Did Fair Value Accounting Contribute to the Financial Crisis?

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Motivation

• FVA has been blamed to have exacerbated the financial crisis
  – Excessive leverage in booms
  – Excessive write-downs in busts
    ▪ Downward spirals: declines in asset values lead to write-downs, which leads to fire sales, further declines, and further write-downs
    ▪ Contagion: Fire sales become relevant “marks” for other banks
• Major policy debate and intense pressure on the standard setters
• Arguments about the problems are often taken for granted, but:
  – Specific evidence of the problems is rarely provided
  – Instead references to various models, but they model full FVA and not the accounting system that is currently in place
• Did FVA accounting contribute to the current crisis?
The Challenge of Identifying FVA as a Culprit

• Market prices are important – not only with FVA
  – Were problems caused by using market prices in accounting?

• Large losses obviously cause problems for banks
  – But did FVA exacerbate the problems?
  – Would these problems have not occurred otherwise?

• HCA as a benchmark or counterfactual
  – Would HCA have been better?
    ▪ Impairments under HCA are quite similar to write-downs under FVA
    ▪ Would the market have reacted differently if banks had not reported losses?
When can we blame FVA?

Losses occur → FVA reports losses → Actions are taken

Actions would have taken place regardless
A Word on Procyclicality

• There are many sources of procyclicality for highly leveraged financial institutions:
  – Market-value-based bank management (VaR)
  – Haircuts and margin requirements (collateralized borrowing and repurchase agreements)
  – Collateralization requirements (based on ratings)

• Banks are forced to raise capital or sell assets in a financial crisis

• But this is not a matter or a result of FVA per se
Procyclicality of FVA?
A Roadmap to Identifying FVA as a Culprit

• We need to identify the link through which FVA caused problems
  – Capital regulation
  – Contracts (e.g., debt covenants, compensation contracts)
  – Accounting fixation by investors, rating agencies and bank managers

• FVA as stipulated by GAAP includes various circuit breakers (that can mitigate the effects if links exist)
  – Did they work?
Sneak Preview

- It is unlikely that FVA contributed to the severity of the financial crisis
  - FVA plays a limited role for most bank assets
  - There are mechanisms in place to limit negative effects from using (distorted) market prices:
    - FVA allows deviations from market prices or dealer quotes
    - Not all FV changes affect banks’ net income
    - Adjustments for regulatory capital purposes
  - We do not find evidence that these mechanisms failed

- It is unlikely that FVA increased the leverage in the boom
  - FVA played a limited role for most bank holding companies
  - Assets for which FVA applies are very liquid and could be sold and repurchased to realize gains under HCA
What is Fair-Value Accounting (FVA)?

- **FV** = Price that would be received to sell an asset in an *orderly* transaction between market participants
  - Explicit restriction: It is *not* a price from a distress or fire sale
- **FV** is based on an exit price notion
  - Illiquidity has a systematic effect as spreads widen
- **Under GAAP**, three different levels of FVs depending on the inputs
  - Level 1: Market price for same asset ⇒ pure marking to market (MTM)
  - Level 2: Prices for similar assets and observable inputs for models
  - Level 3: Predominantly unobservable inputs for models
- **Banks have (some) discretion and can deviate from prices or quotes**
  - 66% of FV is in Level 2 (and Level 3 accounts for another 10%)
  - For over 75% of the fair values, banks use models (rather than prices directly)
  - Key issue: How much discretion did (and should) banks have?
### Key Assets on Balance Sheets of U.S. Banks

<table>
<thead>
<tr>
<th></th>
<th>Large Bank Holding Companies</th>
<th>Smaller Bank Holding Companies</th>
<th>Large Investment Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trading Assets</strong></td>
<td>12.22%</td>
<td>0.71%</td>
<td>33.34%</td>
</tr>
<tr>
<td><strong>Net Trading Assets</strong></td>
<td>6.71%</td>
<td>0.37%</td>
<td>15.66%</td>
</tr>
<tr>
<td><strong>Other Securities</strong></td>
<td>14.69%</td>
<td>20.67%</td>
<td>39.54%</td>
</tr>
<tr>
<td><strong>Available-for-sale</strong></td>
<td>14.56%</td>
<td>17.79%</td>
<td>12.15%</td>
</tr>
<tr>
<td><strong>Held-to-maturity</strong></td>
<td>0.13%</td>
<td>2.88%</td>
<td>2.83%</td>
</tr>
<tr>
<td><strong>Loans and Leases</strong></td>
<td>47.28%</td>
<td>61.67%</td>
<td>Securities Segregated for Regulatory and other Purposes 3.99%</td>
</tr>
<tr>
<td><strong>Repo Agreements</strong></td>
<td>10.04%</td>
<td>2.41%</td>
<td></td>
</tr>
<tr>
<td><strong>Financial Instruments</strong></td>
<td>87.83%</td>
<td>90.02%</td>
<td>97.73%</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Key Rules

