Discussion: Arbitrageurs, Bubbles and Credit Conditions

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Constraints and Asset Prices

- Types: constraints on risky asset holdings, risk-free asset holdings, wealth
- Impact on: asset returns, cost of capital and investment, volatility, correlation (size and cyclicality), asset price bubbles and welfare
- Policy makers: in bad times – reduce procyclicality of asset returns, increase investment, reduce volatility and correlation. Increase welfare.
- Margin constraints and 2007 credit crisis
  - amplification mechanism: constraints bind after negative shock, selling of assets
  - additional term in CAPM – assets with identical cash flows and different margin requirements have different prices
- Stock market participation constraints: fall in risk-free rate $\rightarrow$ higher risk premium
- Short selling constraints: do they inflate stock prices, imposition during bad times
- Bubbles: can imposing constraints reduce size of a bubble?

Literature: continuous time

- Dealing with portfolio constraints
  - He & Pearson (1991), Xu & Shreve (1992), Cvitanic & Karatzas (1992,1993), Cuoco (1997)
- Applications
  - Margin: Cuoco & Cvitanic (1998) Cuoco & Liu (2000), Rytchkov (2010), Garleanu & Pedersen (2011)
  - Borrowing constraints: He (1993), Vila (1997), Dybvig & Liu (2005), Kogan, Makarov & Uppal (2007)
  - Short selling constraints: Detemple & Murthy (1997), Gallmeyer & Hollifield (2008)
  - Participation constraints: Basak & Cuoco (1998), Basak & Croitoru (2000)
  - Constraints on derivatives: , Bhamra & Uppal (2009)
  - Risk constraints: Prieto (2010), Hugonnier (2010)
  - International: Pavlova & Rigobon (2008), Guibaud & Coeurdacier (2008), Schornick (2010)

This paper

- exchange economy
- two assets
  - stock (claim to endowment): S_t
  - risk-free bond in zero net supply: S_t^0
- 3 agents
  - 2 borrowers and a lender
  - one borrower must have positive wealth
  - other borrower can have negative wealth
- market clearing: to make borrowing attractive – lower riskfree rate, to make risky asset attractive for borrowers to lever up in – higher market price of risk
- asset prices differ from fundamental values

$$S_t = E_t \left[\int_t^{\infty} \frac{\xi_u}{\xi_t} \delta_u du \right] + b_t$$

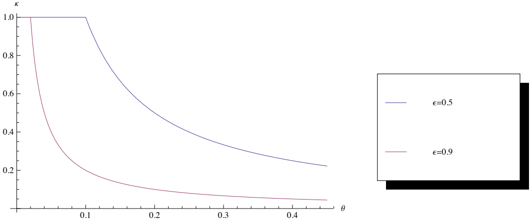
  - bubbles arise on stock and bond : movements in risk–free rate and market price of risk not enough to make markets clear (why not?)

Agents

- all have log preferences, same rate of time preference, ρ
- Agent 1: $W_{1,t} \geq 0$
- Agent 2: $\underbrace{|\sigma_t \cdot \overbrace{\pi_{2,t}/W_{2,t}}^{\text{prop. of wealth in stock}}|}_{\text{vol. of \% changes in wealth}} \leq (1-\epsilon)\sigma_\delta$
  - Very tight constraint: vol. of % changes in wealth must be less than vol. of endowment growth
  - Agent 2 forced to hold bond – is a lender
- Agent 3: $W_{3,t} \geq -\psi S_t$
  - can hold a portfolio which leads to positive wealth at T, but has negative wealth before. E.g. can short assets without posting as much collateral as Agent 1 or is not marked to market as severely as Agent 1
- Potential interpretation?:
  - Agent 1: households (normal people)
  - Agent 2: central bank
  - Agent 3: hedge fund

Consumption – Portfolio Policies: Agents 1 & 2

- Agent 1: $c_{1,t} = \rho W_{1,t}, \pi_{1,t}/W_{1,t} = \overbrace{(\mu_t - r_t)/\sigma_t^2}^{\text{mean-var portfolio}}$
  - Borrows and levers up in stock. Equivalently: shorts bond (price will fall when bubble contracts) and uses stock as collateral
- Agent 2 (lender): $c_{2,t} = \rho W_{2,t},\ \pi_{2,t}/W_{2,t} = \underbrace{\overbrace{\kappa_t}^{\leq 1}}_{\text{shrinks m-v port.}} \cdot \overbrace{(\mu_t - r_t)/\sigma_t^2}^{\text{mean-var portfolio}}$



  - Agent 2 must lend more as market price of risk rises. Risk – free rate cannot adjust enough: get a bubble
  - Question: figure and paper use $\sigma_\delta = 20\%$, constraint becomes very tight for lower (more realistic σ_δ), impact on size of asset price bubbles?

Consumption – Portfolio Policies: Agent 3

- Agent 3: $W_{3,t} \geq -\psi S_t$
- $c_{3,t} = \rho(W_{3,t} + \psi b_t)$, $\pi_{3,t}/W_{3,t} = (\mu_t - r_t)/\sigma_t^2 + \psi(\theta_t b_t - \Sigma_t^b)/\sigma_t$

$$W_{3,t} = \underbrace{\gamma W_{1,t}}_{\text{Agent 3 mimicks Agent 1's strategy}} \overbrace{-\psi b_t}^{\text{Agent 3 shorts bubble in stock}}$$

  - As constraint tightens, ψ falls, Agent 3 becomes more like Agent 1: shorts less of stock bubble (rides the bubble), bubble is larger
  - As constraint relaxes, ψ rises: more shorting of stock bubble (fighting the bubble), bubble is smaller

- Constraining Agent 3 increases bubble size

Welfare

- Constraining Agent 3 makes him worse off, but Agents 1 and 2 are better off
  - Hedge funds are worse off, but households (normal people) and the central bank are better off. Bubble is larger.
  - How does bubble impact output, investment and employment? (need a richer model).
- Constraining Agent 2 makes Agents 1 and 3 better off.
  - When central bank lends more, households (normal people) and hedge funds are better off.
  - What happens to the bubble?
- Should we constrain Agent 3 (hedge fund) and make Agent 2 lend more (central bank lends more)

Comments

- Need a sensible interpretation of who the agents are.
- All borrowing/lending is risk – free.
- More on why the bubbles arise. Analysis of half life, etc.
- Impact of bubble on macroeconomy: need a production economy.
- Why doesn't the bubble vanish? Is this really the kind of bubble policymaker are concerned about?
- Does bubble exist in discrete time version?
- Does calibration make sense ($\sigma_\delta = 20\%$)
- The long – run. Don't some agents vanish? Samuelson's ergodic hypothesis does not hold.