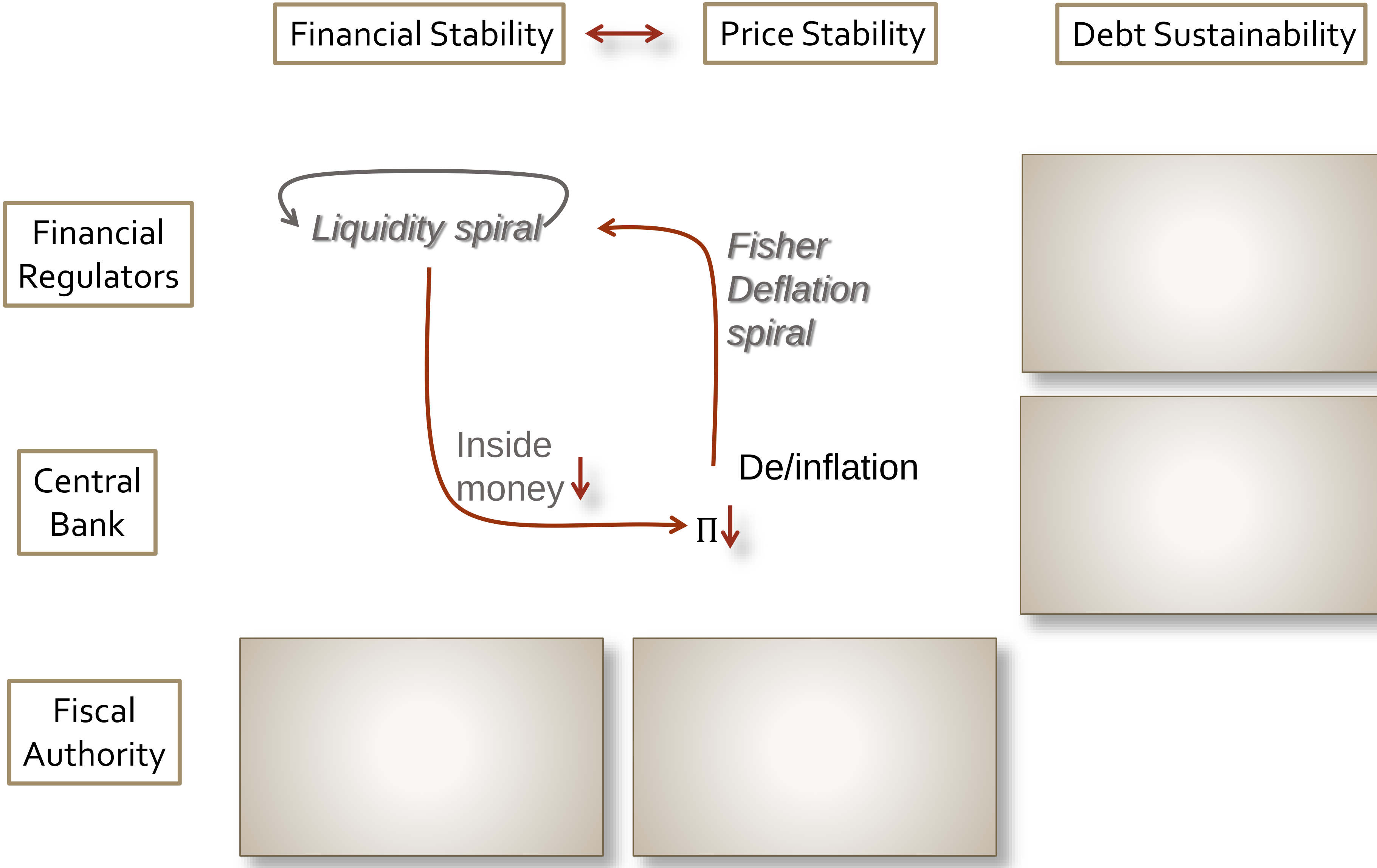
Price Stability
Debt Sustainability
Financial Regulators
Liquidity spiral
Central Bank
De/inflation
Fiscal Authority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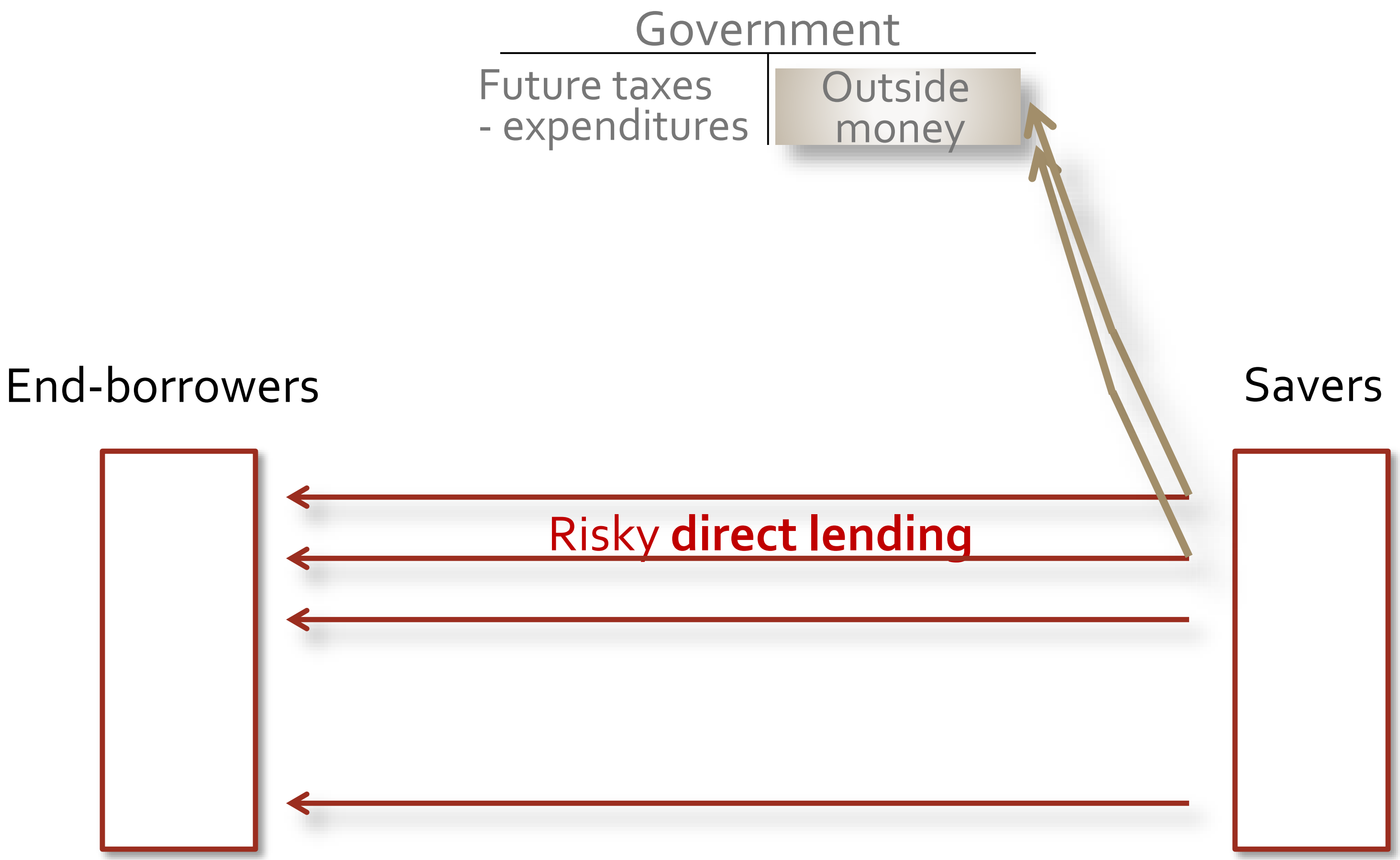
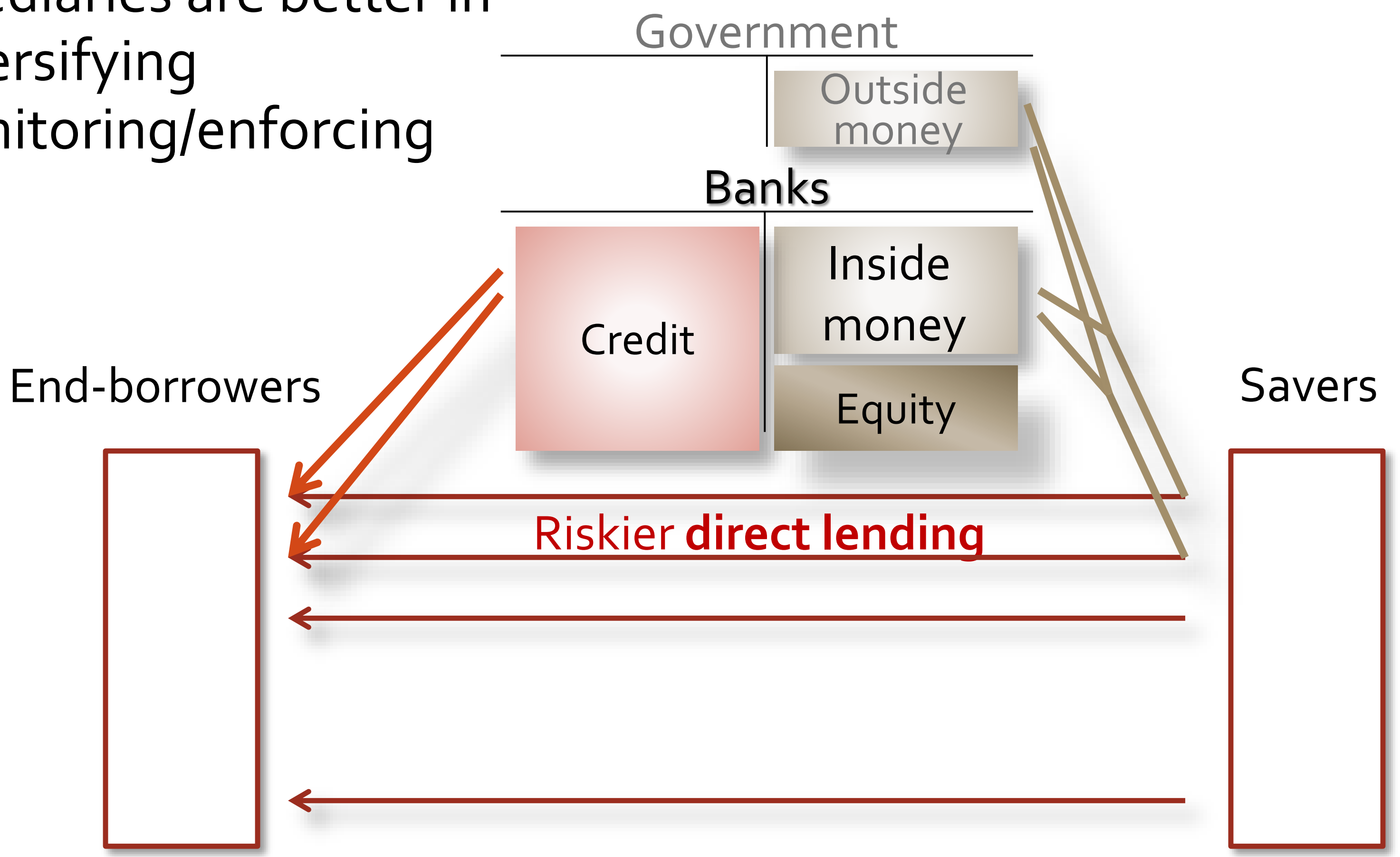
A Stylized Economy: without banks



