

Market Bubbles and Crashes as an Expression of Tension between Social and Individual Rationality: Experiments

E. Asparouhova, P. Bossaerts, and A. Tran

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- Context: credit market bubbles.

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 - Beyond pen and paper, only experiments can create counterfactuals!

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- If not, cash-ins bring pro rata distribution.

Example 1: 11 investors, each holding 1 claim

Money
Pool

\$12

\$13.2

\$14.52

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Money Pool	\$12	\$13.2	\$14.52	\$15.97
Face Value	1.25	1.50	1.80	2.16

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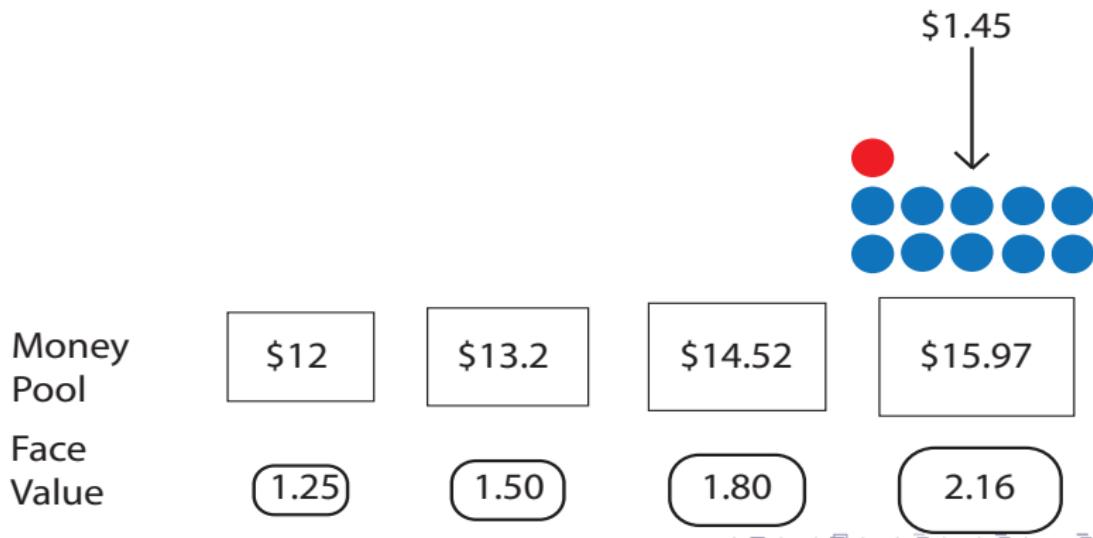
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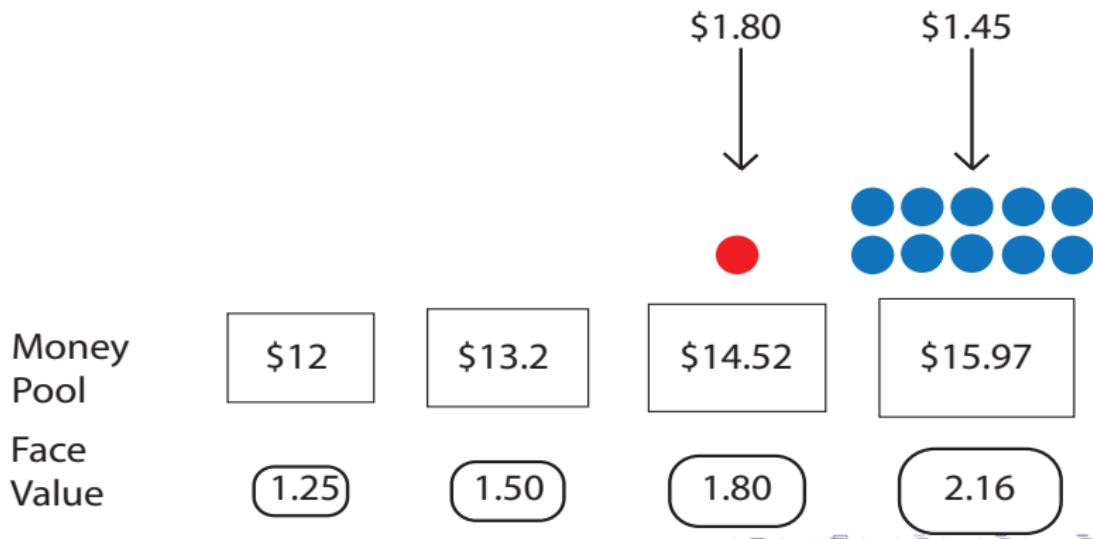


