# Comparison of the 2015 Comprehensive Capital Analysis and Review Stress Test Results by Model

In March, the Federal Reserve published the results from its 2015 round of capital adequacy stress testing for large banks in two parts. The first part was the Dodd-Frank Act Stress Test (DFAST) analysis of bank balance sheets, earnings, losses, and capital under three different economic scenarios. The second was the Comprehensive Capital Analysis and Review (CCAR) test of the banks' submitted capital plans, using the results from the DFAST scenario runs.[1]

The following information presents a comparison of loan loss stress test results for large banks from three different sources: the Federal Reserve's DFAST/CCAR modeling, the banks' own models, and Trepp's Capital Adequacy Stress Test (T-CAST) model. Since credit losses were the primary driver of bank distress in previous cycles, including the most recent recession and bank failure cycle, the focus is on comparing loan losses from the three sets of models.

The Dodd-Frank Act currently requires the banks to publish summary results of their own internal analyses for the Severely Adverse scenario. Trepp has gathered these figures and labeled them "company" results in this report. While Trepp groups these results together, they are actually produced by each bank on its own, using data, tools, and methods that, for the most part, also have been developed independently by each bank.

Trepp's T-CAST model produces scenario-based forecasts for individual bank balance sheets, income/expense, loan losses, and capital impacts for banks and bank holding companies. The T-CAST model uses the same economic scenarios used by the Fed for DFAST/CCAR to produce an enterprise-wide picture of individual banks through a 9- or 13-quarter forecast horizon.

In the comparison of loan loss results, Trepp uses the third quarter 2014 as the starting point for the forecasts, covering the 9-quarter period from Q4 2014 through Q4 2016. The analysis pertains to the results from the Severely Adverse scenario, which produces the highest credit losses for banks.

## Aggregate Loan Losses

The Federal Reserve's model produced the highest loss estimates for the 31 CCAR banks, totaling $340.3 billion in the Severely Adverse scenario. The companies' own results came in at an aggregate $232.5 billion, while Trepp's T-CAST model produced total loan loss estimates of $292.9 billion.

The same sort of pattern tends to show up in individual bank results, with the Federal Reserve's loss estimates typically higher than the bank's own estimates, and Trepp's T-CAST results between the two.

The general similarity in the three sets of results should instill confidence in each set individually,

1 DFAST (Dodd-Frank Act Stress Test) and CCAR (Comprehensive Capital Analysis and Review) were both mandated by the Dodd-Frank Act, although CCAR predates the Dodd-Frank Act. The terms refer to different parts of stress testing, though CCAR tends to be used more broadly and tends to be used to incorporate DFAST as well.

as well as the aggregation of results across all the models. At a fundamental level, each of the three models[2] is starting with the same basic data for the bank—e.g., the size and condition of the loan portfolios—and the same economic scenario forecasts. However, each set of models goes about producing forecasts in its own way. There is very limited insight into the models the Fed uses, and outside firms have virtually no detail about each banks' independent models. Furthermore, the banks and the Fed have minimal knowledge of each other's models.

## Individual Bank Results

The 31 CCAR banks range in size from $55.5 billion in assets (Zions Bancorporation) to $2.5 trillion in assets (JPMorgan Chase). Loan loss estimates range from $0.3 billion (Deutsche Bank Trust company estimate) to $49.7 billion (Federal Reserve results for JPMorgan Chase). Aggregate loss rate estimates range from a low of 1.0% (Bank of New York Mellon company estimate) to a high of 12.5% (T-CAST results for Discover Financial).

Across the three sets of results—the Federal Reserve, the companies', and T-CAST—the largest four banks (JPMorgan Chase, Bank of America, Citigroup, and Wells Fargo) account for 56% of the aggregate loan losses for the 31 banks, in-line with their share of total assets.

In Figure 2, several themes are evident:

- The four largest banks comprise the lion's share of both assets and stress test loan losses.
- The consumer loan/credit card banks are clustered in the upper left, with loss rates of 8% and above.
- Goldman Sachs and Morgan Stanley—the two investment banks—have relatively small loan portfolios for their size, and correspondingly modest loan loss amounts.
- Deutsche Bank Trust, State Street, and Bank of New York Mellon both have below-average modeled loss rates and total loss amounts, which reflect their smaller loan exposure and conservative loan portfolios.
- The rest of the banks have relatively diversified loan portfolios and are generally clustered in the 3% to 6% loss rate range.