A Stylized Economy: with~~out~~ banks

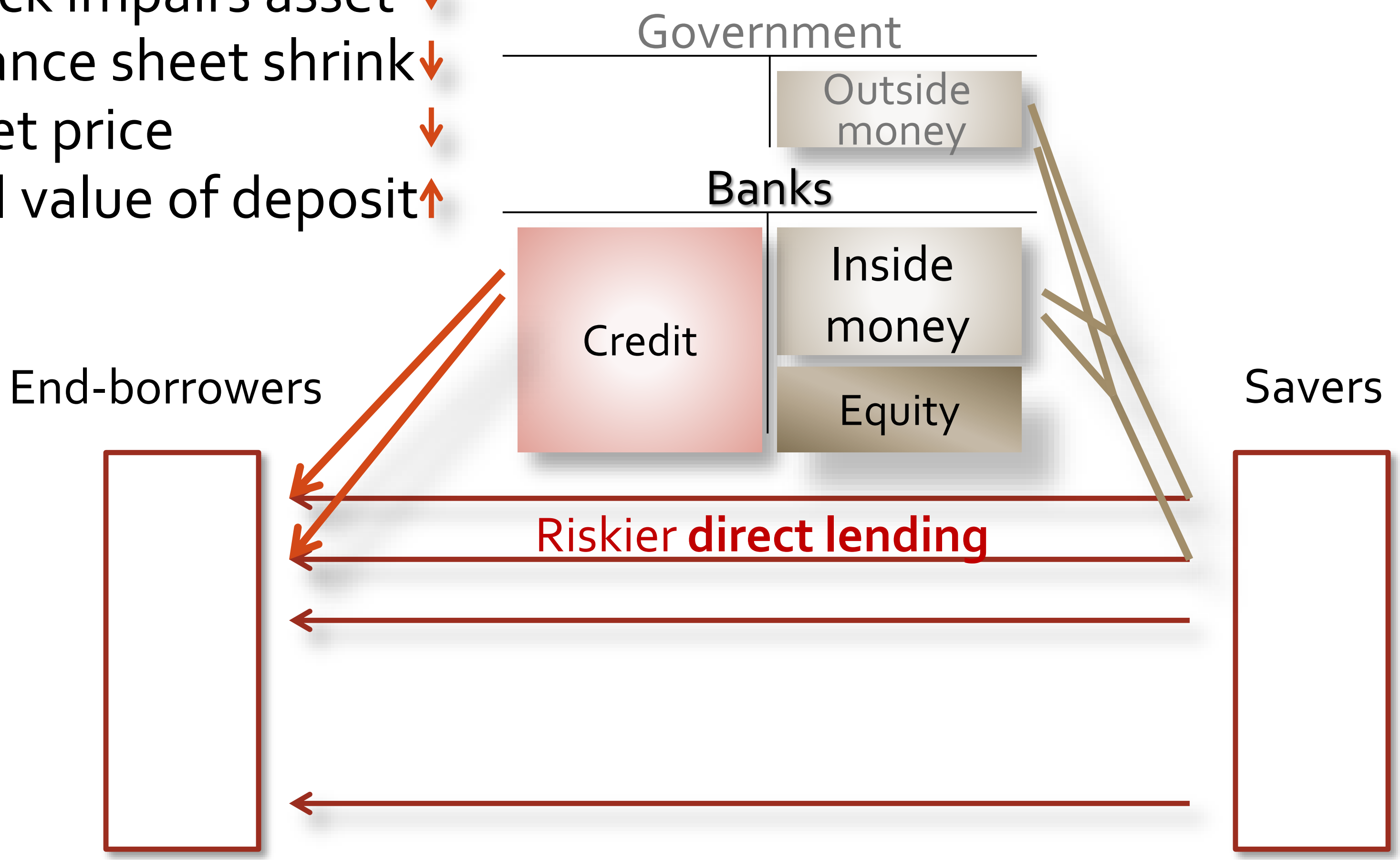
Intermediaries are better in

1. Diversifying
2. Monitoring/enforcing

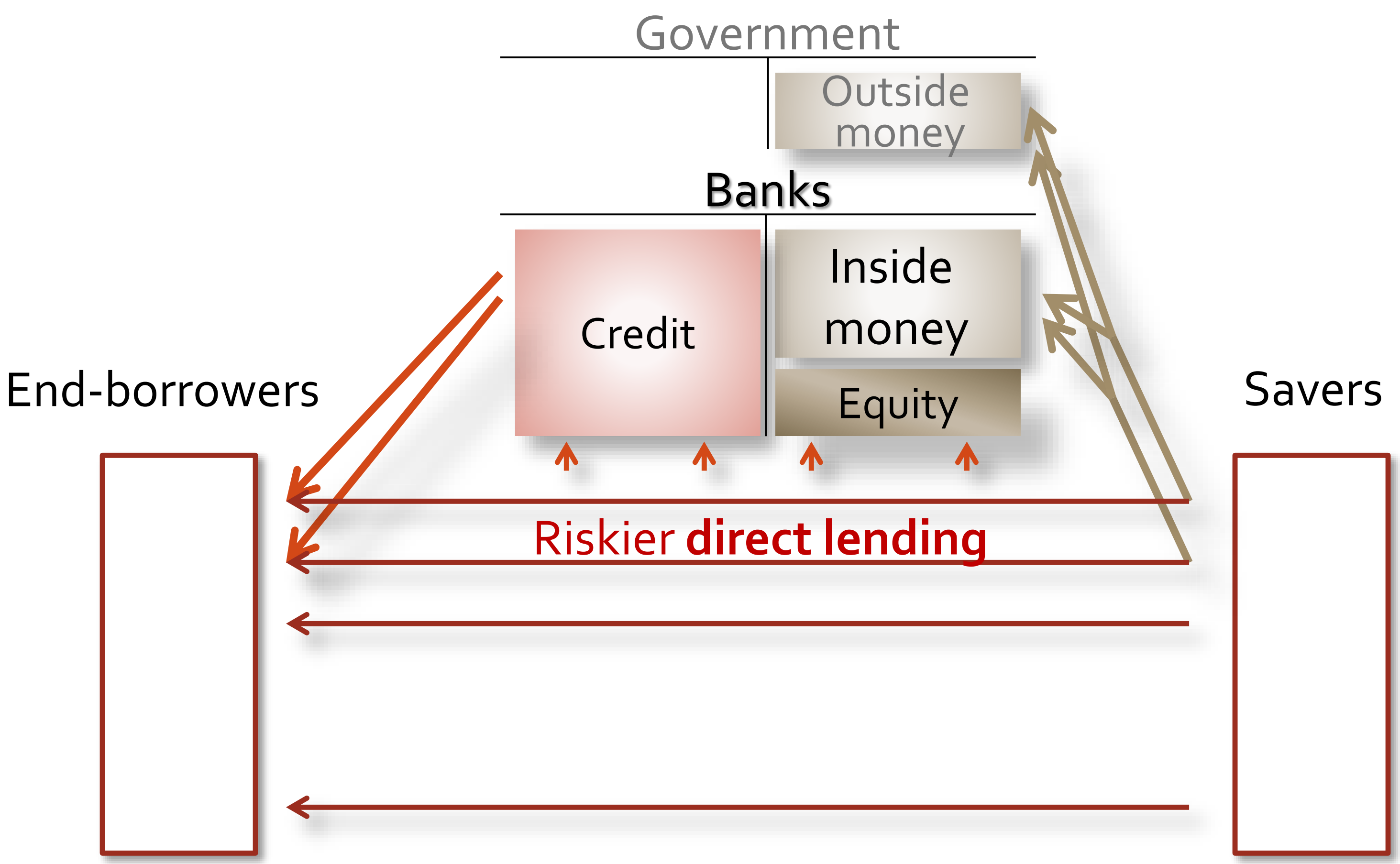


Adverse Shock split into 4 Steps

