Credit Earnings Volatility and Share Price Performance: Implications of IFRS 9 and CECL

Portfolio and Balance Sheet Research

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Does Risk Management Add Value?

In order for risk management to matter, **stable performance must be valued at a premium**, compared to more volatile.
Enter CECL and IFRS 9

Today’s Agenda

1. The relationship between accounting rules, credit earnings volatility and share price performance
   - How does the market interpret the volatility in financials?

2. Implications of credit portfolio management on share price performance
   - To what extent can credit portfolio management help address volatility under CECL and IFRS 9?
Why Earnings Volatility Matters

» Impacts capital surplus and solvency

» High volatility is associated with:
  – Concerns of opacity and questionable business practices
  – Concerns of questionable portfolio composition

» Ultimately, volatility:
  – Impacts cost of capital
  – Limits business opportunities
  – Feeds into valuation and share price
Market reactions are higher for firms where estimation risk is reduced.
The magnitude of the effect is substantial with a 1% increase in cash-flow volatility, resulting in approximately a 0.15% decrease in firm value.
Observations From the Market

WE EXPLORE
the relationship between dynamics in financial statements and equity value of public US bank holding companies from 2002 to 2017; roughly, 6000 observations.

... where Equity Value = ratio of market value and book value

WE WILL FOCUS ON
the impact of credit earnings risk, measured as:

- Volatility of Allowance
- Volatility of Net Charge Off

WE CONTROL FOR
- Capital Structure
  - Debt-to-Assets Ratio
- Systematic Risk
- Financial Performance
  - Earnings
  - Allowance
  - Charge Off
  - Interest Income
  - Interest Expense
  - Return on Assets
  - Book Value Growth
  - Volatility of Interest Income
  - Volatility of Interest Expense
### Valuation and Components of Earnings Vol

<table>
<thead>
<tr>
<th>Dependent Variable: Ln(Equity Value)</th>
<th>Beta</th>
<th>t value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(Volatility of interest income)</td>
<td>-0.028</td>
<td>-1.64</td>
</tr>
<tr>
<td>Ln(Volatility of interest expense)</td>
<td>-0.062</td>
<td>-4.22</td>
</tr>
<tr>
<td>Ln(Volatility of change in loss allowance)</td>
<td><strong>-0.080</strong></td>
<td><strong>-4.69</strong></td>
</tr>
<tr>
<td>Ln(Volatility of net charge off)</td>
<td><strong>-0.120</strong></td>
<td><strong>-7.13</strong></td>
</tr>
<tr>
<td>Ln(Total assets)</td>
<td>-0.220</td>
<td>-10.08</td>
</tr>
<tr>
<td>Assets growth</td>
<td>1.748</td>
<td>2.65</td>
</tr>
<tr>
<td>Debt-to-Asset ratio</td>
<td>0.752</td>
<td>3.80</td>
</tr>
<tr>
<td>Return on assets</td>
<td>9.519</td>
<td>8.90</td>
</tr>
<tr>
<td>Ln(Systematic risk)</td>
<td>0.404</td>
<td>12.55</td>
</tr>
<tr>
<td>Ln(Idiosyncratic risk)</td>
<td>0.031</td>
<td>0.95</td>
</tr>
<tr>
<td>Ln(Non-performing Assets)</td>
<td>-0.015</td>
<td>-3.28</td>
</tr>
</tbody>
</table>

* Newey-West standard errors and accounting for time fixed effects

- A 1% increase in volatility of charge off will lead to a 12 bps decrease in stock price.
- A 1% increase in volatility of change in loss allowance will lead to a 8 bps decrease in stock price.
Equity Valuation and Volatility

Cross Sectional contribution of credit earnings volatility in 2015 Q2

Sensitivity of Equity Value to Volatility

Variation across the credit environment

![Graph showing regression coefficient and standard deviation of credit earnings volatility over years from 2005 to 2017. The graph indicates fluctuations in both sensitivity and volatility across the years.]

- Green line: Sensitivity of Equity Value to Credit Earnings Volatility
- Blue line: Standard Deviation of Credit Earnings Volatility
Sensitivity of Equity Value to Volatility

Variation across the credit environment

Regression Coefficient
- Sensitivity of Equity Value to Credit Earnings Volatility
- Market Price of Risk


Enter CECL and IFRS 9

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The Value of Credit Risk Management

The negative relationship between earnings volatility and valuation motivates exploring how much value a prudent credit risk management practice can add to a financial institution.

We evaluate a credit risk management strategy:

- Start with the same initial portfolio as benchmark in the first period
- Starting in the second period, our CRM strategy updates the portfolio by optimally allocating free cash to minimize portfolio ex-ante earnings volatility while maintaining the profitability level as benchmark.

