Collateral Crises

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Financial Crises

1. Financial crises are not rare.
2. Crises are preceded by credit booms.
3. Crises occur at/near business cycle peaks, when the macroeconomy weakens.
4. The longer the credit boom the deeper the recession.
5. Financial crises are sudden and always involve private money - - money market in recent crisis.
6. Crises not “large” shocks.
7. Crises systemic: “banking system” insolvent if not for suspension or government/central bank intervention.

Overview: Crises related to the Macro Information Environment

- In a world of collateralized short-term debt, it may **not** be optimal to produce information about the quality of collateral.
- Opacity, which makes it hard to distinguish good collateral from bad collateral has:
  - Benefits: **Ignorance-based Credit Boom** – Firms with bad collateral get loans that they otherwise would not.
  - Costs: **Fragility** – System very susceptible to small shocks.
- As "ignorant credit" grows, system becomes increasingly fragile.
- **Low probability events, tail events, are endogenous.**

Micro Foundations

Financial intermediation is about the provision of trading securities: money.

- Gorton and Pennacchi (1990): banks exist to create information-insensitive debt (riskless) for trading.
    - Agents trade; need a security to protect against adverse selection.
    - Liquidity→information-insensitivity; but debt exogenous.

- Dang, Gorton, Holmström (2011): debt is the optimal trading security because it is information-insensitive (not just riskless).
    - Crisis→fear of adverse selection reduces amount traded (and hence welfare); **Crisis: info-insensitive->info-sensitive.**

Model

- Two overlapping generations every period.
  - Young/Households: Endowment and no labor.
  - Old/Firms: Labor but no endowment.

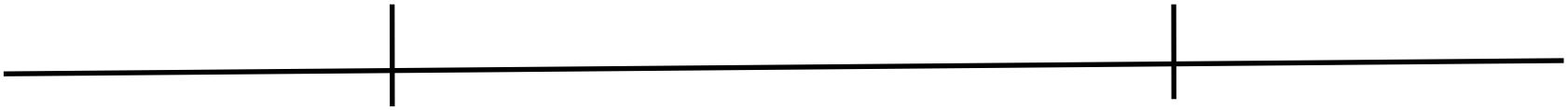
- Two goods that can be used to consume or produce.
  - Numeraire (K): Perishable and reproducible.
  - Land (X): Non-perishable and non-reproducible.

Land Collateral

- Land type unknown without info production.
- Good land: Generates C units of numeraire (only once).
- Bad land: Generates 0 units of numeraire (only once).
- Each unit of land has a common belief p of being good.

$$X = \begin{cases} C & \text{with probability } p \\ 0 \text{ with probability } (1-p) \end{cases}.$$