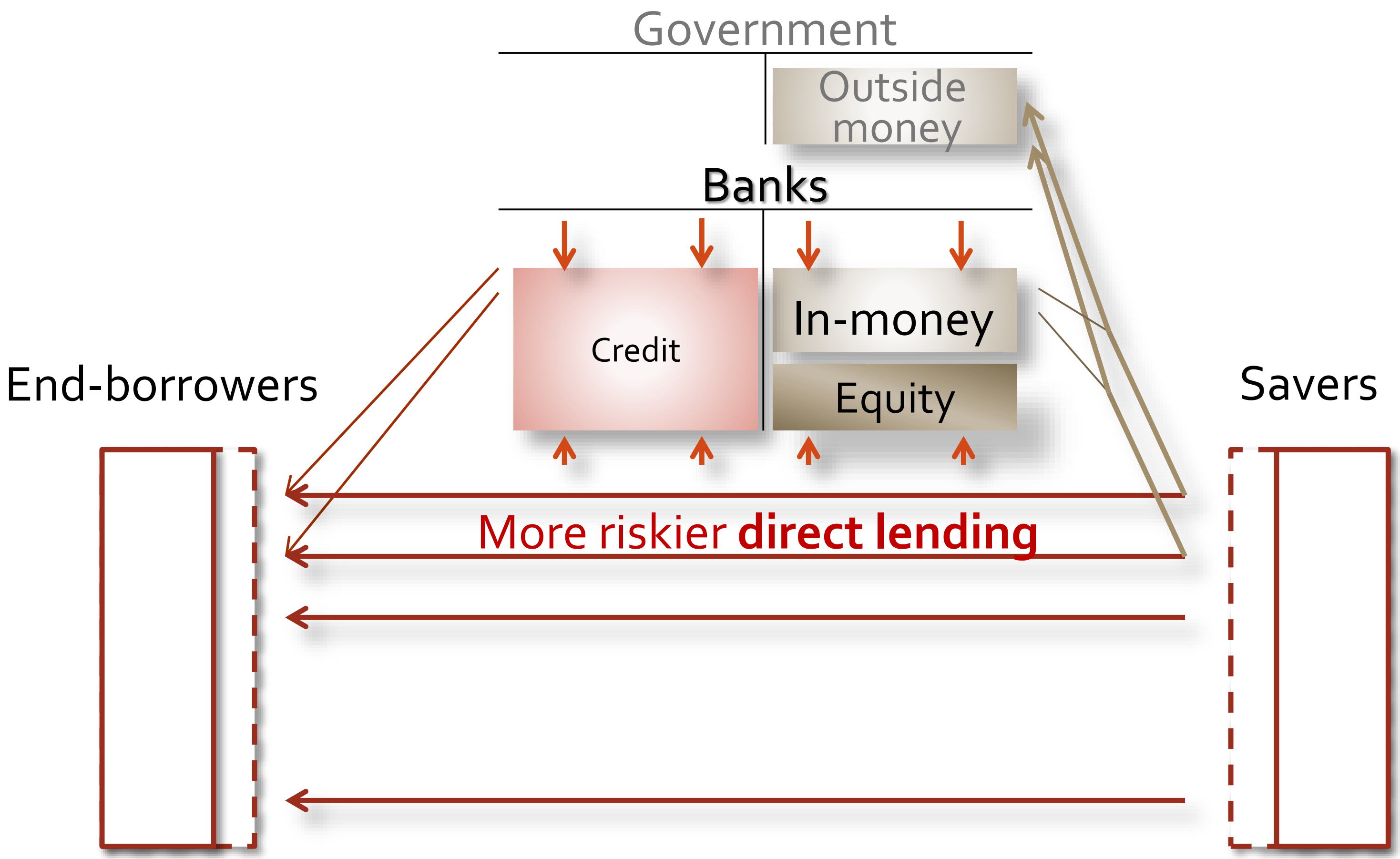
1. Shock impairs asset ↓
2. Balance sheet shrink ↓
3. Asset price ↓
4. Real value of deposit ↑



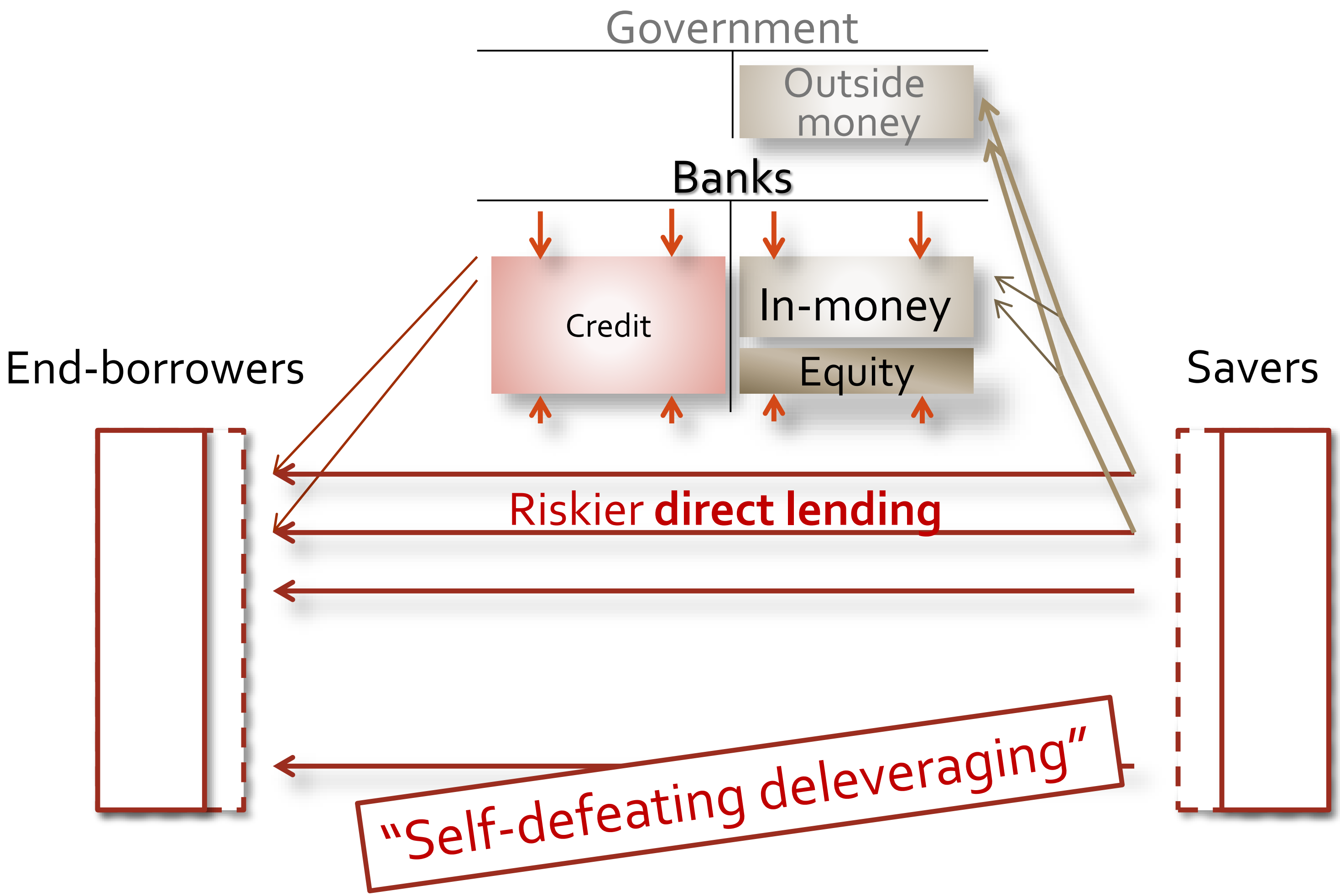
1. Shock Impairs Assets – 1st of 4 Steps



