

Mark-to-Market Accounting For Financial Institutions

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Price volatility and accounting

- The current crisis is characterized by exceptional volatility in the prices of both stocks and fixed income assets
- Prices of (originally) AAA-tranches of securitized subprime mortgages traded at very low prices (e.g., Merrill Lynch traded some at 22c on the dollar)
- This kind of price volatility can worsen the financial crisis because of the use of mark-to-market accounting by financial institutions

Mark-to-market: The debate

- Proponents of MTM:
 - It reflects the “true” value of balance sheets
 - It allows a better assessment of the position of financial institutions by the market and regulators (e.g. S&L problems in 1980s)
- Detractors of MTM:
 - It leads to excessive and artificial volatility
 - Value of balance sheets is driven by short-term fluctuations of the market that do not always reflect fundamentals

Who is right?

- The debate is complex and both sides have some good points
- MTM is best if financial markets are always efficient so that market prices reflect the true future earning power of assets
- However, financial markets do **not** seem to work well in times of crises

Joint work with Elena Carletti (European University Institute)

- “Mark-to-Market Accounting and Liquidity Pricing,” *Journal of Accounting and Economics*, 2008a, 45, 358-378
- “The Role of Liquidity in Financial Crises,” in *Maintaining Stability in a Changing Financial System*, Federal Reserve Bank of Kansas City, 2008b, 379-412
- “Should Financial Institutions Mark-to-Market?,” *Banque de France Financial Stability Review*, 2008c, 1-6

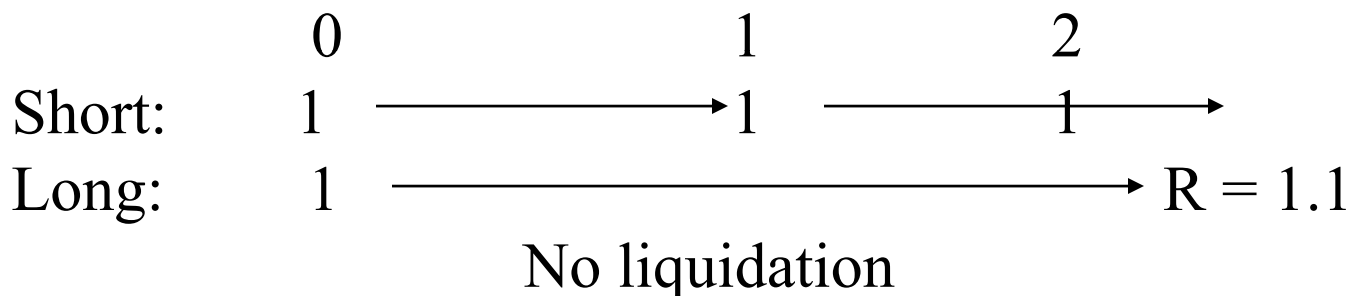
When does *mispricing* occur?

- Allen and Carletti (2008a):
 - When markets are imperfect and liquidity is scarce, prices reflect the cash available to buyers in the market (*cash in the market* price)
- This leads to excess price volatility, and in particular to **low** prices in bad states of the world when many assets are on sale (“fire sales”)
- The price level affects directly the value of banks’ assets and can cause unnecessary failures and contagion if MTM is in use