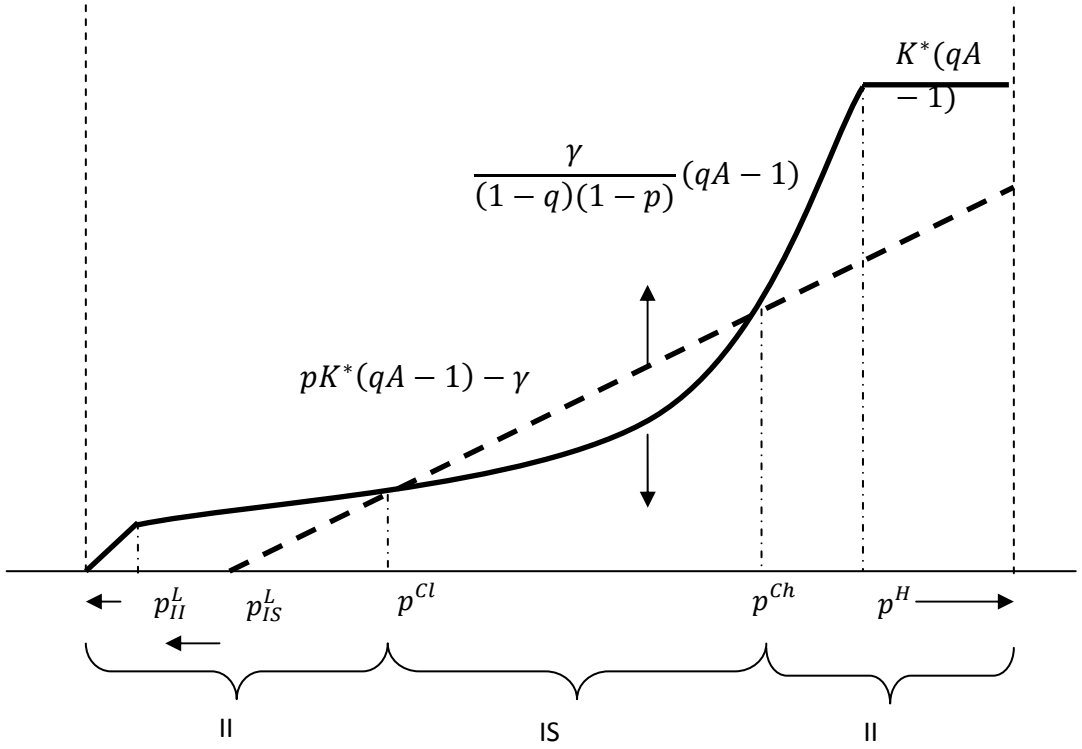
- Learning whether a unit of land if good or bad costs γ in terms of K.



Credit Market	Land Market
-Firm w/ collateral of quality p Borrows K w/ II or IS debt -Lenders choose to produce info on collateral quality or not	-Project realizations -Debt paid off -Firms sell land

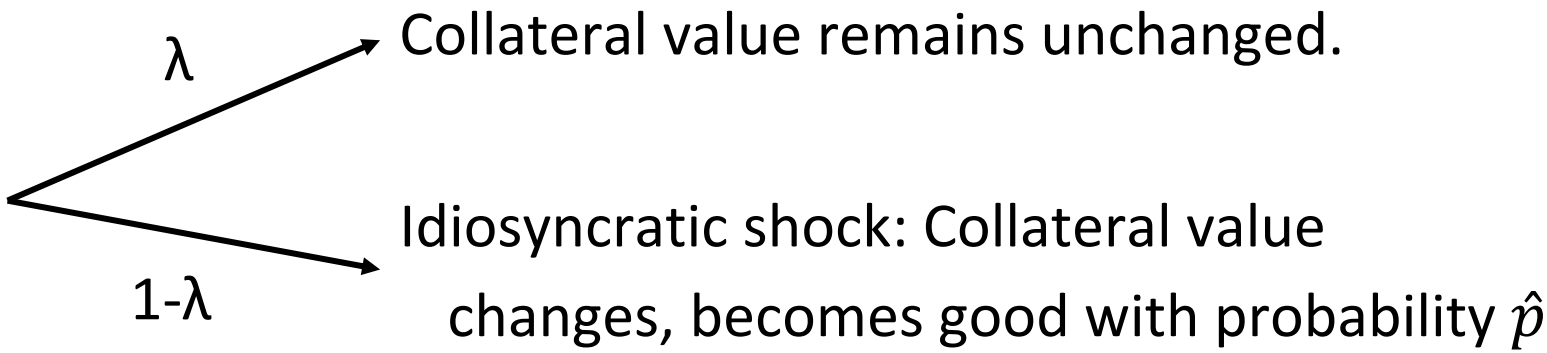
Optimal Debt

- Info-sensitivity of debt depends on beliefs, p.