2. Shrink Balance Sheet: Sell off of Assets

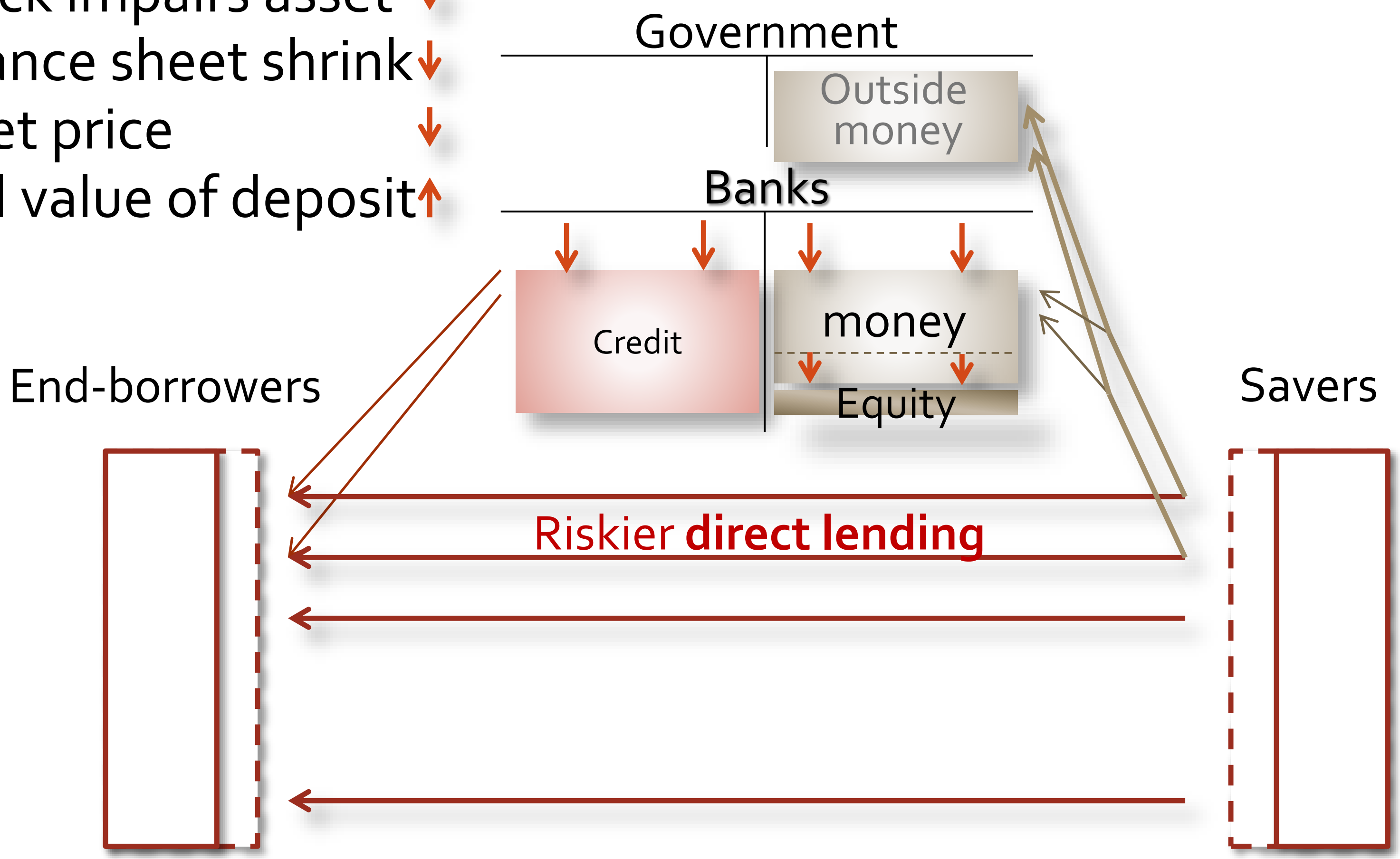


3. Liquidity Spiral: Sell off of Assets



4. Deflation Spiral: Value of Liabilities Expands

1. Shock impairs asset ↓
2. Balance sheet shrink ↓
3. Asset price ↓
4. Real value of deposit ↑



Small shock has large effect and redistributes wealth

In sum, after an adverse shock

- Banks are hit on both sides of the balance sheet

- **Assets side:**
  - New credit supply $\downarrow$
  - Fire sales of assets $\Rightarrow$ asset price $\downarrow$
  - $\Rightarrow$ Investment $\downarrow$
  - $\Rightarrow$ Growth $\downarrow$

Liquidity spiral

Financial instability

- **Liability side:**

Price instability

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  - New credit supply ↓
  - Fire sales of assets⇒ asset price ↓
  - ⇒ Investment ↓
  - ⇒ Growth ↓

Liquidity spiral

Financial instability

- **Liability side:**
  - Deposits ↓
  - Deflation ⇒ real value of debt ↑
  - Money multiplier ↓

Deflation spiral

Price instability

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Liquidity spiral — Financial instability

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Deflation spiral — Price instability

- **Response** of banks to adverse shock leads to
  - Amplification
  - Persistence

endogenous/systemic risk
wealth redistribution

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Deflation spiral — Price instability

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  - Amplification
  - Persistence

⇒ endogenous/systemic risk, wealth redistribution

- Effects extent to other overly indebted sectors
  - Japan 1980s: corporate sector | US 2000s: Households

Equilibrium characterization

- Equilibrium is a map

Histories of shocks

$\{t_1 < t_2 < \cdots < t_n \leq t\}$

prices, allocations

$q_t, p_t, \{x_t, (1-x_t), \underline{\ldots}\}, \{C_t, \underline{C}_t\}$

wealth distribution

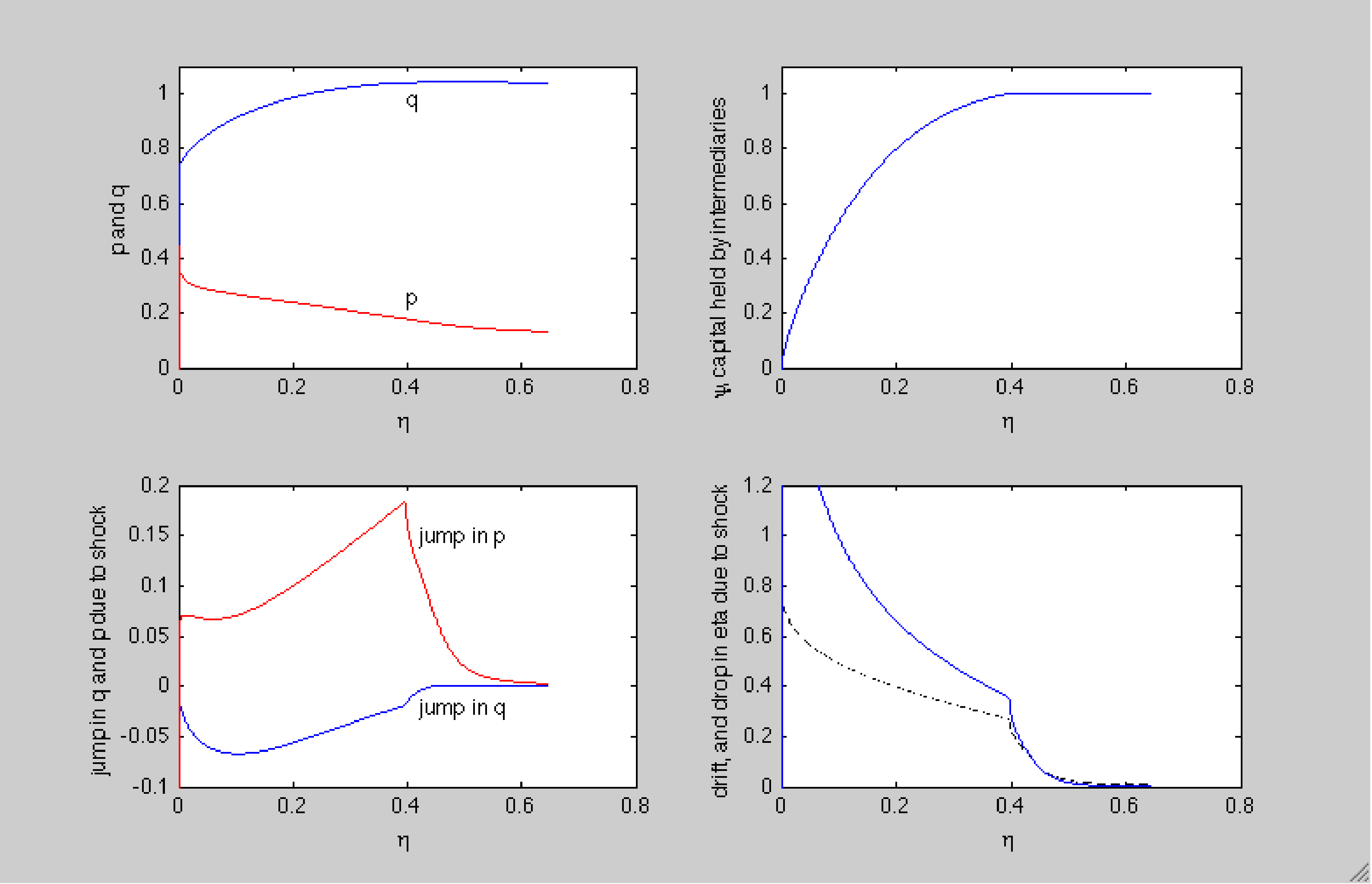
$$\eta_t = \frac{N_t}{(p_t + q_t)K_t} \in (0,1)$$

intermediaries' wealth share

- Growth μ_t^η in η (absent a shock)
- At "steady state" η^* : $\mu_t^\eta = 0$
  - Intermediaries' earnings offset their consumption rate

Example

- Parameters $a = 0.1$, $\underline{a} = 0.02$, $\Phi(\iota)$ has quadratic adj. costs, $\delta = .04$, $r = 5\%$, $\rho = 6\%$, $\tau = 0.1$, $\lambda = 1$, $\varphi = .005$, $\underline{\varphi} = .05$, HH can't diversify



Introducing Monetary Policy

- Role of monetary policy
  - Limit amplification and endogenous risk
  - Limit/undo wealth redistribution due to endogenous risk
    - Risk redistribution = wealth redistribution contingent on (tail) event