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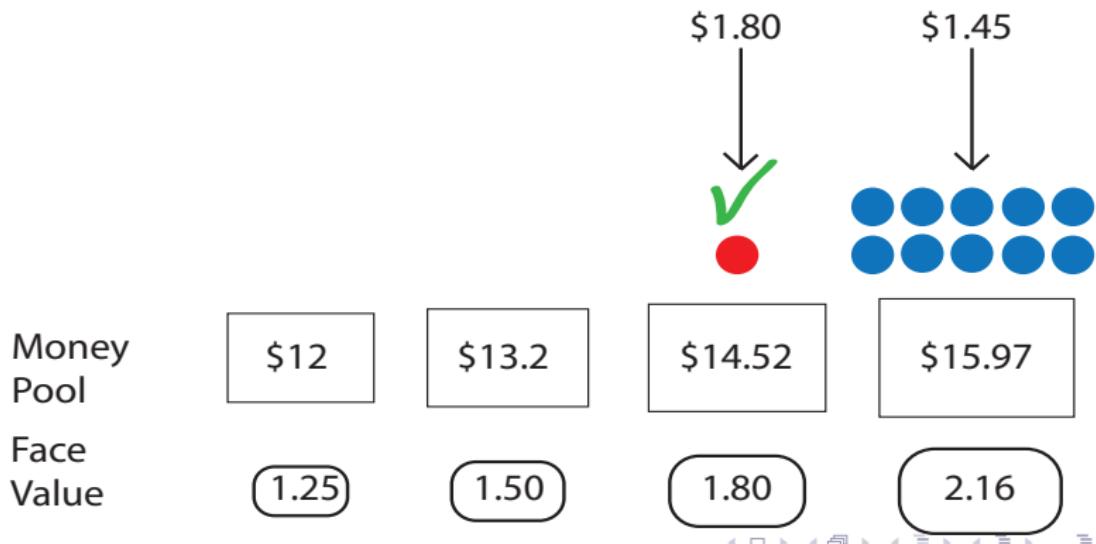
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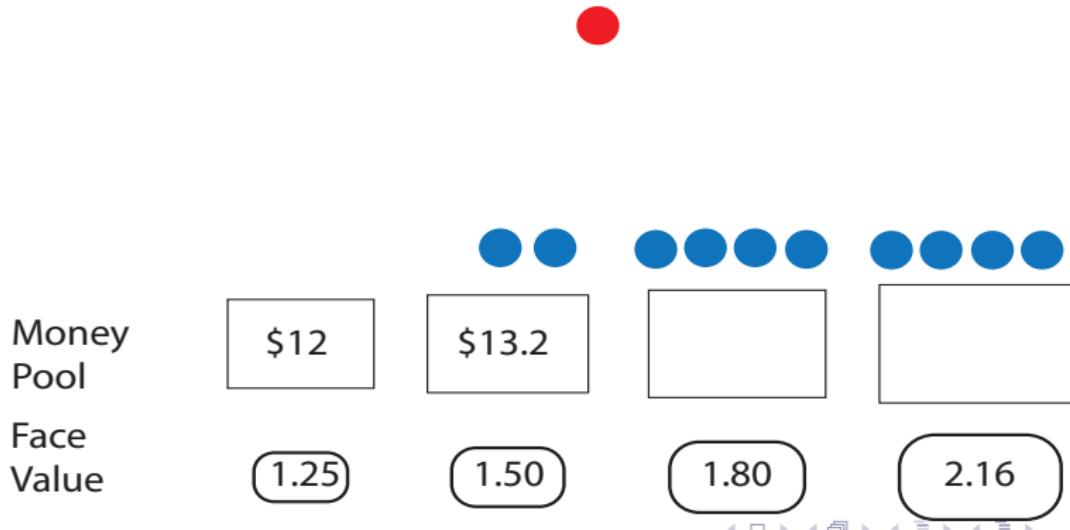
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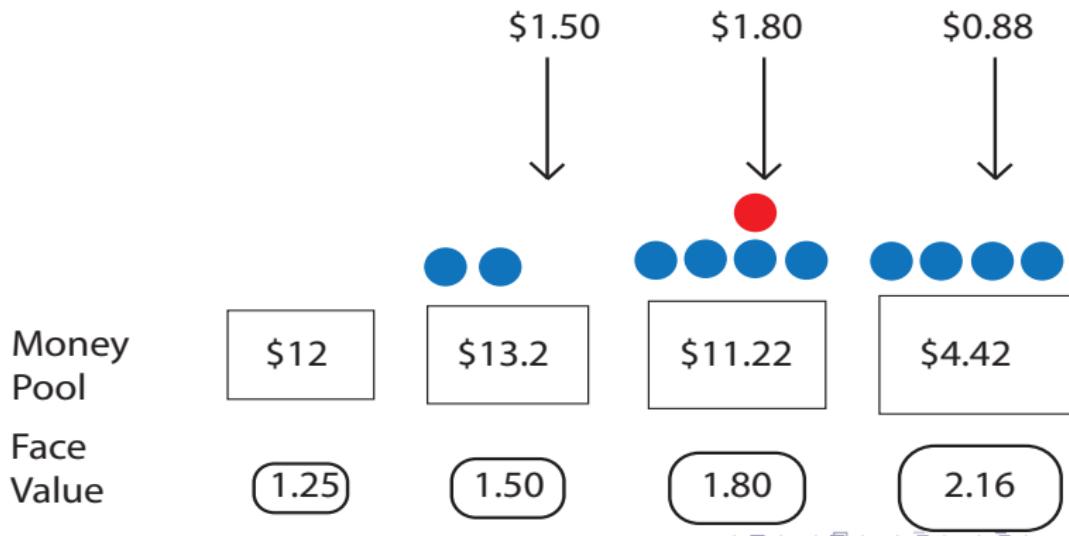