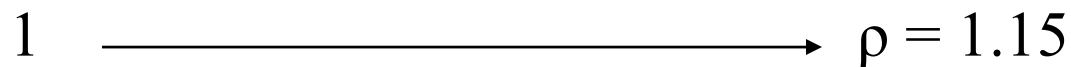
The model

- Three dates $t = 0, 1, 2$

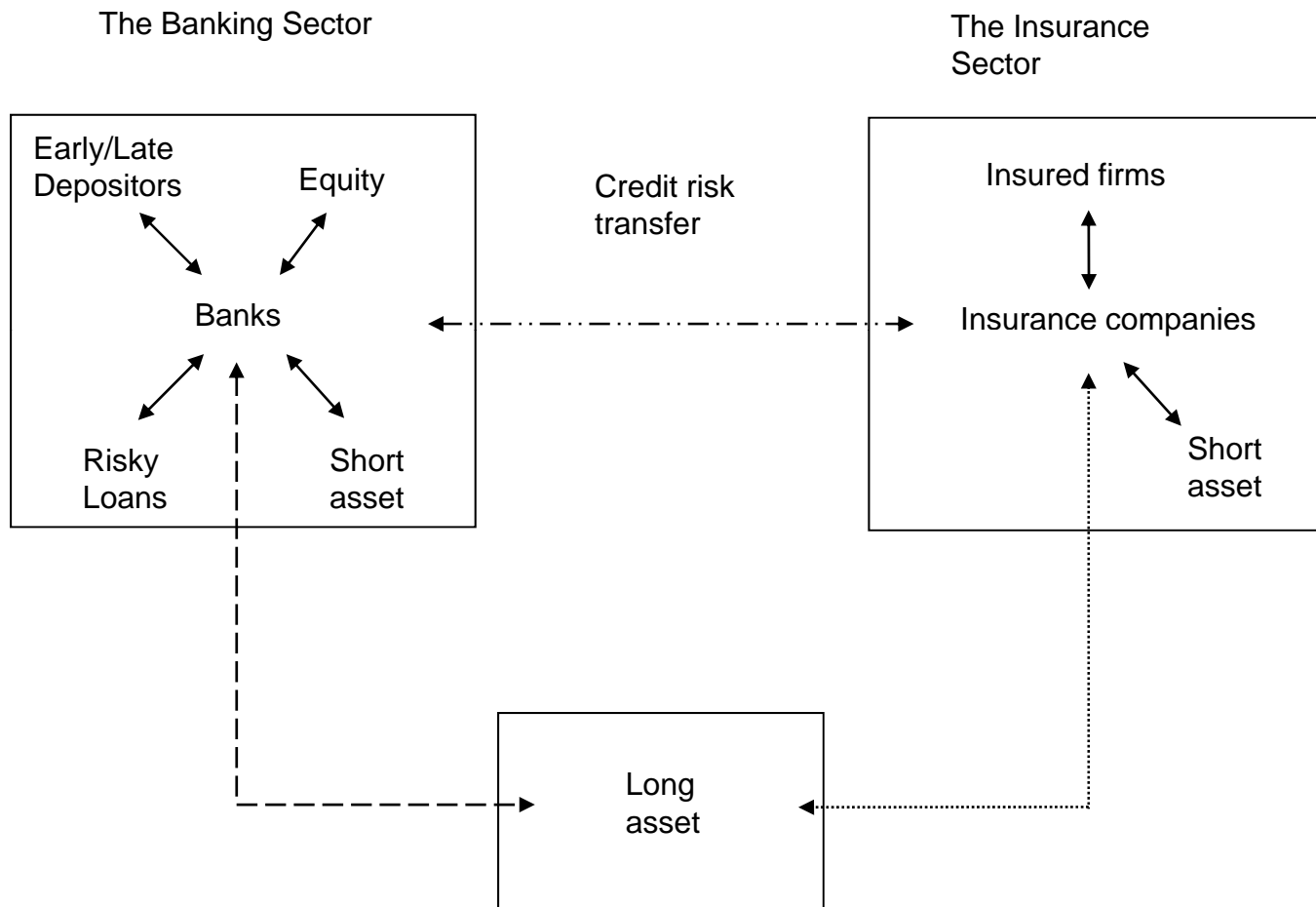
- Two assets



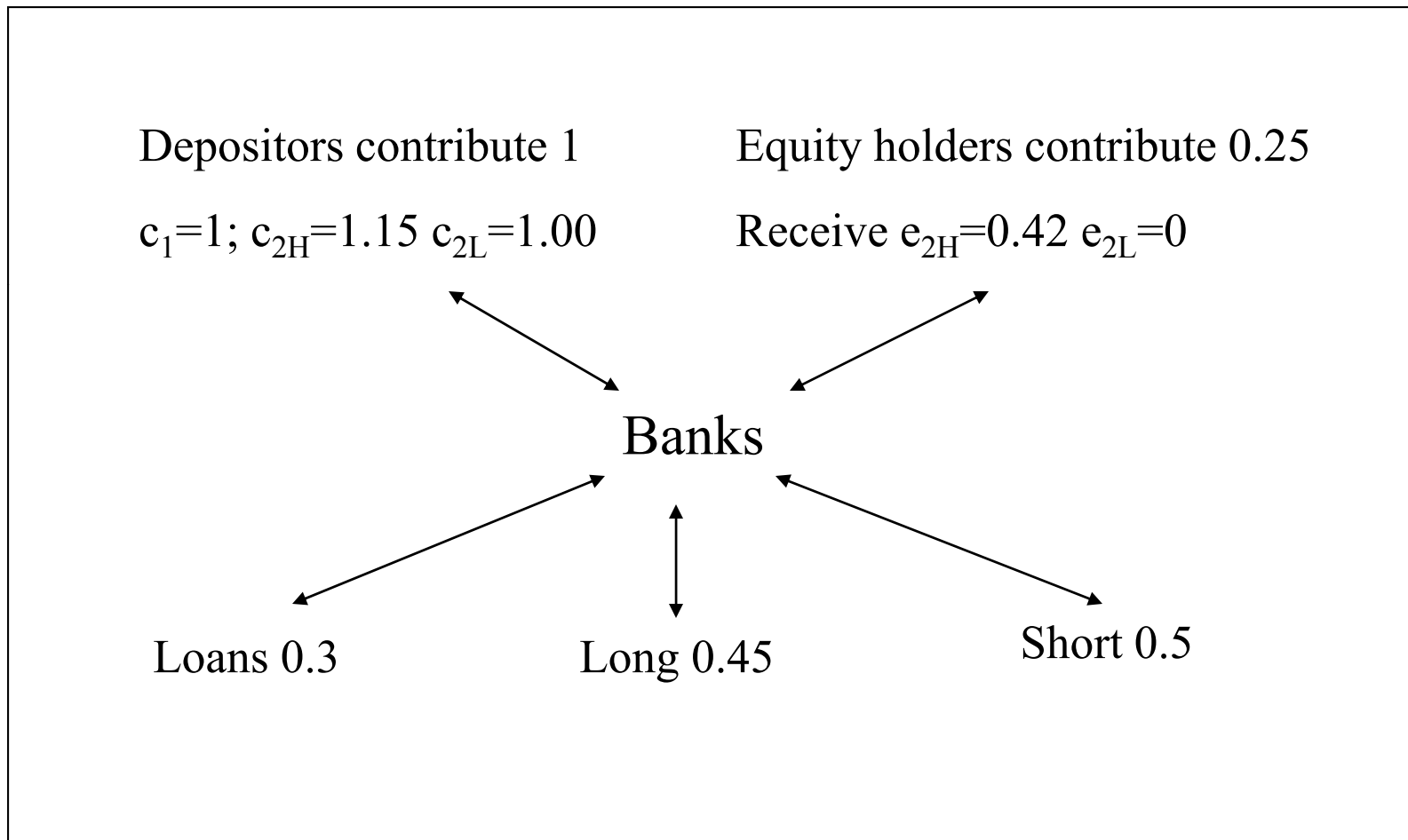
- Risk neutral suppliers of bank equity and liquidity have opportunity cost



The Financial System



Banking sector in autarky



Insurance sector in autarky

Insured firms pay premium 0.5 and put 0.5 in long

$$c_{2H} = A + 0.5R = 1.7; c_{2L} = 0.5 + 0.5R = 1.05$$

Insurance companies

Short 0.5



Credit risk transfer

- Suppose risks in banking and insurance are independent so that there is scope for risk sharing between sectors
- 4 states: (Banking, Insurance)
(H,H), (H,L), (L,H),(L,L)

(H,L) Banks → Insurance
(L,H) Banks ← Insurance
- Without market for long asset best for insurance companies to fund credit risk transfer with short asset

Equilibrium with market for liquidation of long asset

- Introducing a market for liquidating the long asset and using historic cost accounting leads to an improvement
- But with mark-to-market accounting it leads to
 - Contagion (spillover of systemic risk from insurance to banking) that causes real damage because the banks are liquidated

- Somebody must provide liquidity to this market
- In equilibrium it is the same investors who supply bank equity that turn out to provide this liquidity by holding some of the short asset from dates 0 to 1
- In order to earn their opportunity cost the price of the long asset must be **low** in at least one state to make up for the low returns on holding cash in the other states

Historic cost accounting

Bank's situation:

- Bank equity 0.25; Deposits 1
Repayment to capital $e_2=0.42$
- Loans 0.3; Long 0.45; Short 0.5
- Historical cost: $0.3 + 0.45 + 0.5 = 1.25$
Liabilities: $c_1 = 1$
Bank is solvent

Pricing with historical cost accounting

- In states HH and LH the insurance companies do not sell any of the long asset at date 1 and investors continue to hold the short asset between dates 1 and 2 so given this excess liquidity

$$P_{HH} = P_{LH} = R = 1.1$$

Pricing with historical cost accounting (cont.)