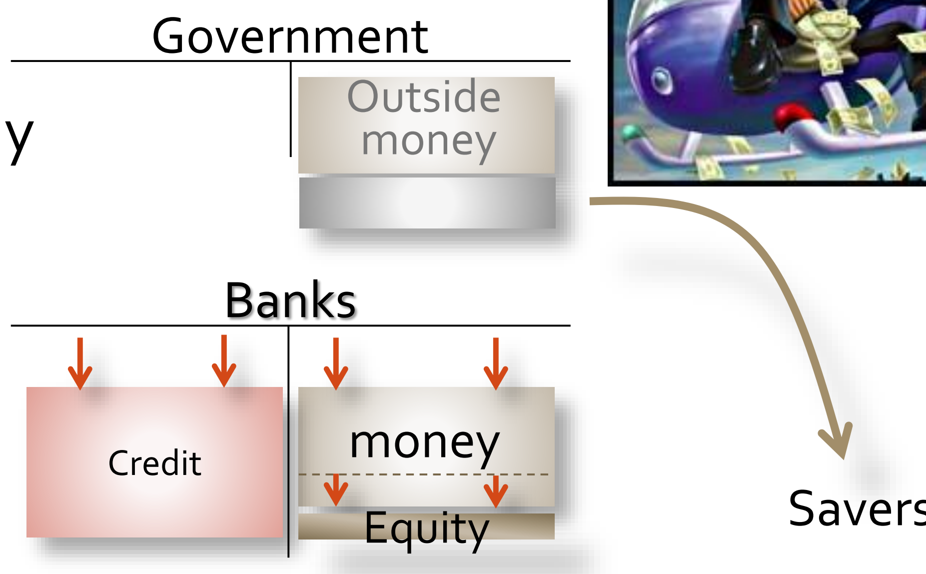
- Permanent losses

- Temporary shortage
  - Liquidity policy
    - Lender of Last Resort

- Contrast: Money View and Credit View
  - Switch off deflationary spiral vs. restore credit

Money View

- Restore money supply
    - Helicopter drop to savers



Money View

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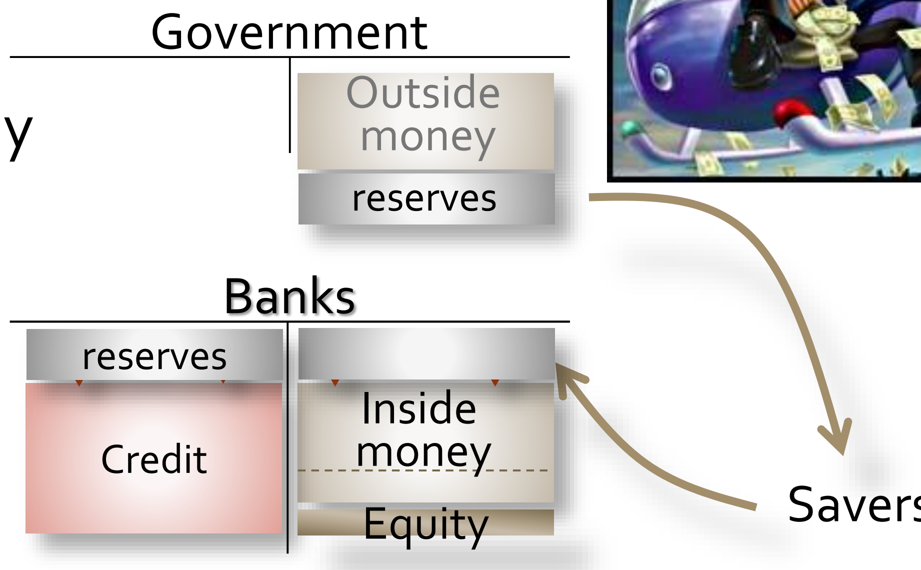
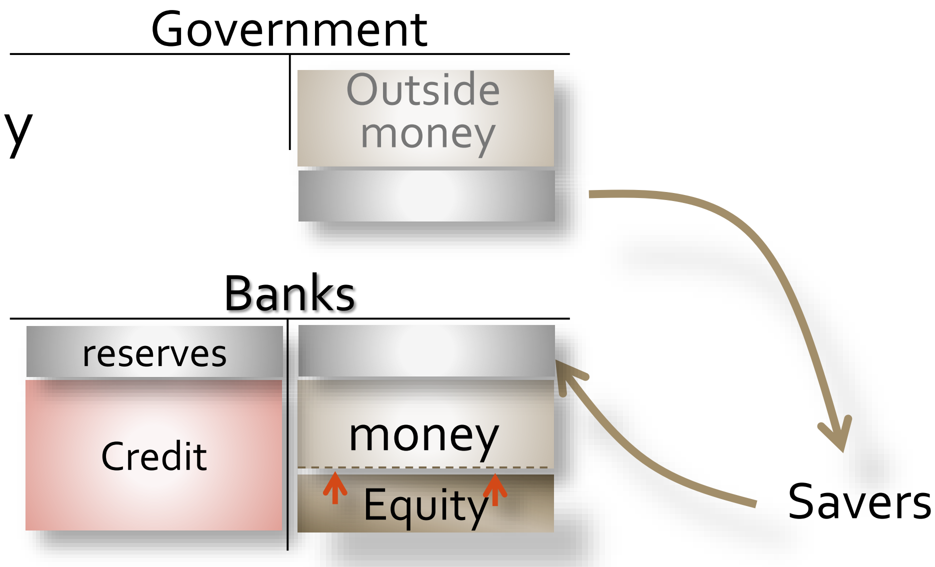


Money View

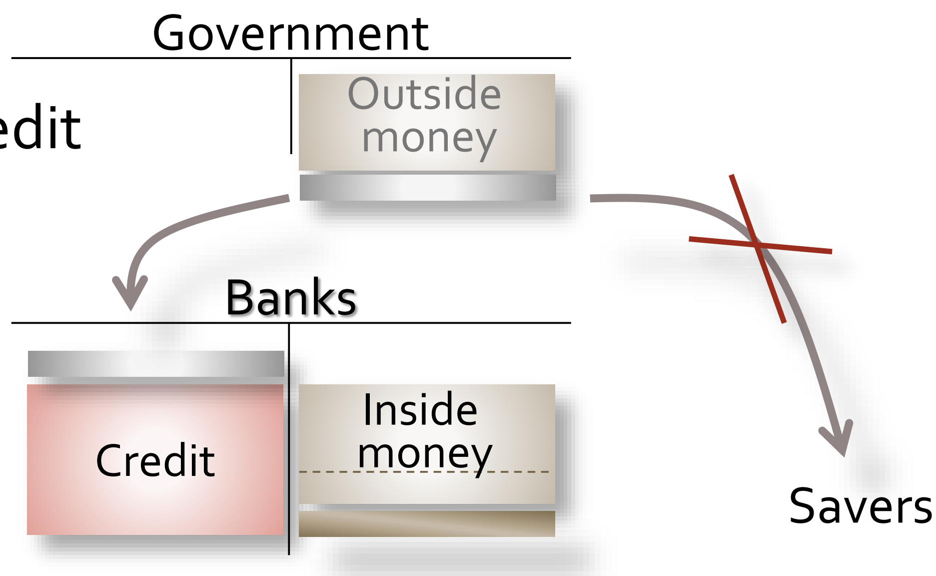
- Restore money supply
- Switches off Deflationary spiral
  - Bankers are better capitalized



  - Slightly more credit
    BUT credit is not restored

Credit View

- Restore "healthy" credit
  - Not Zombie banks
  - Not Vampire banks



Credit View

- Restore “healthy” credit
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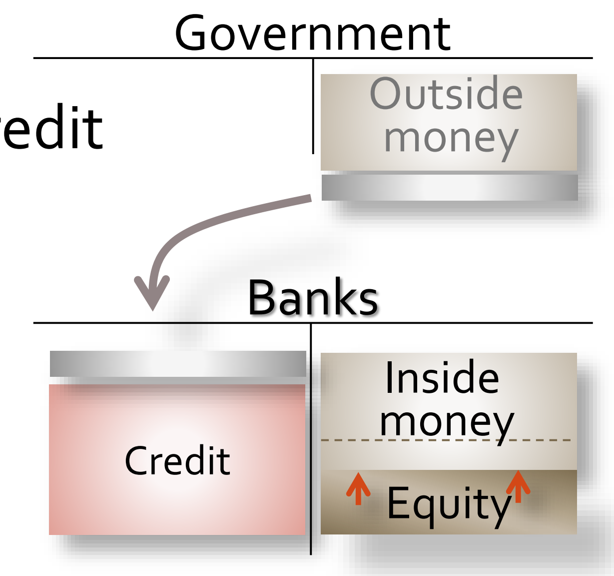
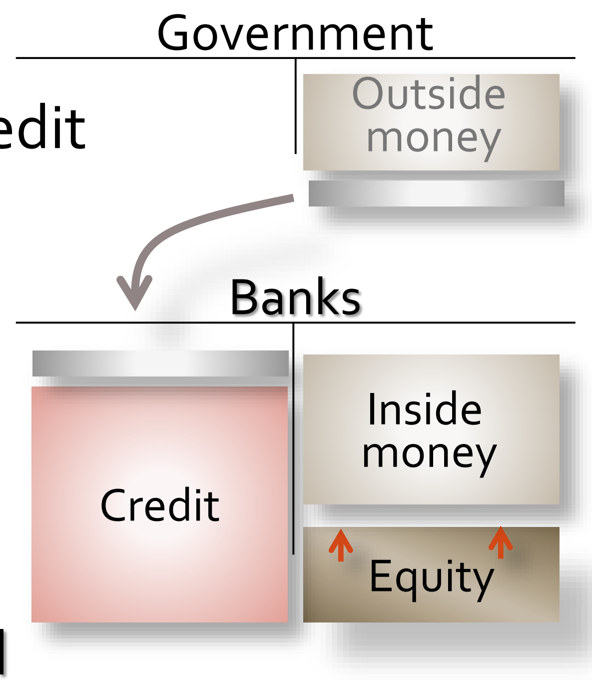
- Recapitalization
  - Gift to solvent banks