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Money Pool	\$12	\$13.2	\$14.52	\$15.97
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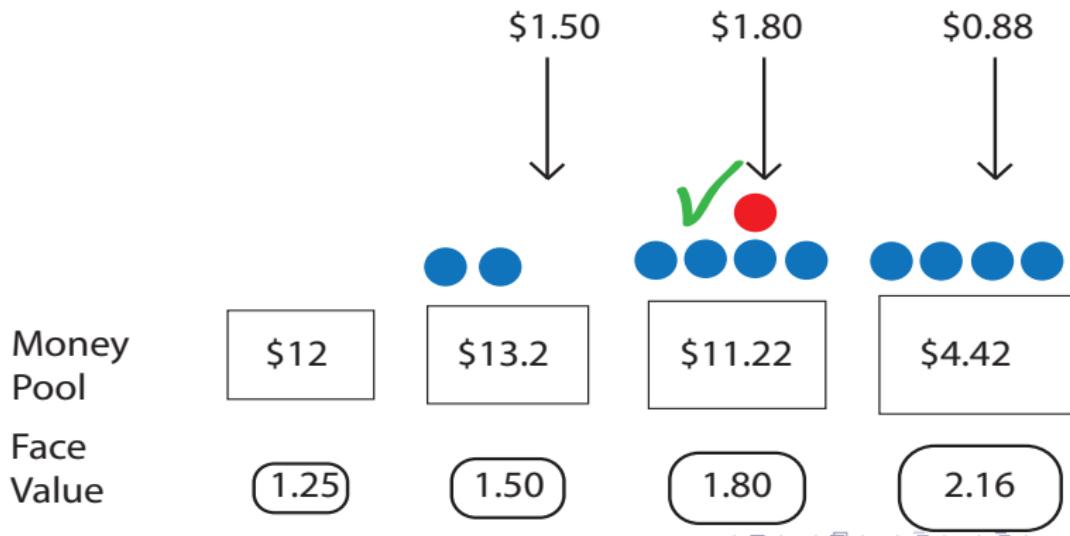
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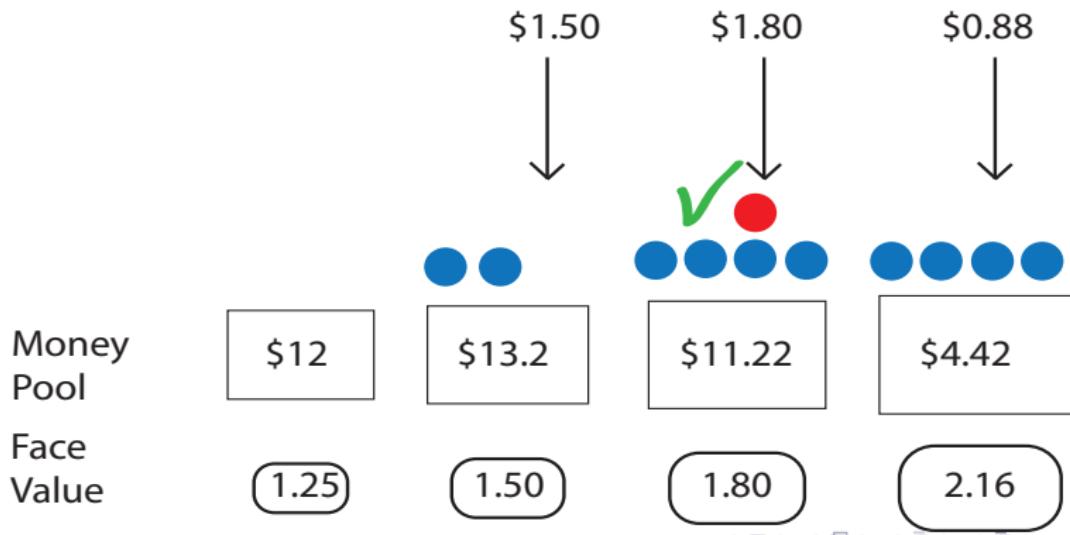
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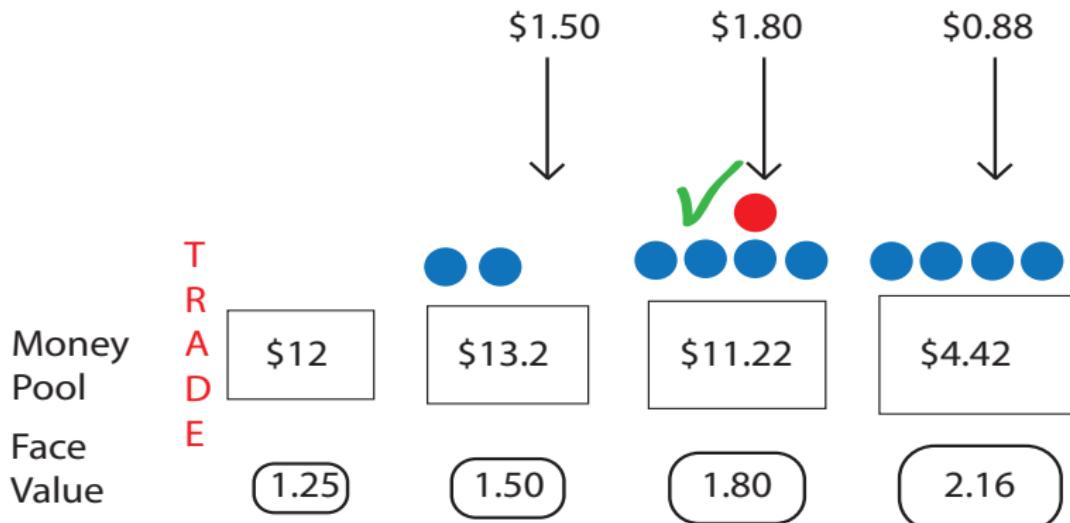
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- Well understood (experimentally) game (although ours is far more complex than usual one!); Nash equilibrium *does not* obtain even after replication, because of social rationality.
- Our goal: to add markets and study *asset pricing* in this scenario.