• Loans (including mortgages) and held-to-maturity securities (HTM) are reported at amortized costs
  - For most BHCs, loans constitutes over 50% of the balance sheet
  - But there are FV disclosure requirements for both loans and HTM
    ▪ Interestingly, these disclosures are not criticized or questioned in the debate
• For securities reported at FV, changes do not always affect the income statement or regulatory capital
  - Unrealized changes in AFS securities affect only book equity (AFS ≈15% of BS for BHCs)
  - Unrealized changes in AFS debt securities do not affect Tier 1 or Tier 2 capital
  - “Full FVA” applies only to trading assets (for most banks <10% of TA)
Impairment Testing

- Impairment testing is an old concept and it also applies to assets reported at (amortized) cost

- Other-Than-Temporary Impairments (OTTI) for AFS & HTM
  - OTTI affect income and regulatory capital
  - Concept addresses temporary price declines (e.g., liquidity crunch)

- Banks have some discretion in recognizing OTTI
  - Citigroup reported the first OTTI charges in the fourth quarter of 2008
  - Citigroup’s total OTTI in 2008 was $2.8 billion on AFS & HTM compared to over $19 billion of net unrealized losses
Next steps

• Rules do not stipulate pure marking to market prices
  – They contain various circuit breakers
    ▪ Fire-sale restriction
    ▪ OTTI
    ▪ Discretion in determining FV

• Procyclicality argument implies that
  – FVA leads to excessive leverage in booms
  – Write-downs in busts are excessive

• Any evidence on the use of circuit breakers?
  – Possible that the rules or their implementation were too tight
FVA in the Boom Period

• Unlikely that FVA write-ups contributed to high leverage
  – For IB, the use of market values seems inevitable (and not driven by accounting rules) given their business and funding model
  – For most BHC, the fraction of FV assets affecting regulatory capital in a boom was very small

• For liquid securities, HCA does not really impose a constraint
  – Gains trading and repurchase agreements
FVA in the Crisis: Investment Funds and Investment Banks

• At the beginning of the crisis
  - Slow-down in growth and decline in housing prices
  - Increase in delinquency rates and defaults (especially subprime)

• Led to major problems in mortgage markets
  - Information asymmetry, uncertainty, reduced liquidity and difficulties with refinancing & repos

• Problems affected investment funds (or SIVs)
  - Given their business model (short-term financing & redeemable funds), FVA is not an option, it is inevitable
  - Similar arguments apply to investment banks (e.g., Bear Stears faced a run)

• Concerns about subprime exposure would have existed under HCA
  - If anything, the issue was lack of transparency

• There were problems, but essentially the same under HCA
Recall this picture

- Losses occur
- FVA reports losses
- Actions are taken

Actions would have taken place regardless
FVA in the Crisis: Bank Holding Companies

- BHC generally have a different business model
  - For a few large BHC with substantial trading positions, the earlier discussion for IB also applies
- Regulatory capital constraints (and other mechanisms) could in principle lead to downward spirals
- But even if link exists, two questions arise:
  - Were there widespread fire sales or price distortions?
  - Did the circuit breakers work?
    - Banks get to classify securities at the outset
    - OTTI (instead of strict impairment)
    - Regulatory capital add-backs (e.g., AFS debt securities)
    - Deviations from market price (e.g., use of models, Level 3)
Mixed Evidence on Price Distortions

• Key element of the FV criticism is that it forces write-downs to distorted or artificially low prices
  - What evidence do we have?

• Coval et al. (2009) find that pricing of high-grade credit risk is consistent with movements in equity markets
  - Of course, equity markets could also suffer from distortions

• Bank of England (2008), Fitch (2008) and various banks claim that ABX indices cannot be justified by fundamentals
  - Exclude liquidity premia & non-credit-risk factors from fundamentals
  - But they can be relevant, especially if there are solvency concerns

• Even if prices (or quotes) are distorted, FVA allows for deviations
  - Evidence of distorted prices is not sufficient
Evidence on Deviations from MTM

• Use of models is widespread (Level 2 and Level 3)
  − Banks report almost all MBS in Level 2 or Level 3 (even prior to the crisis) ⇒ MBS were generally not subject to pure MTM

• Net transfers into Level 3 from other categories were clearly possible
  − Level 3 assets doubled during the crisis (7% to almost 14%)
  − Relative to total FV, transfers were small but individual banks made substantial transfers
Evidence on Deviations from MTM (cont.)