Credit View



- Restore "healthy" credit
  - Not Zombie banks
  - Not Vampire banks
- Recapitalization
  - Gift to solvent banks
- Switches off
  - Deflationary spiral
  - Liquidity spiral
    - Credit is restored, as banks are recapitalized

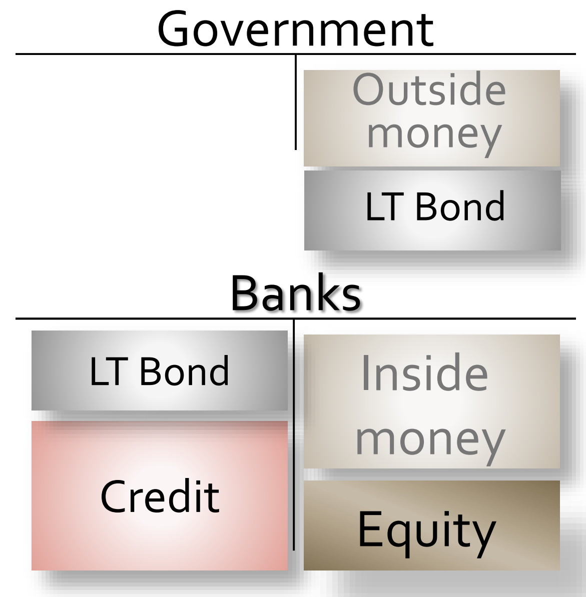
- Next, "stealth recapitalization of banks"

Monetary Policy in reality

- Outright purchase of bank loans (credit)
- Interest policy and OMO

Monetary Policy in reality

- Interest policy and OMO
- Introduce long-term Gov-bond
  - Fixed interest rate
  - No default
  - Held by banks



Monetary Policy in reality

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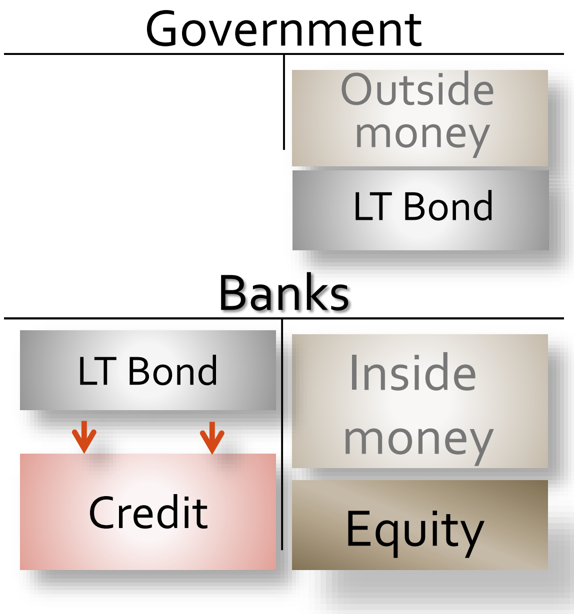
- Adverse shock
  - ⇒ value of credit/loans drops



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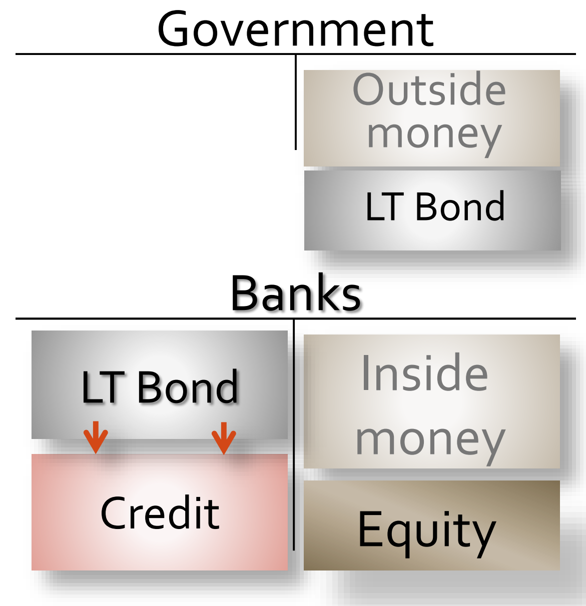
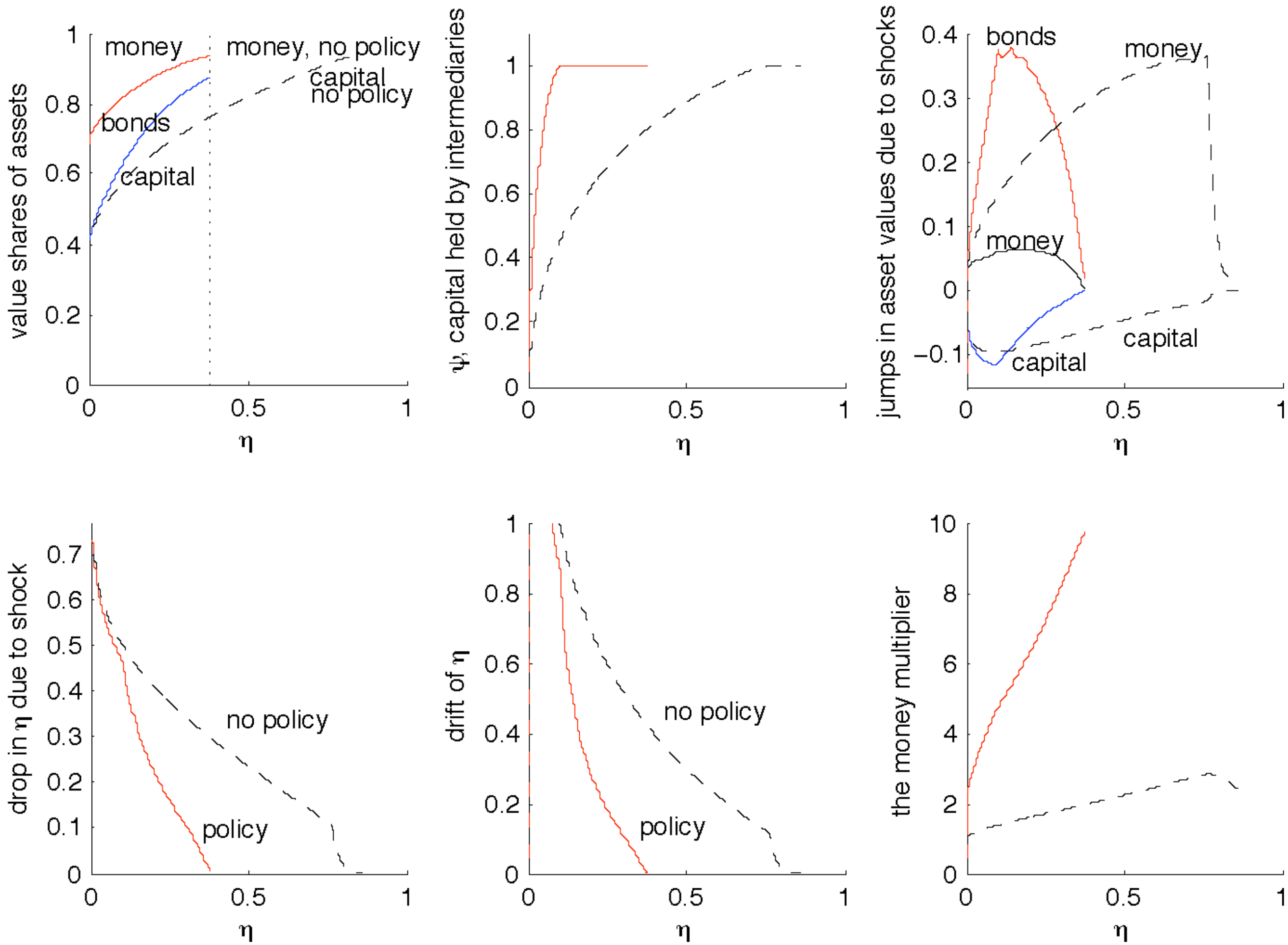


- Monetary Policy Response: Cut short-term interest rate i_t
  - ⇒ value of long-term bond rises - "stealth recapitalization"
  - Increases the supply of assets that can be used to "store of value"
- ⇒ Liquidity & Deflationary Spiral are switched off

Example

- Parameters
  - $a = .1$
  - $g = .04$
  - $r = .05$
  - $\rho = .06$
  - $\tau = .1$
  - $\lambda = 1$
  - $\phi = .002$
  - $\underline{\phi} = .2$
  - Policy
    - $i_t = 0.25\% + .1\eta_t, \frac{b_t}{p_t} = .5$