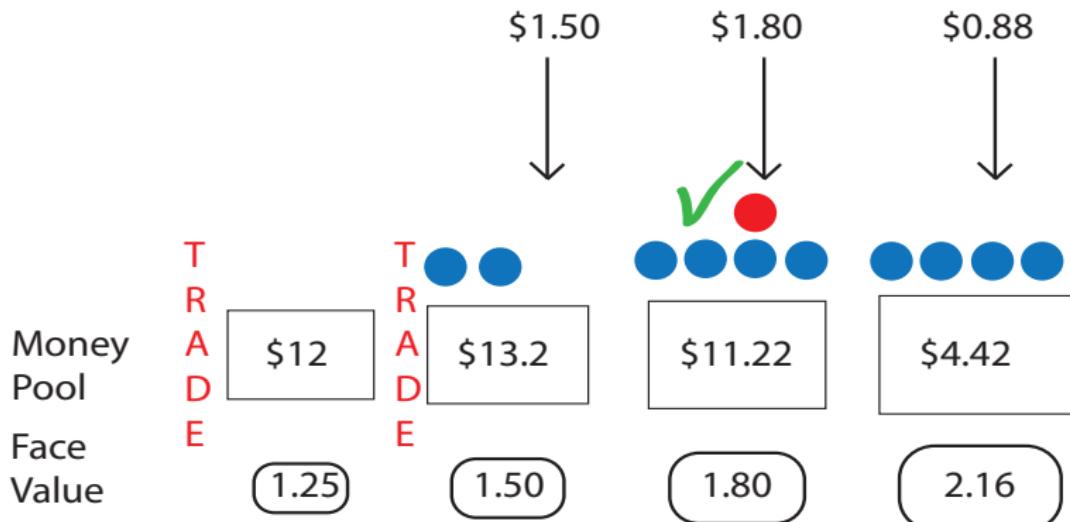
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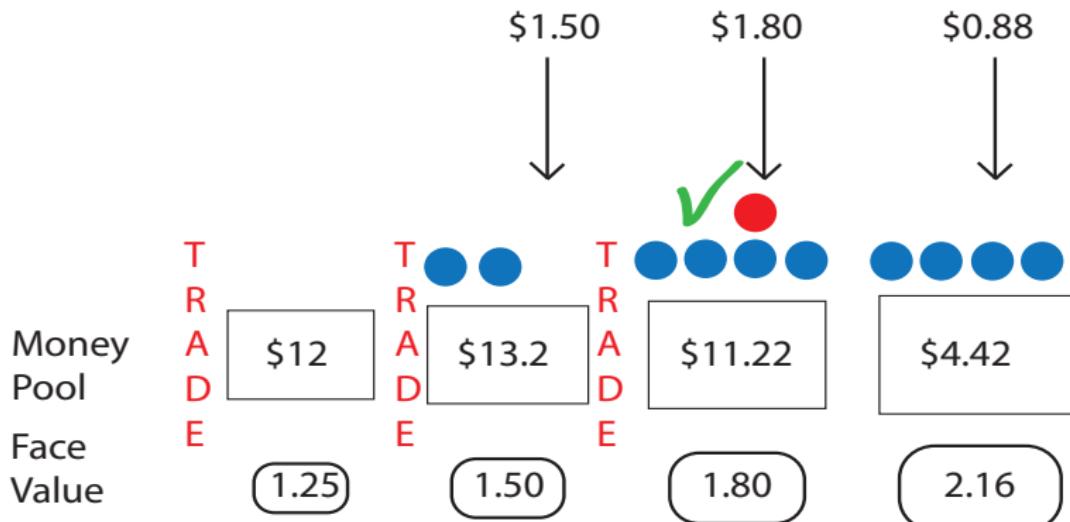
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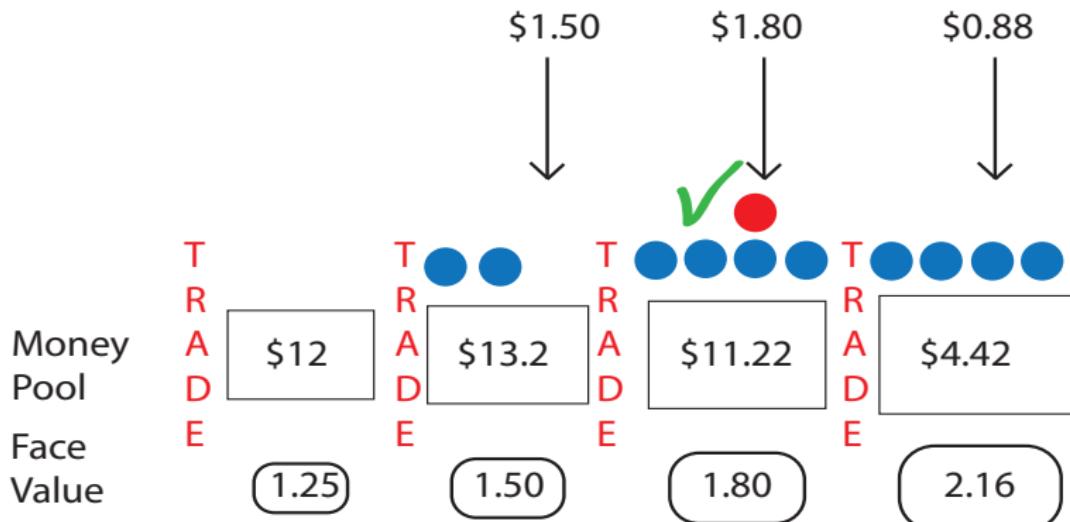
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Equilibrium of the Market-Centipede Game