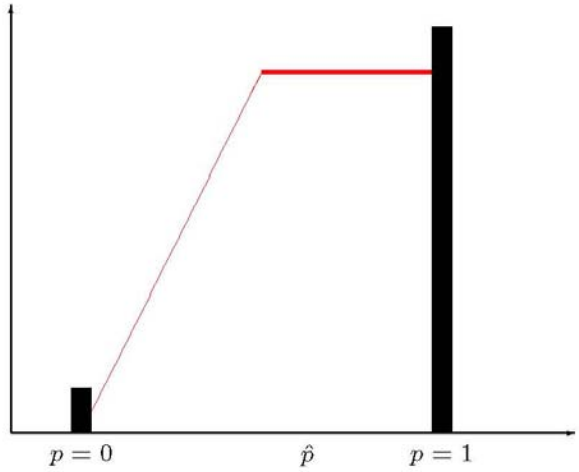
Multiple Periods

- Evolution of collateral value:

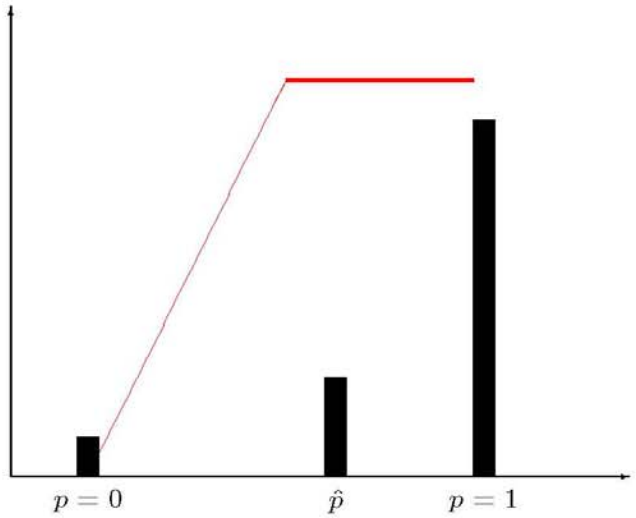


  - Each collateral is characterized by one of three possible beliefs:
    - $p = 0$, if information is that the collateral is bad and no shock.
    - $p = 1$, if information is that the collateral is good and no shock.
    - $p = \hat{p}$, if no information after the last shock.
  - Assume that at t=0 all collateral qualities are known.
  - Assume (for now) no aggregate shock.