- In states HL and LL insurance companies go bankrupt and sell their holdings of the long asset at price

$$P_{HL} = P_{LL} = P_L$$

- For the investors to participate in the market

$$\rho = 0.9 \times 1 + 0.1 \times \frac{R}{P_L}$$

- Solving gives $P_L = 0.44$
- Key feature of the equilibrium is that historic cost accounting ensures that banks stay solvent even though their assets are worth $0.698 <$ their liabilities of 1. However, they can meet their liabilities at date 2.

Mark-to-market accounting

Next we solve for the equilibrium with mark-to-market accounting

$$P_{HH} = P_{LH} = P_{HL} = R = 1.1$$
$$P_{LL} = 0.183$$

$$\begin{aligned} \text{Assets at date 1} &= \text{loans} + \text{long} \times P_{LL} + \text{short} \\ &= 0.882 < \text{Liabilities } c_1 = 1 \end{aligned}$$

so banks closed

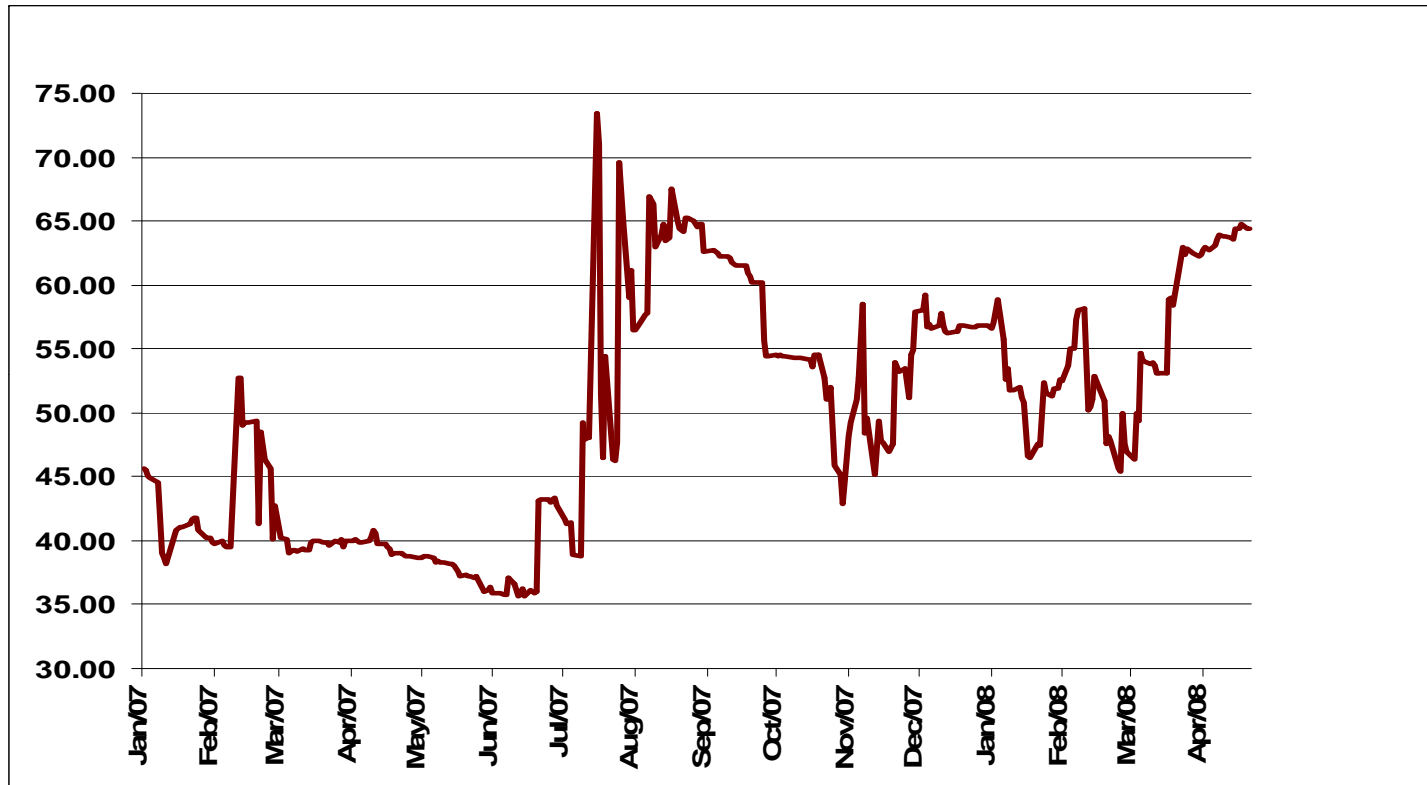
$$\text{Depositors } EU^{\text{MTM}} = 0.0235 (< EU^{\text{HC}} = 0.0496)$$