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Asset-Pricing Equilibrium

The unique equilibrium of the economy has the pool liquidated in period $t = 1$ and prices in period 1 equal to the pro-rata claim value.

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Experimental Design

- Initial face value = \$1.25; grows by 20% each period.
- The money in the pool grows by 10% each period.
- Every subject was initially endowed with 6 claims and 6 USD (or Swiss Francs).
- Up to 9 periods.

Trading Software: Continuous Double Auction

► Software

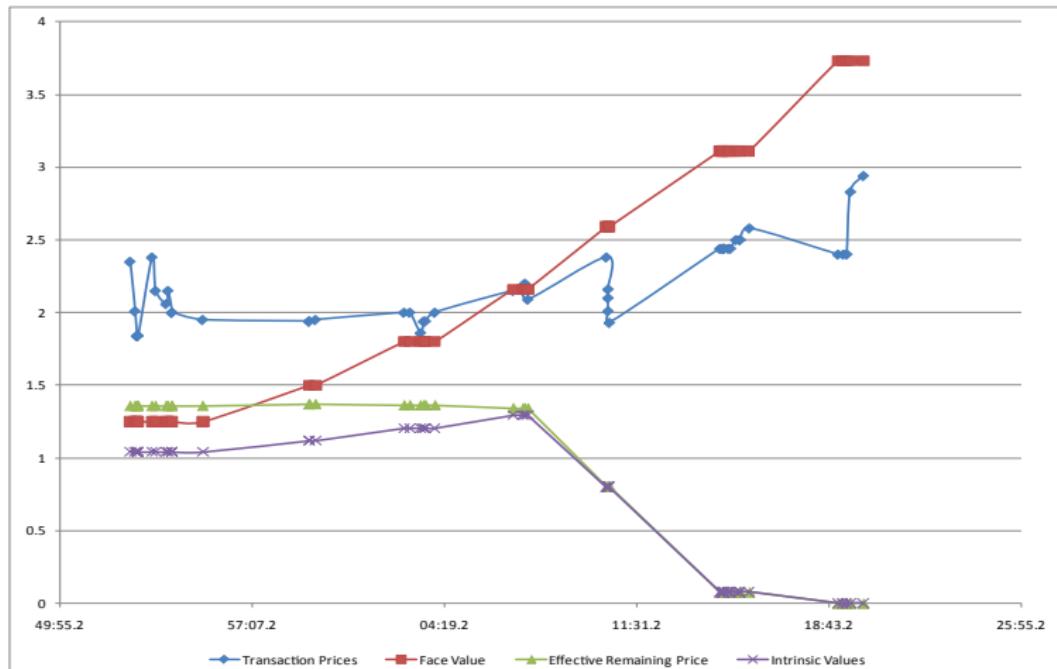
No-Markets Sessions: Bubble Duration

	Replication 1	Replication 2	Replication 3	Replication 4	Replication 5
NTCIT1	6	4	3		
NTCIT2	5	3	2		
NTCIT3	6	4	3	2	2
NTCIT4	5	3	2	8	
NTCIT5	5	4	3		
Means	5	4	3	5	2

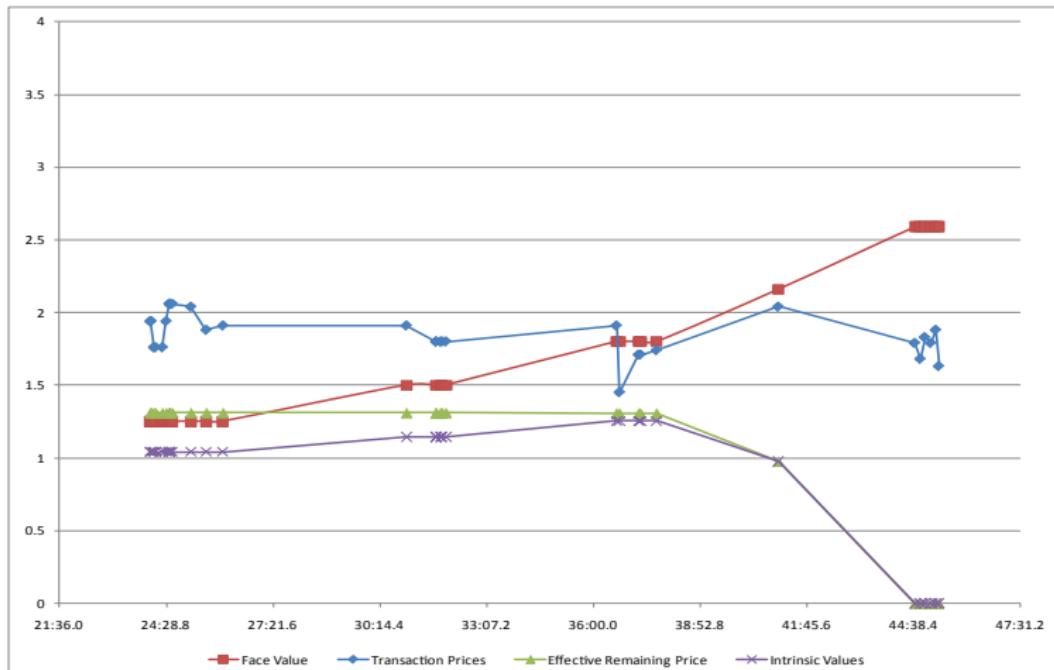
No-Markets Sessions: Payoff Above Intrinsic Value