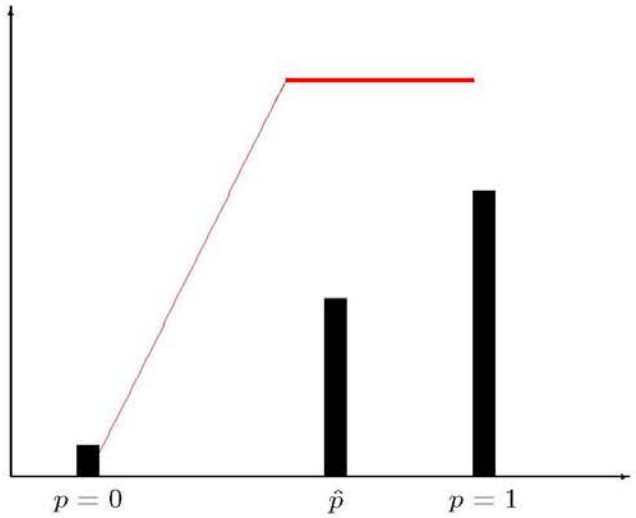
INITIAL DISTRIBUTION OF COLLATERAL QUALITY



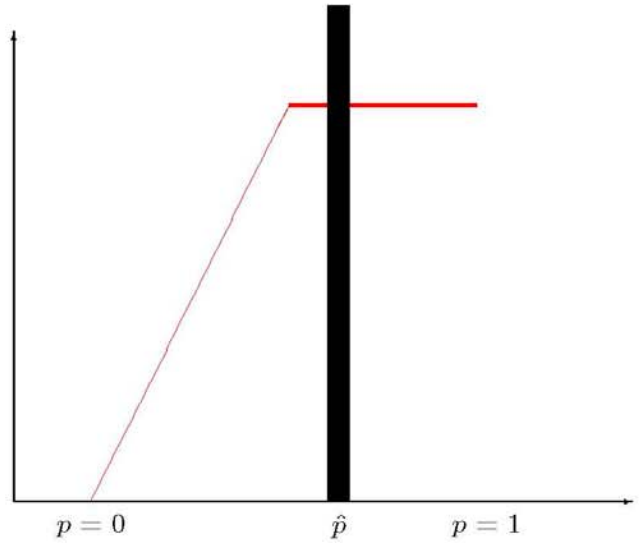
NEXT PERIOD DISTRIBUTION OF COLLATERAL QUALITY



NEXT PERIOD DISTRIBUTION OF COLLATERAL QUALITY



LONG-TERM DISTRIBUTION OF COLLATERAL QUALITY



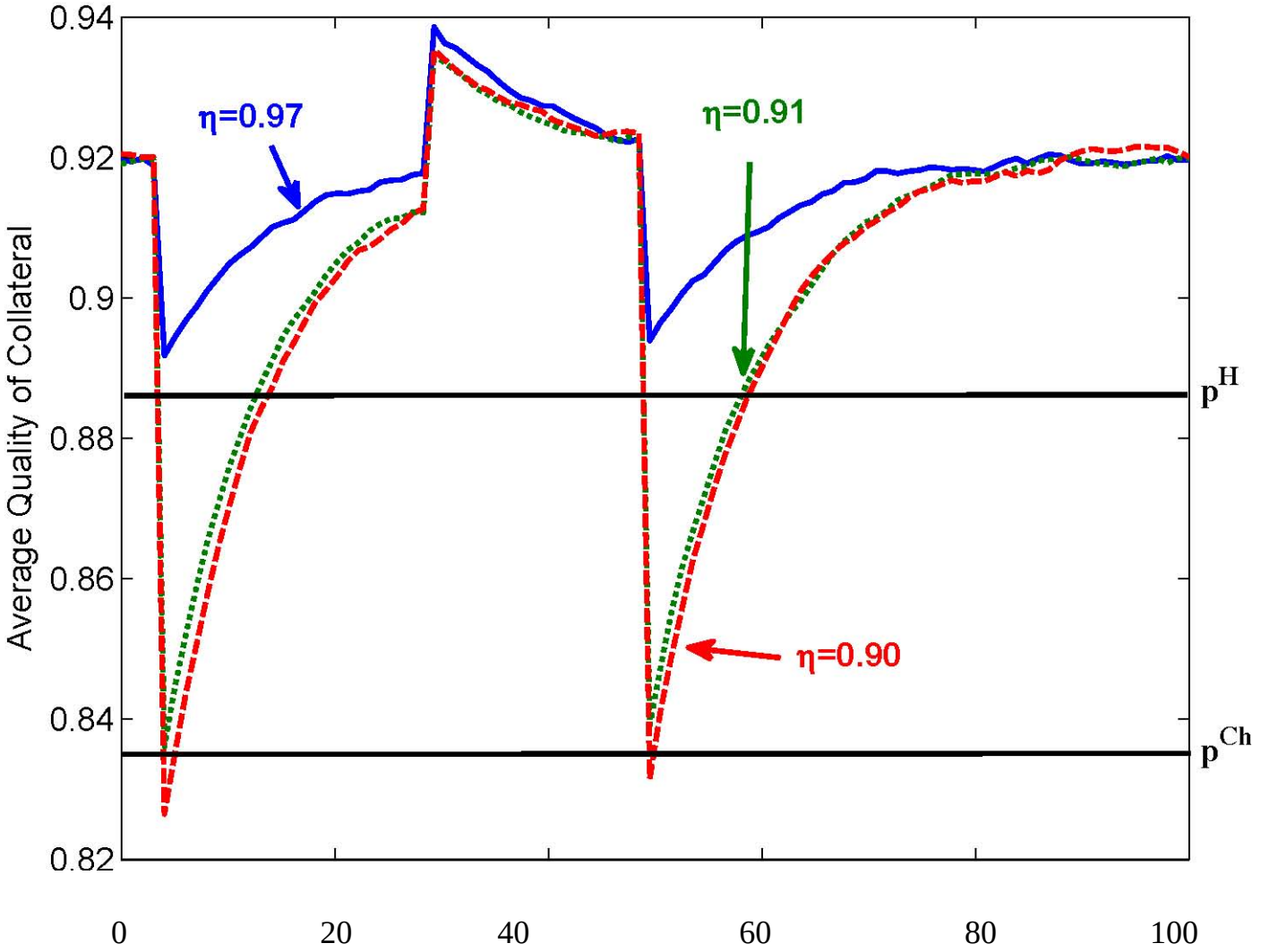
Aggregate Shocks

- Negative shock: transforms a fraction $(1-\eta)$ of good collateral into bad collateral.
- Shock observable, but which collateral changes quality is not observable.
- Example, negative shock:
  - Collateral with $p = 1$ becomes $p' = \eta$ after the shock.
  - Collateral with $p = \hat{p}$ becomes $p' = \eta\hat{p}$ after shock.
  - Collateral with $p = 0$ remains $p' = 0$ after shock.