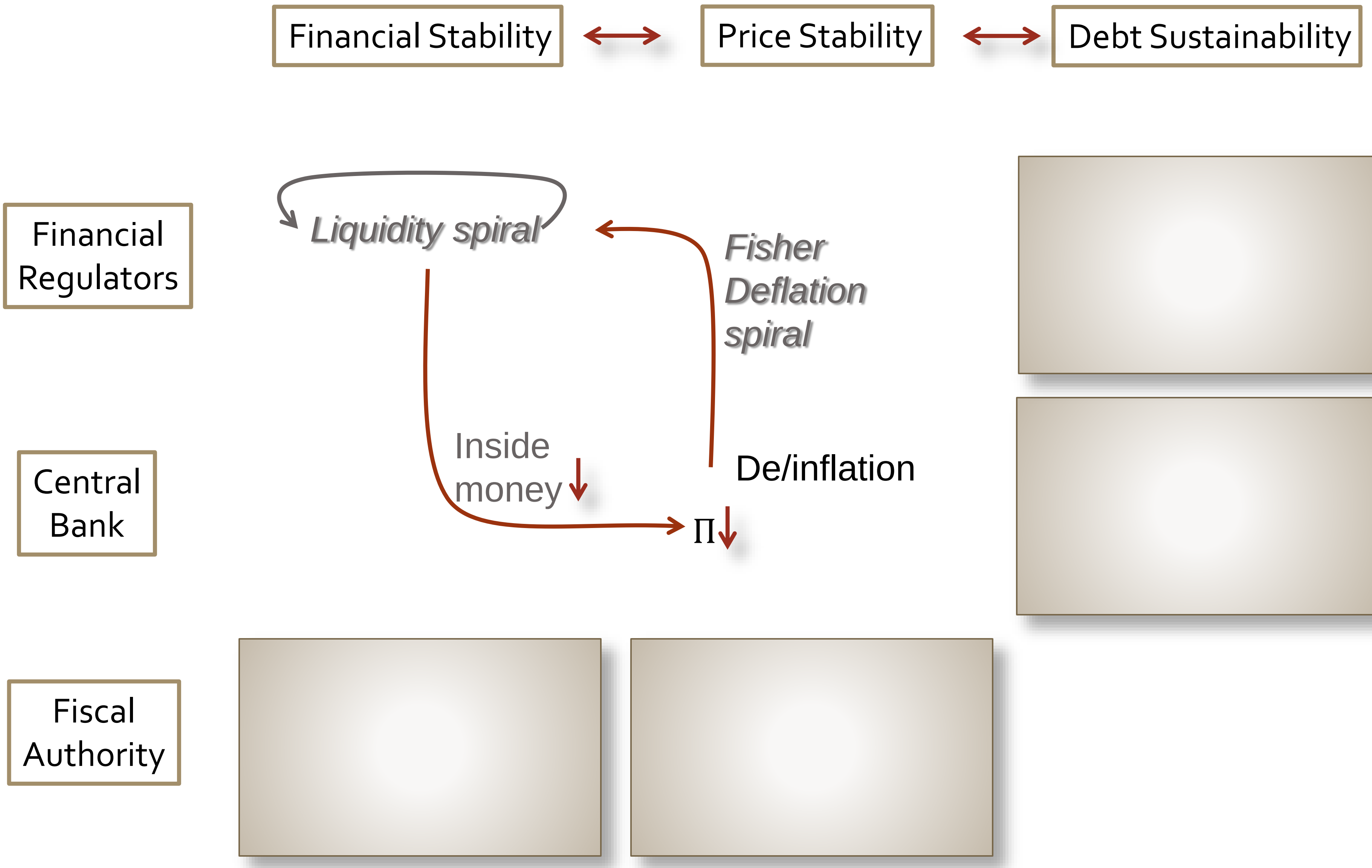


Ex-post Redistribution

- Undo redistribution which would be caused endogenously
- Redistribution is not a zero sum game!
  - Welfare gain – potentially to everyone

Ex-ante Monetary Policy Rule

- "Insurance arrangement" across sectors
  - Completes markets
  - Simple interest rate rule is not sufficient
  - Target excessive credit spreads
- Moral Hazard – limits "implementable" rules
  - Combine with macro-prudential (quantitative) rules (LTV, haircuts,…)
  - Punish the weak and strengthen the cautious within sector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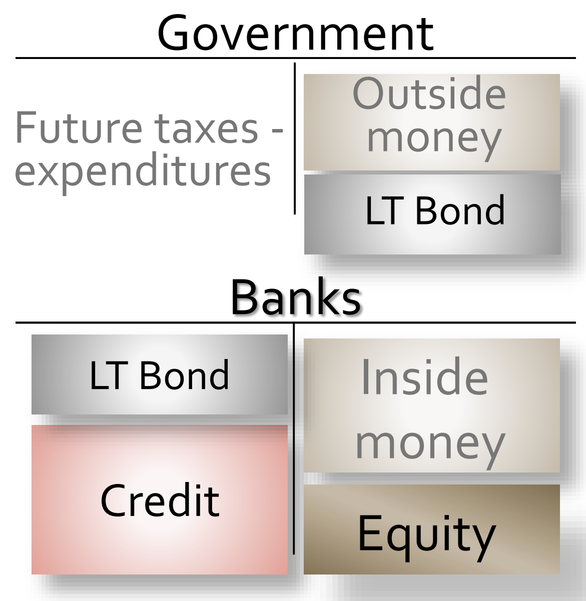
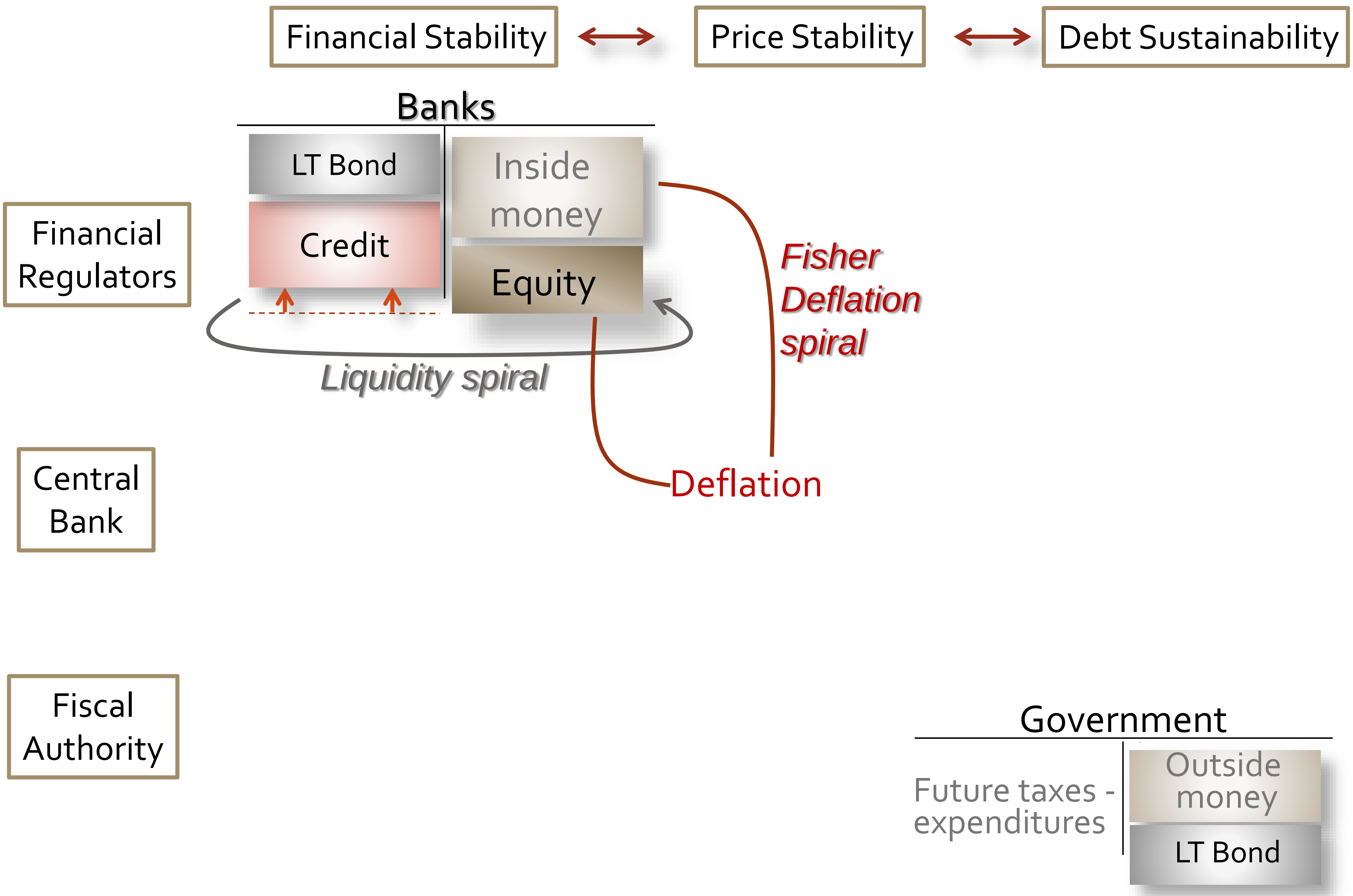
Link: … & Fiscal Debt Sustainability