	Replication 1	Replication 2	Replication 3	Replication 4	Replication 5
NTCIT1	0.27	0.20	0.11		
NTCIT2	0.26	0.17	0.06		
NTCIT3	0.40	0.25	0.10	0.03	0.01
NTCIT4	0.23	0.16	0.04	0.09	
NTCIT5	0.27	0.17	0.08		
Means	0.29	0.19	0.08	0.06	0.01

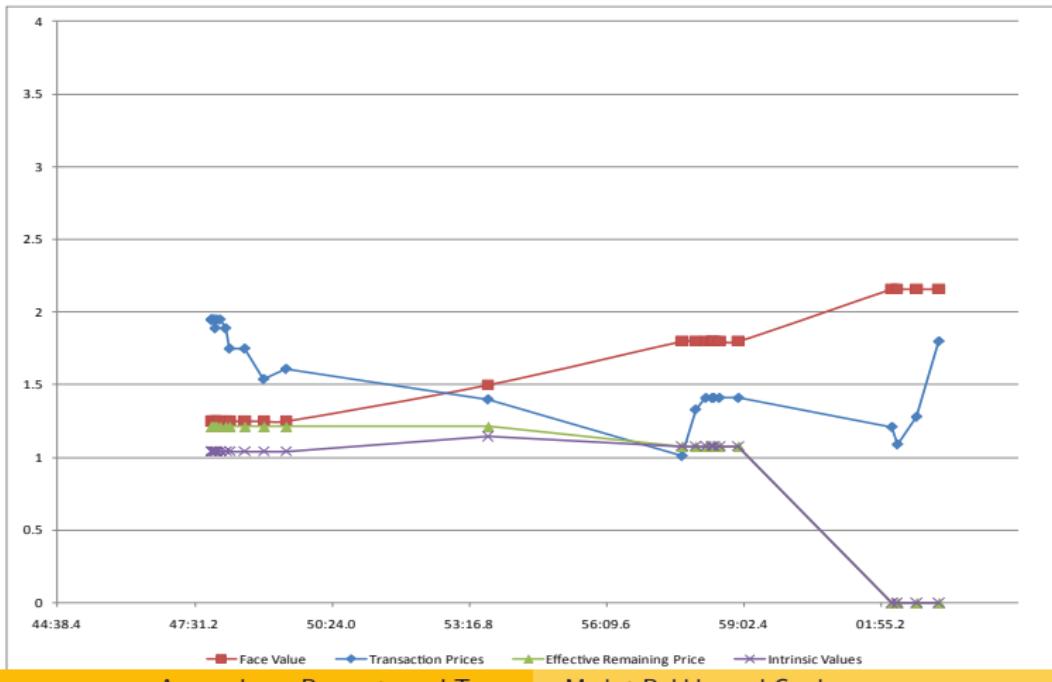
Prices: CIT4, Replication 1



Prices: CIT4, Replication 2



Prices: CIT4, Replication 3



Summary of Asset Pricing Results

- Bubbles are observed in every replication: prices always start at or above intrinsic (and even face) values.

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- Shortsales reduce (positive) drift in prices (until crash).
- While prices and choices are at odds with traditional theory, subjects on average made (far) more money.

Bubble Duration

	Replication 1	Replication 2	Replication 3	Replication 4
CIT1	6	5		
CIT2	5	3		
CIT3	5	4	3	
CIT4	6	4	3	
CIT5	5	3	3	
CIT6	5	4	3	2
CIT7	5	4	4	
EPFL	7			
UU1	6	5	4	
UU2	6	4	3	
UU3	4	3	3	
Means	5.45	3.9	3.25	2

Payoff Above Intrinsic Values

	Replication 1	Replication 2	Replication 3	Replication 4
CIT1	0.28	0.33		
CIT2	0.24	0.26		
CIT3	0.25	0.25	0.17	
CIT4	0.36	0.31	0.21	
CIT5	0.38	0.24	0.15	
CIT6	0.41	0.28	0.2	0.12
CIT7	0.38	0.3	0.21	
EPFL	0.53			
UU1	0.4	0.39	0.32	
UU2	0.44	0.33	0.19	
UU3	0.24	0.18	0.15	
Mean	0.36	0.29	0.20	0.12

Market vs. No-Market

- Social rationality (waiting to cash in) creates payoffs above intrinsic values:

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- While bubble duration itself is not different across the two treatments, the payoffs are higher under the Market Treatment – so more people wait to cash in (more “social rationality”).