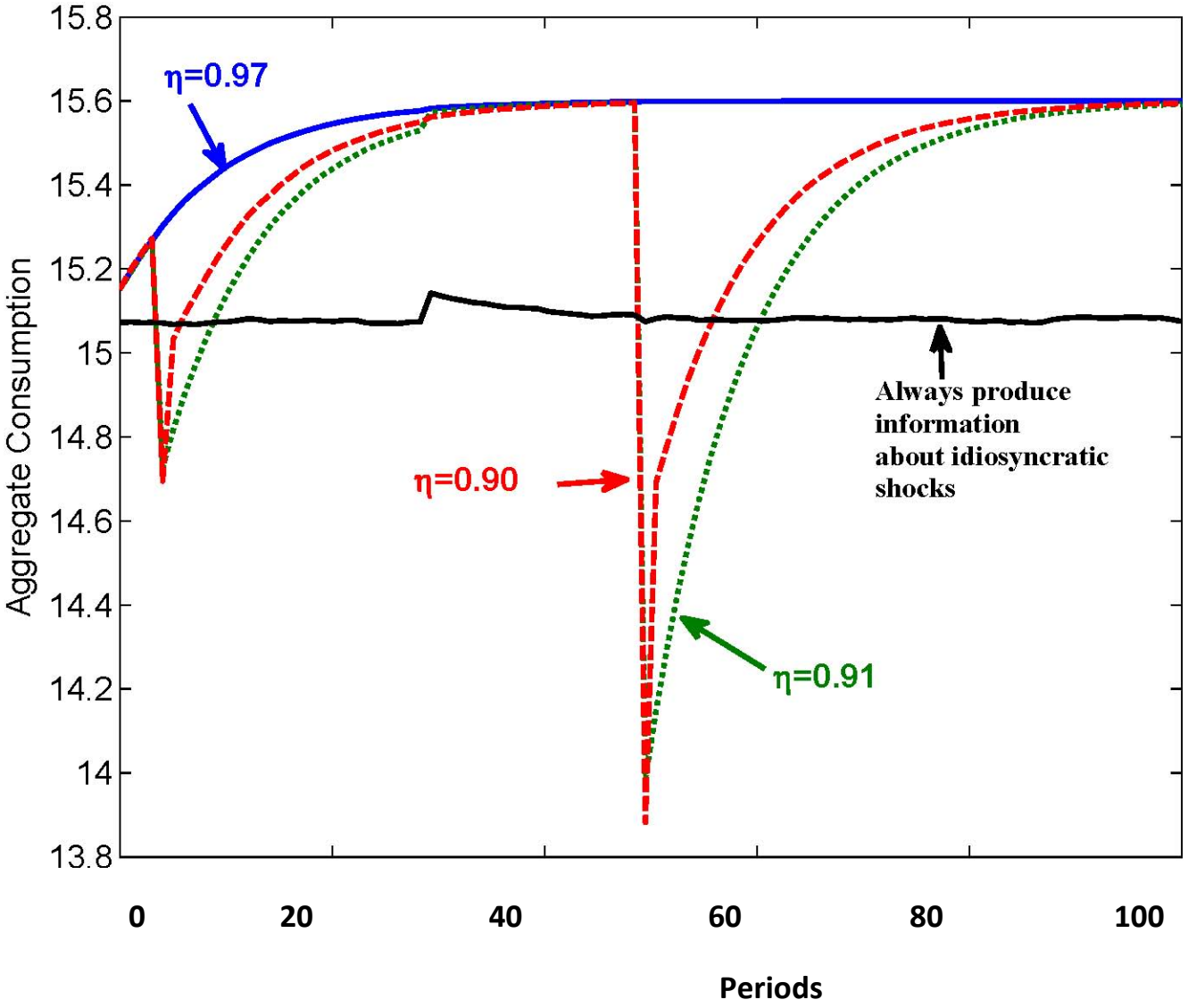
Numerical Simulations

- Pick parameter values for: λ, q, A, $\overline{K}$, L*, K*, γ, C, β.
- Parameters are such that $\hat{p} > p^H$.
- Simulate for 100 periods.
- Assume:
  - Transitory negative shock in periods 5 and 50.
  - Transitory positive shock in period 30.

