Collateralization Bubbles when Investors Disagree about Risk

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Motivation

Two-Part Motivation:

1. Boom in the price of (newly) collateralized assets pre-GFC
2. Disagreement about second moments (so far) unanalyzed

The Main Question:

How do collateralized products affect asset prices when investors disagree about risk ?

$\Rightarrow$ **Answer:** *It can create rational 'bubbles'!*

This Discussion:

- Results (empirical vs. theoretical)
- Some comments and 'alternatives'

Empirics

Risk Perceptions: People disagree *a lot* (and relatively more recently)

Survey Evidence:

1. Asset price risk
   - Michigan Survey of Consumer Sentiment (2002-2005)
   - Ben-David et al (2013) survey of CFOs
2. Uncertainty about future GDP from the SPF

But...:

Questionable survey reliability, link between GDP and asset prices?, data treatment, lack of forecastability etc.

Simple Alternative: Volatility markets combined with no-trade theorem

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Baseline Model

Basic Setup:

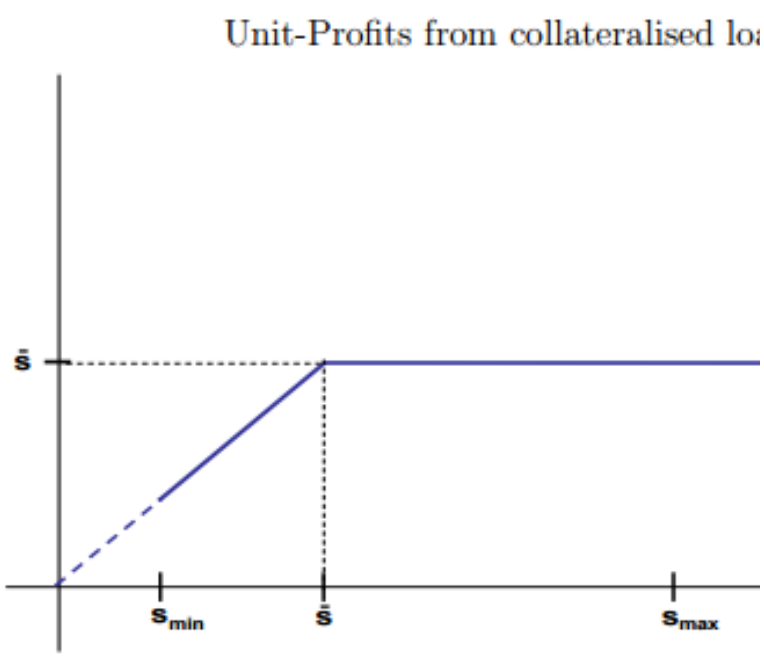
- Two period model with two assets
  (risky asset, collateralized debt with endogenous face value)
- Two types of risk neutral investors (R and S) with $f_S \succ_2 f_R$
- And that is more or less it ...

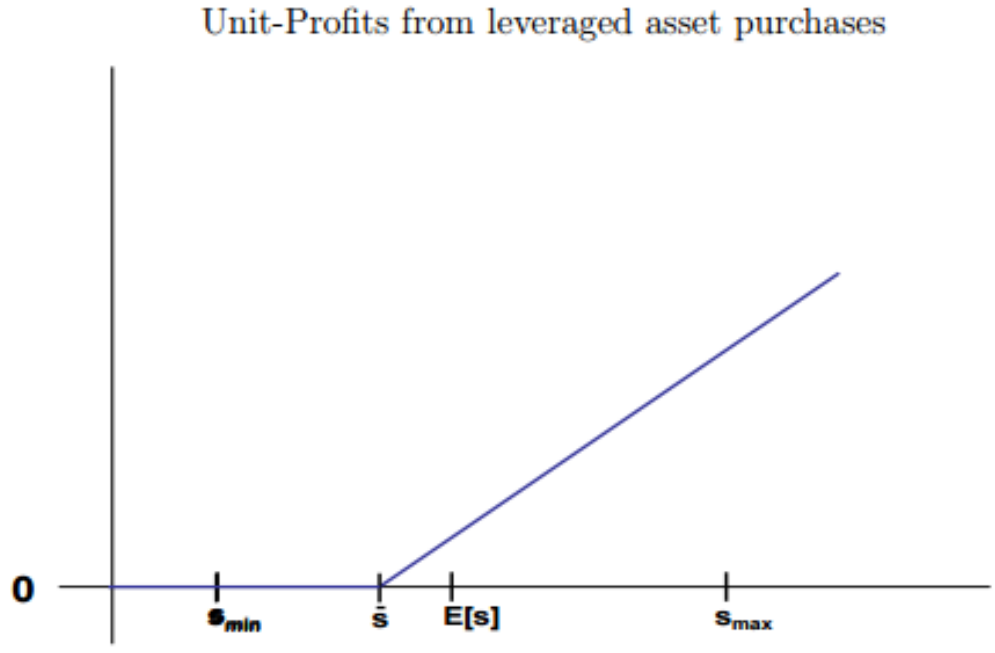
Payoff Profiles of Asset:

- Risky asset: *linear* in next-period's asset value
- Levered purchase: *convex* in next-period's asset value
- Collateralized debt: *concave* in next-period's asset value

(Option Theory: Levered purchase $\sim$ call option; debt $\sim -$ put option**)**

Baseline Model





Concave $\Rightarrow$ **S** type lends

Convex $\Rightarrow$ **R** type levers up

Levered purchases $\Rightarrow p > \frac{\mathbb{E}[s]}{R}$ = **Bubble!**

... caused by the selection of heterogeneous belief types into asset classes

$\sim$ **Levered purchases = CDOs** $\neq$ **CDOs**^{2}

Model Comments

General Comments:

1. A simple insightful mechanism for $p > \frac{\mathbb{E}[s]}{R} \Rightarrow$ **excellent**!
2. Shows how the set of assets can have cross-effects on prices
3. Heterogeneity in beliefs about second moments (**at last!**)

Specific Comments:

1. **Convexity/Concavity of Payoffs**
   - *Stiglitz and Weiss (1981):* the existence of credit rationing
   - *DeMeza and Webb (1991):* ... depends on the set of assets Ω
     $\Rightarrow$ $\partial^2[\cdot]/\partial[\cdot]^2$ **are always conditional on** Ω
   - *The design of optimal contracts* vs. CDO^2 = *complete markets*

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Specific Comments:

2. Risk Aversion

- Risk aversion $\rightarrow$ leverage unattractive (especially for R) $\rightarrow$ $p \downarrow$
- Which effect dominates (risk free/equity premium puzzle)?

Q: What caused the run-up in house prices pre-GFC?

FT explanation "too low risk perception":

Singleton (1987) (simplified) with two types of traders (S and R)

$$p = \beta \mathbb{E}[s], \quad \beta = \frac{1}{(1+r) + \frac{\gamma}{2}(\mathbb{V}_S[s] + \mathbb{V}_R[s])}, \mathbb{V}_S[s] = \mathbb{V}_R[s]$$

Decrease $\mathbb{V}_S[s] \rightarrow p \uparrow$

Low risk type pushes up the asset prices [Branch and Evans (2011)]

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- Precise description of house prices pre-GFC?
- 1st order SD (Simsek 2013) $\rightarrow$ Optimist drives $p \uparrow$
  2nd order SD $\rightarrow$ R/S causes $p \uparrow$

3. Persistent Disagreement

- *Learning about second moments is hard*: EKF and PF
- Villaverde et al (2014) and Viscusi (2013)

But ...$\mathbb{V}[p_{t+1}]$ should be pinned down by obs ($>$ 15 years)

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Summary

Main Contributions:

- **Dispersion** in beliefs about $\mathbb{V}[\cdot]$ combined with **levered products**
- $\Rightarrow$ **theory for bubbles**
- The **set of assets** *really* matter

Future Work:

- **Extensions**: Other asset classes and dynamics
- Implications for the design of policy (assets, #traders etc.)

Thank you for your time and attention!