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- A huge income redistribution; A possible policy recommendation would to not allow cash-ins and match maturity with pool life; in that case everyone gains but nobody more than anyone else.
- Not clear whether everyone prefers this ex ante! Skilled traders (shortsellers) PREFER endogenous uncertainty of short-term roll-over debt.

FT: Financial Crisis and Covered Bonds

European banks are selling record amounts of the bonds, which have their roots in 18th-century Prussia and are backed by pools of loans that remain on a bank's books, unlike the toxic subprime securitisations the financial crisis made infamous.

The securities are considered ultra-safe because banks must replace bad loans and the pool is ring-fenced for the bondholders in bankruptcy.

A bill launched in the House of Representatives aims to give US products similar bankruptcy protection, considered vital for banks to get the low borrowing costs the bonds deliver in Europe. But the proposals allow for the US bonds to be backed by a far wider range of assets than is common in Europe, where up to four-fifths are based on high-quality mortgages.

Jens Tolckmitt, chief executive of the Association of German Pfandbrief Banks, said that using other assets, such as student or car loans, could damage the bonds' reputation if those backed by riskier assets attracted different investors who might not hold their nerve, as investors generally did in the crisis.

"European-style covered bonds are bought by a very stable investor base that likes seemingly boring products," Mr Tolckmitt said. "If you create something that appeals to hedge funds, those investors may not be there in a crisis."



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- Markets provide a tool to achieve “coordination” and we almost never observe cash-ins in periods 1 and 2.

Returns from buying a ticket at average trade prices in round 1 and selling at average trade prices in the round when the face value is above the purchase price

Experiment	Replication 1	Replication 2	Replication 3	Replication 4
CIT1	0.14	0.09		
CIT2	-0.02	-0.09		
CIT3	0.00	-0.01	0.02	
CIT4	0.05	0.05	-0.25	
CIT5	-0.04	-0.35	0.04	
CIT6	0.05	-0.09	-0.07	-0.09
CIT7	0.01	0.05	-0.12	
EPFL	0.17			
UU1	0.01	0.10	-0.19	
UU2	0.03	-0.19	-0.11	
UU3	0.05	0.05	0.18	
Sharpe Ratio	0.67	-0.27	-0.43	NA
Skewness	1.13	-1.24	0.59	

Avoiding Decay: Online Sessions

- Allow participants to enter and exit session replication but provide to new entrants all information from past sessions.

Payoff Above Intrinsic Values

Session	Percentage Increase
1	0.32
2	0.29
3	0.19
4	0.36
5	0.48
6	0.42
7	0.70
8	0.48
9	0.51
10	0.47
11	0.40
Mean	0.42

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Euro Problem

Game theory and euro breakup risk premium

The meaning of declining tail risk premium

The cost of insuring against EUR tail risk has fallen sharply over the past month. The EU Summit has persuaded many investors that the negative consequences of a euro breakup are so great that politicians will pay whatever price necessary to avoid it. We have reservations about the soundness of this logic and view EUR tail risk premium as mispriced.

Italy may be a bigger problem than Greece

We make our case by using game theory and a cost-benefit study of the relative incentive for a voluntary exit. Our analysis leads to three surprising conclusions. One, Eurobonds are not a Nash equilibrium. Two, while Germany and Austria have the least incentive of any eurozone countries to exit, Italy and Ireland have the most. Three, Germany's incentive to pay other countries to stay is more limited than meets the eye.

Only a weaker EUR can save the EUR

Our analysis suggests that only a much weaker euro can reduce the breakup risk by reducing the incentive for exit and buying time for reforms. We feel that the downside to our near-term 1.20 EUR/USD target is increasing, especially given the low level of US real yields that will reduce the impact of further Fed easing on the USD. We initiate a new recommendation to buy a 6m EUR/USD 1.10 one-touch option that has a 5 to 1 payoff.

Annex: Greece faces mounting challenges

The new coalition government was formed on an agenda that is not fully consistent with the IMF program. We see the next few months as potentially Greece's last chance to stay in the eurozone.

FX and Rates | Global
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Euro Problem

Table 1: Germany vs Greece

		Germany	
		Eurobonds	No Eurobonds
Austerity		Germany: +5 Greece: +5	Germany: +10 Greece: -5
Greece	No austerity	Germany: -5 Greece: +10	Germany: 0 Greece: 0

Source: BofA Merrill Lynch Global Research

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