- So far, Gov. bond default-free
  - Now: "fear" of default
- Fiscal dominance
  - Unwillingness of governments to balance long-run budget
- Monetary dominance
  - Unwillingness of central bank to print money
- Financial dominance
  - Unwillingness of banks to raise equity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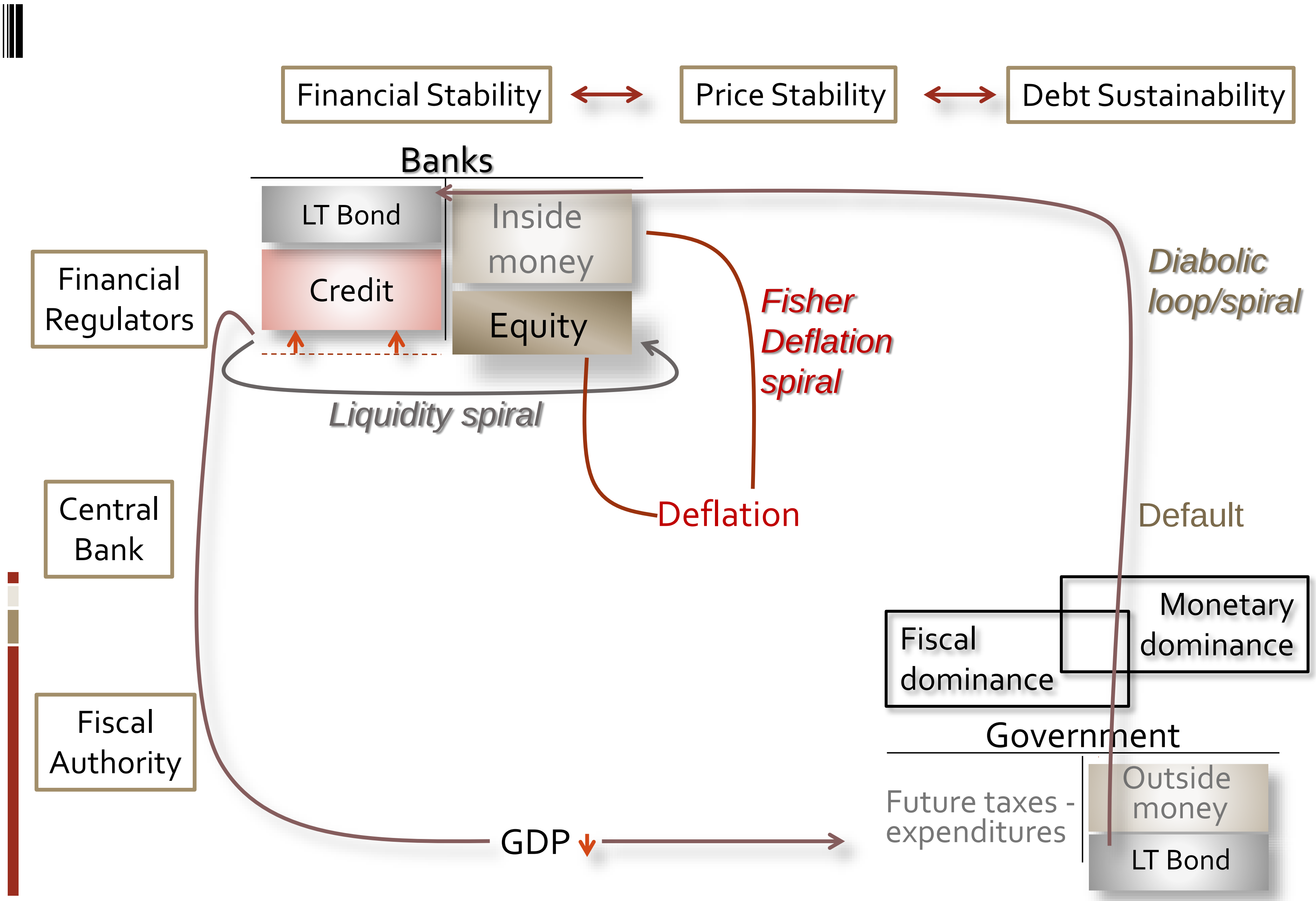

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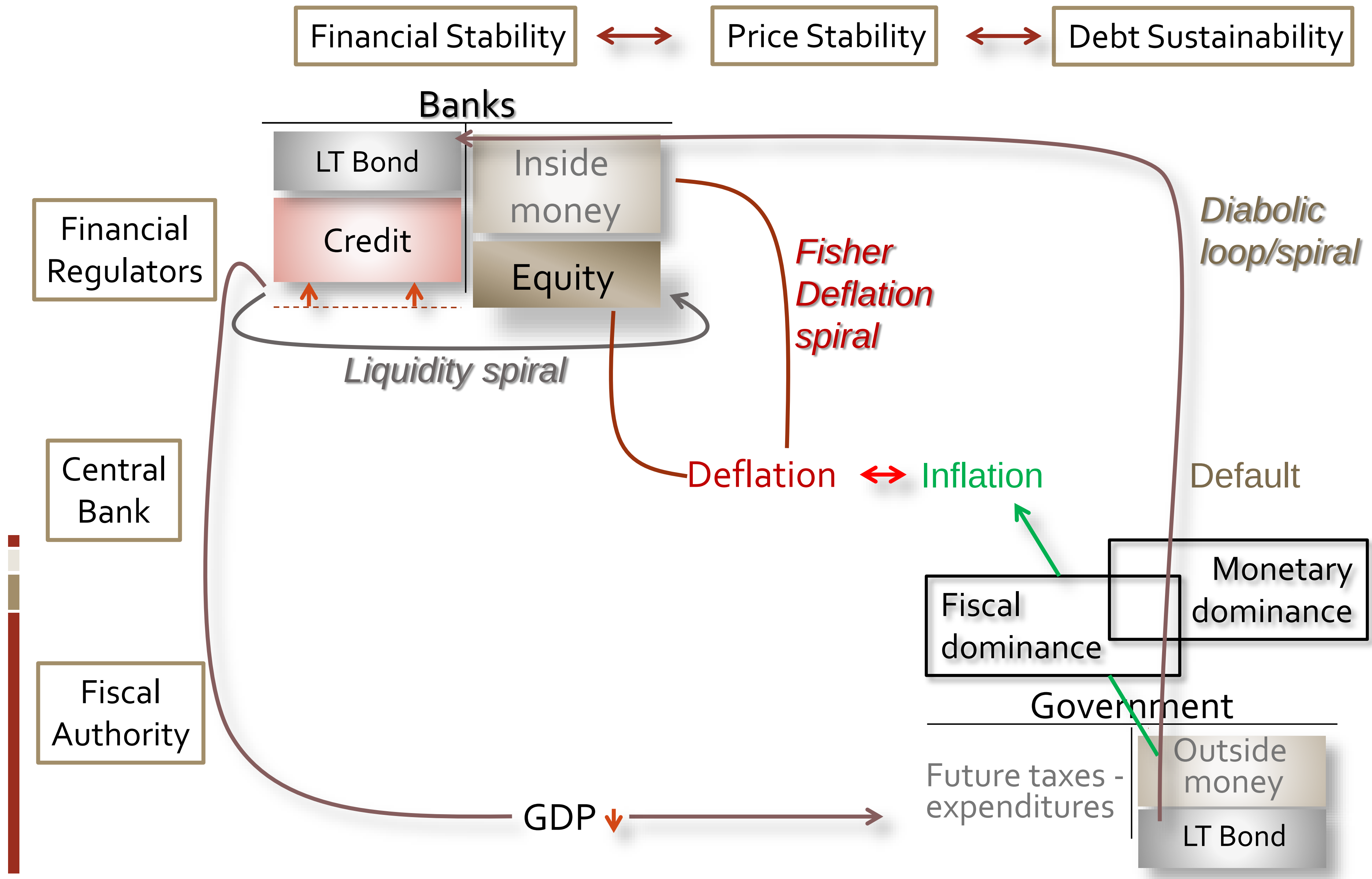
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Opposing De- and Inflationary Forces

- Difficult to balance
- System is very unforgiving towards small mistakes

- Divergence in inflation expectations
- Possibly high inflation risk premium

Preventive Monetary Policy

- Early warning signals
  - Credit growth and imbalances
  - Follow credit and monetary aggregates
  - Volatility Paradox + Financial Innovation
- Quantity controls
  - Through macro-prudential tools
  - LTV, DTI, …

	New Keynesian	I-Theory
Key friction	Price stickiness & ZLB	Financial friction
Role of money	Unit of account	Store of value
Driver	Demand driven as firms are obliged to meet demand at sticky price	Misallocation of funds (impaired balance sheets)
Monetary policy • implementation • First order effects	 Optimal price setting over time Affect HH's intertemporal trade-off Nominal interest rate impact real interest rate due to price stickiness	 Ex-ante insurance "complete markets" Ex-post: redistributional effects Ex-ante: insurance
	Substitution effect	Income effect
Time consistency	Wage stickiness Price stickiness + monopolistic competition	Moral hazard in risk taking (bubbles) - Greenspan put -
Yield curve	Expectation hypothesis only	Term/inflation risk premia

Conclusion

- Financial Stability & Systemic Risk
  - Liquidity spiral
- ... and Price Stability
  - Fisher Debt Deflation spiral
  - Redistributive Role of Monetary Policy
    - Money view vs. Credit view
- ... and Fiscal Debt Sustainability
  - Diabolic loop/spiral
  - Opposing inflationary and deflationary forces