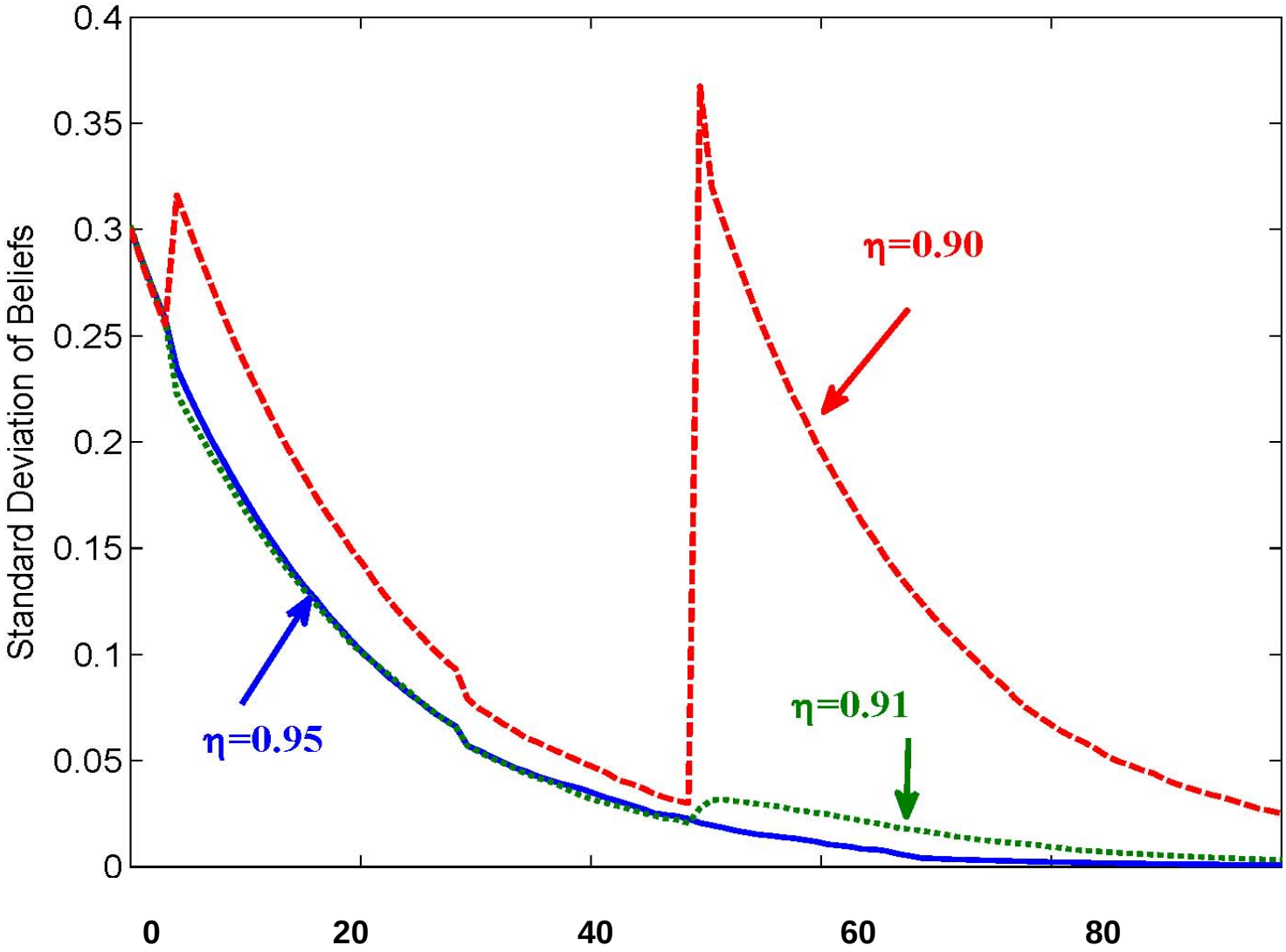
Average Quality of Collateral



Aggregate Consumption (Welfare)



Standard Deviation of Belief Distribution



Choice of Collateral

- Firms want to choose high $\hat{p}$ and high γ collateral. E.g., complex securities linked to land!

- Borrowing is maximized by increasing complexity (higher γ).

- Complexity of securities is endogenous.

Policy Implications

- The planner maximizes discounted utility of all cohorts:

$$U_t = E_t \sum_{\tau=t}^{\infty} \beta^{\tau-t} W_t.$$

- Planner faces same restrictions as households; info costly to produce.

- Key question: Is leverage desirable?

- Proposition: Some fragility can be optimal.

Empirical Tests

- Focus on the prediction that during a credit boom the standard deviation of beliefs declines. The change in credit trough-to-peak should be negatively correlated with the change in beliefs about "quality."
- Measure "beliefs" with the standard deviation of the cross section of stock returns.
- Credit boom measure by total bank assets or, in the early periods, by industrial production (Davis) and number of years T-to-P.

Credit Booms and the Decay of Information			
		Correlations	
Period	Number of Cycles (Trough-to-Peak)	No. Years and ΔBeliefs	Davis Boom and ΔBeliefs
1823-1914	13	-0.16	-0.19
1837-1914	10	-0.27	-0.10
		ΔBeliefs with ΔTotal Assets	ΔH-P Beliefs and ΔTotal Assets
National Banking Era, 1863-1914	12	-0.37	-0.33
Federal Reserve Era, 1914-2010	17	-0.09	-0.002
Whole Period: 1863-2010	29	-0.23	-0.05

Final Comments

- It is not optimal to produce information all the time. It is optimal to NOT produce information. But, although Information-insensitive debt may be socially desirable, it is vulnerable to a sudden loss of confidence in its insensitiveness.
- Macroeconomic implications:
  - Info dynamics leads to credit booms and increased fragility.
  - The switch from info-insensitive to info-sensitive regimes causes a loss of welfare.
  - Fragility may be optimal.
  - Volatility of beliefs leads to volatility of production and consumption.