• It is of course possible that banks did not transfer enough assets into Level 3 to avoid contagion
  – But UBS & Citi moved to “fundamental models” or “intrinsic cash flow methodology” for subprime (in Q4 07)
  – JPM (Q4 2008): Majority of CMO, CDO & ABS in Level 3

• Thus, problem assets appear to have been moved to Level 3 either before or during crisis

• But it is possible that Level 3 FVs are too low to avoid contagion and downward spiral
Evidence on Market Pricing of Reported FVs

• Is there evidence of excessive write-downs?
• Several studies on market pricing:
  - E.g., Goh et al. (2009); Kolev (2009); Song et al. (2009)
• Basic idea:
  - Regress market price per share on FVs and other assets (per share)
  - What is the market value of $1 reported FV?
  - Coefficient of about 1 on FV (or L1-L3) assets implies market pricing and reporting are consistent
• Key result: Level 3 assets have a coefficient below 1 and a lower coefficient than Level 1 and Level 2 FVs
  - No clear evidence of excessive write-downs, such as coefficient > 1
Two Explanations for Market Pricing of FVs

• Reporting explanation
  − Level 3 assets are overstated relative to market value of these assets
  − Banks use the discretion in Level 3 to their advantage

• Fire-sale explanation
  − Banks deviate from market prices, i.e., reduce some of the extreme liquidity discounts in accordance with FAS 157
  − Market anticipates that the bank may have to engage in fire sales and hence prices L3 assets below reported values
  − In this case, market agrees with long-run value reported but simply anticipates that some assets will have to be sold at a discount

• However, the second explanation implies that
  − Banks are deviating from extreme prices
  − Fire sales take place in spite of higher reported FVs
## Evidence from Market-to-Book Ratios

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<tr>
<th></th>
<th>Major U.S. Investment Banks</th>
<th>Large U.S. Bank Holding Companies</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>2007 Q1</td>
<td>2.24</td>
<td>2.26</td>
</tr>
<tr>
<td>2007 Q2</td>
<td>2.26</td>
<td>2.31</td>
</tr>
<tr>
<td>2007 Q3</td>
<td>2.08</td>
<td>1.95</td>
</tr>
<tr>
<td>2007 Q4</td>
<td>1.92</td>
<td>1.86</td>
</tr>
<tr>
<td>2008 Q1</td>
<td>1.53</td>
<td>1.50</td>
</tr>
<tr>
<td>2008 Q2</td>
<td>1.39</td>
<td>1.29</td>
</tr>
<tr>
<td><strong>2008 Q3</strong></td>
<td>1.08</td>
<td>1.24</td>
</tr>
<tr>
<td><strong>2008 Q4</strong></td>
<td>0.94</td>
<td>0.73</td>
</tr>
<tr>
<td><strong>2009 Q1</strong></td>
<td>0.86</td>
<td>0.86</td>
</tr>
</tbody>
</table>
Evidence from Loans

- Banks report loans at amortized cost in the balance sheet but have to provide FVs in the notes.
- Loans are fairly illiquid and hence we expect that, if anything, reported FVs of loans would be fairly low during the crisis.

<table>
<thead>
<tr>
<th></th>
<th>Loans Held</th>
<th>Reported Loss Expectation</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Amortized Cost</td>
<td>Fair Value</td>
<td>Allowance for LLL</td>
</tr>
<tr>
<td>Bank of America</td>
<td>866.2</td>
<td>841.6</td>
<td>23.1</td>
</tr>
<tr>
<td>Citigroup</td>
<td>660.9</td>
<td>642.7</td>
<td>29.6</td>
</tr>
<tr>
<td>JP Morgan</td>
<td>721.7</td>
<td>700.0</td>
<td>23.2</td>
</tr>
<tr>
<td>Wells Fargo</td>
<td>849.6</td>
<td>835.5</td>
<td>21.1</td>
</tr>
</tbody>
</table>
**Key Takeaways**

- We do **not** find evidence supporting claims that
  - FVA contributed to the crisis in a major way or that
  - HCA would have helped to mitigate the crisis
- FVA is far less pervasive and links to leverage or regulatory capital are far less obvious than often thought
- Banks made ample use of the discretion in FVA
  - The notion of pure marking to market is in many cases a myth
- Little evidence that banks were forced to **excessively** write-down assets (for some assets the opposite is likely true)
- But we neither claim that there were no downward spirals nor that more FVA during the crisis would have been better
  - Other factors (e.g., collateralization, haircuts, margin requirements, short-term financing) seem more important
  - There are various subtle tradeoffs with respect to the accounting system
Policy Issues and Tradeoffs

• It is important to recognize that one reason why FVA played a small role is its limited use and effect on banks’ capital
  − Our study cannot be used to legitimize an extended use of FVA

• While FVA did not hurt, it is also not clear how much it helped either
  − Did FVA really provide an early warning in this crisis?
  − As illiquidity increases, FVA loses many of its desirable properties
  − Evidence from HCA for loans suggests slow impairment (as in prior crises)

• FVA may inject some volatility into the numbers and the system but timely impairments facilitate prompt corrective actions
  − Tradeoff (also with respect to ex ante incentives)
  − Even if there are problems with FVA, it is not clear that we would prefer HCA

• It is not clear that problems of procyclicality or regulatory capital are best addressed (directly) in the accounting system