Was there mispricing in the current crisis?

Allen and Carletti (2008b):

- In the summer of 2007 the prices of AAA-rated tranches of subprime securitizations fell dramatically in a short period of time
- In efficient markets, this would mean that information about the underlying quality of the assets deteriorated
- However, the correlation with other securitized products (with very different fundamentals) increased dramatically
- The prices of AAA tranches of securitizations went to levels that were very difficult to explain on the basis of fundamentals

But not just subprime mortgages were affected:



Co-movement between securitizations of AAA-rated tranches of subprime mortgages, commercial mortgages and firm CDSs increased

- The April 2006 Bank of England Financial Stability Report deduced that prices of these securities at that time implied a 38% loss rate – consistent with a 76% default rate and an eventual 50% loss given default – that seemed much too high
- At the time, there were no defaults and none was expected
- However, **due to the use of MTM**, financial institutions were hit by more than USD 300 billion in write-downs and had to raise more than USD 260 billion from outside investors since the previous year

It was mispricing if we believe...

- New information about subprime defaults led to a realization they were more risky than previously thought
- This led to sales of the AAA tranches as portfolios were readjusted
- The volume of sales overwhelmed the absorption capacity of the secondary markets for securitized assets and prices fell below fundamentals
- Once the link between prices and fundamentals for these products was broken it became risky to try to arbitrage (“limits to arbitrage”, Shleifer and Vishny 1997)

How to recognize mispricing?

- It is crucial to understand why prices are low:
 - Low expected cash flows?
 - Liquidity factors?
- Regulators and investors should be given information to distinguish between these two situations
- What (easily available) information can be used?

Our proposal: Allen and Carletti (2008c)

- IASB and FASB prescribe to use MTM for some portfolios of financial institutions when appropriate
 - Held for trading
 - Available for sale
- The FAS 157 put forward three levels of input
 - Level 1 valuations are based on observable prices in “liquid” markets
 - Level 2 valuations are based on prices on nearby dates or prices of very similar instruments
 - Level 3 valuations allow the use of theoretical valuation models of the reporting entity

- First, what is a *liquid* market?
 - We need **not** only continuous markets and price quotations
 - We **also** need the market to be able to absorb large amounts of extra supply of without the price changing significantly
- Second, the three valuation methods should give similar results most of the time
- In crises though, they may differ significantly
- Here the model-based valuations using plausible assumptions would give significantly higher values as seems to have happened (Goh, Ng, and Yong, 2009)

- We suggest to not only use level 3 valuations when levels 1 and 2 are unavailable
- But to report them **also** when they differ significantly from levels 1 and/or 2 (e.g. more than 5%)
- Reporting historic cost values can also be helpful
- Market participants and regulators will have a warning that markets are pricing in a different way than usual if the different methods give significantly different results
- They can then decide based on all the evidence whether to use market information

Concluding remarks

- If markets are always efficient then MTM is best
- In crises markets appear to misprice some assets
- Reporting Levels 1-3 when there are wide discrepancies in valuations can help regulators and market participants identify periods of mispricing
- Regulators will then need to decide whether to use market prices in their decisions about solvency
- Bank capital regulation is based on accounting capital rather than market values