Where does the Information in Mark-to-Market Come from?

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"Consensus" on Mark-to-Market

- Asset prices aggregate dispersed information
- MTM transmits information in asset price to market participants
- Enhanced information revelation generates various benefits
- Rigid reliance on accounting numbers causes problems when prices are not “right,” mainly due to liquidity issues
Market is no panacea to accounting, for good reasons
The Deeper Root of Illiquidity

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Accounting Measurement  →  Price Informativeness
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Accounting Measurement \rightarrow Price Informativeness

Firm Activities
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Accounting Measurement → Price Informativeness
Firm Activities

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Assumptions

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- Banks prefer early recognition of earnings:
  \[ e_1 + \max \{ e_2 + r, 0 \} \]
  - Earnings determine the distribution of banks’ resources
  - Banks are protected by limited liability
Model Setting

Timeline

1. $t = 0$: bank exerts effort $m$ to originate a good loan with probability $m$; future cash flow is $\theta + \tilde{x}$; $\theta \in \{G, B\}$ is private
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Accounting Measurement of Retention $k$

- HC records the retention at the original cost $B_0$
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Accounting Measurement of Retention $k$

- HC records the retention at the original cost $B_0$
- MTM uses the market price of the sold portion of the loan to revalue the retention to $p(k)$
Price Discovery and Loan Origination Effort

Ex-ante Effort Choice

\[ s'(\hat{m}^A) = V_G^A - V_B^A \quad A \in \{H, M\} \]
Ex-ante Effort Choice

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- Price discovery improves ex-ante incentive
- Cost of price discovery reduces ex-ante incentive
Retention Decision

\[
V^A_\theta \equiv \max_{k \in [0, \overline{k}]} U^A(k; \theta)
\]

\[
U^A(k; \theta) \equiv e_1^A + E \left[ \max \left\{ \tilde{e}_2^A(\theta), 0 \right\} \right]
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Earnings Determination

\[ e_1^A = (1 - k)(p(k) - B_0) + k \left[ (B_1^A - B_0) - c \right] \]
Retention Decision

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Earnings Determination

\[ e_1^A = (1 - k)(p(k) - B_0) + k \left[ (B_1^A - B_0) - c \right] \]

\[ \tilde{e}_2^A(\theta) = k \left[ (\theta + \tilde{x}) - B_1^A \right] \]

\[ B_1^A = \begin{cases} p(k) & \text{if } A = M \\ B_0 & \text{if } A = H \end{cases} \]
Retention Decision

\[ U^A(k; \theta) = (p(k) - B_0) - k \left[ c - (\theta - p(k)) - A_\theta \right] \]
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Three Components of Unit Retention Cost

- direct cost \( c \)
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Three Components of Unit Retention Cost
- direct cost \( c \)
- expected payoff revelation \( \theta - p(k) \)
- option value \( A_\theta \)

\[ A_\theta = \int_{x}^{B_1^A - \theta} \left[ (B_1^A - \theta) - x \right] dF(x) = A_\theta (B_1^A - \theta) \]
Option Value of Retention

Option Payoffs

- $M_B$
- $M_G$
- $H_B$
- $H_G$

- $B_0 - G$
- $B_0 - B$
- $G - G$
- $G - B$

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First Best (Lemma 1)

When there is no information asymmetry, banks follow OTD model: they exert first-best effort to originate loans and sell the entire loan. Accounting measurement is irrelevant.
Equilibria: Second Best

Equilibrium:
- Bad banks are indifferent in retention
- Good banks prefer retention and separation

<table>
<thead>
<tr>
<th>Separating Equilibrium</th>
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<td>( G - k^H [c - (B - G) - H_B] = B ) (HC)</td>
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Separating Equilibrium

\[ G - k^H [ c - (B - G) - H_B ] = B \]  (HC)
\[ G - k^M [ c - (B - G) - M_B ] = B \]  (MTM)

Partial Separating Equilibrium

\[ p(\bar{k}) - \bar{k} [ c - (B - p(\bar{k})) - M_B ] = B \]  (MTM)
Equilibria

\[ k^M = \frac{G - B}{G - B + c - M_B} \]

\[ k^H = \frac{G - B}{G - B + c - H_B} \]

\[ k^{FB} \]

Retention

\[ k \]

\[ c_1 \]

\[ c_2 \]
Main Result 1: Risk Retention

Proposition 4

Banks retain more loans on their balance sheets under MTM than under HC, that is $k^M > k^H$. 
Equilibrium Loan Prices

Loan Prices

G

B

0

c_1

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Proposition 6 (Extended)

When $c < c_{11}$ or $c > c_{3}$, the value of originating good loans is lower under MTM than it is under HC, that is, $V^M_G < V^H_G$. 
Main Result 2: Origination Effort and Loan Quality

**Proposition 6 (Extended)**

When $c < c_{11}$ or $c > c_3$, the value of originating good loans is lower under MTM than it is under HC, that is, $V_G^M < V_G^H$.

**Corollary 8 (Extended)**

When $c < c_{11}$ or $c > c_3$, the overall loan quality is lower under MTM than under HC.
Two opposing effects of accounting measurement lead to higher unit retention cost: $V^A_G = G - B_0 - k^A(c - A_G)$.

MTM results in higher retention level: $k^H < k^M$. 

Intuition

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Intuition

\[ V^A_G = G - B_0 - k^A(c - A_G) \]

Two opposing effects of accounting measurement

- HC leads to higher unit retention cost: \( c - H_G > c - M_G \)
Intuition

\[ V^A_G = G - B_0 - k^A(c - A_G) \]

Two opposing effects of accounting measurement

- HC leads to higher unit retention cost: \( c - H_G > c - M_G \)
- MTM results in higher retention level: \( k^H < k^M \)
Informativeness of Loan Prices

Loan Prices

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Main Result 3: Informativeness of Price and Liquidity

Proposition 9 (Extended)

Loan prices are (weakly) less informative under MTM than under HC.
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Liquidity and Information

- Liquidity provision is costly
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Proposition 9 (Extended)
Loan prices are (weakly) less informative under MTM than under HC.

Liquidity and Information
- Liquidity provision is costly
- Liquidity is fragile
Implications for Current Financial Crisis

MTM may have contributed to current financial crisis through two channels

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MTM may have contributed to current financial crisis through two channels:

- MTM could have reduced ex-ante incentive to originate good loans
- MTM could have forced banks to retain excessive exposure to the risk of the loans they originated
Conclusion

- Attempt to use information in asset price interferes with the market mechanisms that produce the information.
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- Implementation difficulty is only a symptom of the conceptual issue of MTM.
- Understanding the micro-foundation of informativeness of asset prices is important for improving MTM.