1 CECL Benchmark
Actual US banks’ portfolio time series in the CRD/LAS dataset.

2 IFRS 9 Benchmark
Synthetic European loan portfolio time series consisting of all European public-firm borrowers.
Reinvestment Policies

Allocation of free cash-flow generated by a credit portfolio

Interest Income

Recovery from Defaults

Matured Loans

Free Cash is Used to Originate Loans

Optimized reinvestment policy: Minimize earnings volatility
Data for CECL Benchmark Portfolios

Seven US banks’ portfolios from Moody’s CRD/LAS database

- There are seven US banks with data from 2005 to 2016, covering both pre and post crisis periods.
- The benchmark bank portfolios include non-real estate term loans and revolvers that have bank-provided net balance, coupon rates and maturity as well as Moody’s Analytics RiskCalc PDs.
- Loss given default is set to be 25% for secured loans and 45% for non-secured loans.
- Portfolio performance over time is evaluated under CECL rules.
Data for the IFRS 9 Benchmark Portfolio

A synthetic loan portfolio consisting of loans to public European firms

Instrument Characteristics

NEW ORIGINATION

**LOAN MARKET** determined by outstanding liabilities of publicly traded firms
- some adjustments for financial firms

**MATURITY** determined by current and long-term liabilities validated against Pillar III data

**CREDIT RISK** Moody’s Analytics EDF

**SPREAD** Implied Par Spread

**REFERENCE RATE** three-month LIBOR rate
Realized Default Loss of Seven US Banks

The CRM strategy reduces default risk during the crisis period

The CRM strategy reduces default loss volatility by 63%, which is associated with a 7.6% increase in each bank’s equity value.
The CRM strategy results in less CECL loss allowance

CECL Loss Allowance of Seven US Banks

Percent of Notional

Bank Portfolios Combined

Optimized Portfolios Combined

Financial Crisis
2015-2016 stock market selloff
The CRM strategy reduces volatility of changes in loss allowance by 67%, which is associated with a 5.4% increase in equity value.
The Implication of CECL

Loans with shorter maturity and lower PD are preferred under CECL
### Portfolio Default Loss Volatility by Bank

The CRM strategy lowers volatility in default loss

<table>
<thead>
<tr>
<th>Bank</th>
<th>Default Loss Volatility</th>
<th>Implied Increase in Equity Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benchmark</td>
<td>Optimized</td>
</tr>
<tr>
<td>Bank 1</td>
<td>0.53%</td>
<td>0.20% (63% ↓)</td>
</tr>
<tr>
<td>Bank 2</td>
<td>0.36%</td>
<td>0.13% (64% ↓)</td>
</tr>
<tr>
<td>Bank 3</td>
<td>0.42%</td>
<td>0.41% (2.4% ↓)</td>
</tr>
<tr>
<td>Bank 4</td>
<td>0.77%</td>
<td>0.47% (39% ↓)</td>
</tr>
<tr>
<td>Bank 5</td>
<td>0.34%</td>
<td>0.20% (41% ↓)</td>
</tr>
<tr>
<td>Bank 6</td>
<td>0.26%</td>
<td>0.15% (42% ↓)</td>
</tr>
<tr>
<td>Bank 7</td>
<td>0.38%</td>
<td>0.17% (55% ↓)</td>
</tr>
</tbody>
</table>
The CRM strategy results in less loss allowance in the portfolio, as shown in the table below:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Change in Loss Allowance Volatility</th>
<th>Implied Increase in Equity Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benchmark</td>
<td>Optimized (Volatility Reduction)</td>
</tr>
<tr>
<td>Bank 1</td>
<td>0.48%</td>
<td>0.14% (71% ↓)</td>
</tr>
<tr>
<td>Bank 2</td>
<td>0.93%</td>
<td>0.27% (71% ↓)</td>
</tr>
<tr>
<td>Bank 3</td>
<td>1.08%</td>
<td>0.37% (66% ↓)</td>
</tr>
<tr>
<td>Bank 4</td>
<td>0.62%</td>
<td>0.25% (60% ↓)</td>
</tr>
<tr>
<td>Bank 5</td>
<td>0.69%</td>
<td>0.32% (54% ↓)</td>
</tr>
<tr>
<td>Bank 6</td>
<td>0.73%</td>
<td>0.25% (66% ↓)</td>
</tr>
<tr>
<td>Bank 7</td>
<td>0.47%</td>
<td>0.17% (64% ↓)</td>
</tr>
</tbody>
</table>
The CRM strategy reduces risk during the crisis period.

The CRM strategy reduces default loss volatility by 59%, which is associated with a 7.1% increase in equity value.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benchmark</td>
<td>Optimized</td>
</tr>
<tr>
<td>Default Loss</td>
<td>0.13%</td>
<td>0.03%</td>
</tr>
</tbody>
</table>
Realized Loss Allowance Under IFRS 9

The CRM strategy results in less IFRS 9 loss allowance
The CRM strategy lowers CECL loss allowance volatility by 35%, which is associated with a 2.8% increase in equity value.

### Change in IFRS 9 Loss Allowance

The CRM strategy reduces changes in loss allowance volatility by 35%, which is associated with a 2.8% increase in equity value.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Average</th>
<th>Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benchmark</td>
<td>Optimized</td>
</tr>
<tr>
<td>Change in Loss Allowance</td>
<td>0.00%</td>
<td>-0.01%</td>
</tr>
</tbody>
</table>
Realized Portfolio Characteristics

PD to Maturity and Proportion of Stage 2
Accounting rules can have a material impact on valuation. Opacity and cost can have a detrimental impact on valuation.

Earnings volatility is negatively associated with valuation. For financial institutions both charge off and allowance play a role.

Credit portfolio management. Techniques can materially reduce portfolio volatility and positively impact valuation.
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