**Figure 1. Loss Estimate Comparison, Severly Adverse Scenario, Cumulative 9-Quarter Losses**

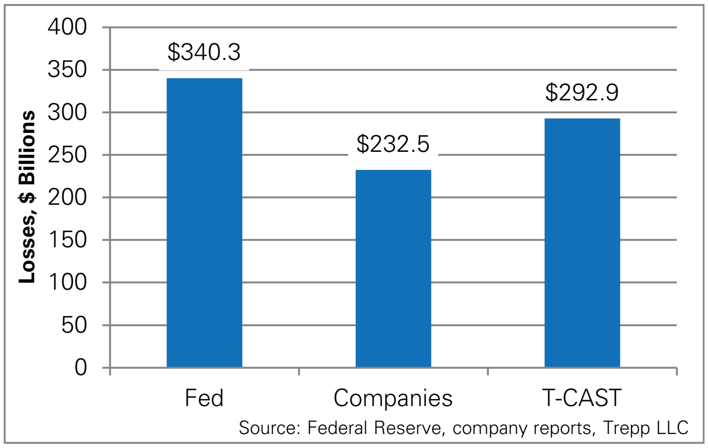
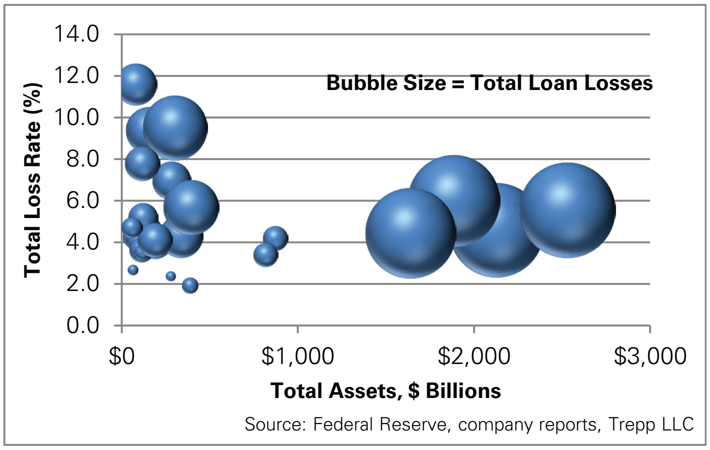



**Figure 2. Loss Estimates by Bank, Bank Size, Loss Rate, and Loss Amount**




*The horizontal axis shows bank assets, the vertical axis the 9-quarter stress test loss rate, and the size of the bubbles the total stress test loan losses for each bank.*

2 We treat the company results as one set of results although each company has produced its results independently of the other banks.

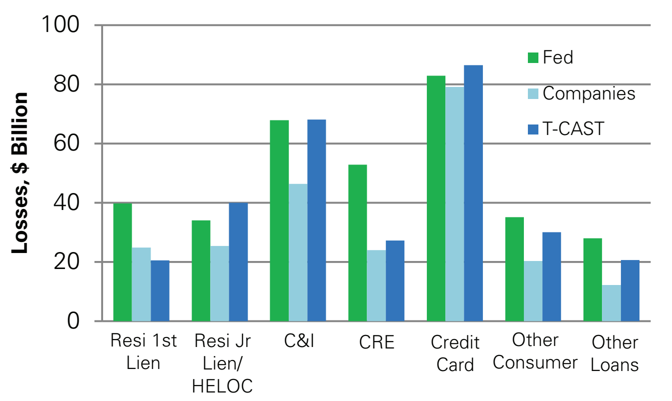
## Loss Amounts by Loan Type

Retail exposures (residential and consumer loans) account for approximately 60% of the loss estimates across all three sets of results. Wholesale exposures (C&I and CRE loans) make up about one-third of loss estimates, and other loans comprise about 7%. While the aggregate T-CAST results are between the Fed and the company loss estimates, different patterns emerge by loan type. The Fed's results represent the highest loss estimates for four of the loan types, while the T-CAST model produces the highest loss estimates for three of the loan types.

- Residential First Lien Mortgage loss estimates range from $20.5 billion (T-CAST) to $39.7 billion (Fed). The company results came in at $24.9 billion, closer to the T-CAST estimates.

- Residential Junior Lien and HELOC loss estimates range from $25.3 billion (company) to $40.0 billion (T-CAST). The Fed produced results of $34.0 billion, closer to the T-CAST estimates.

**Figure 3. Loss Estimates by Loan Type, Cumulative 9-Quarter Losses**




Source: Federal Reserve, company reports, Trepp LLC

- C&I loss estimates range from $46.3 billion (company) to $68.1 billion (T-CAST). The Fed results total $67.8 billion, just below T-CAST.

- CRE loss estimates fall in a rather broad range, from $24.0 billion (company) to $52.8 billion (Fed). The T-CAST results are $27.2 billion, close to the company figures.

- Credit Card loss estimates are clustered around $80 billion, ranging from $79.1 billion (company) to $86.5 billion (T-CAST). The Fed total is $82.9 billion, about midway between the other two.

- Other Consumer Loan loss estimates range from $20.3 billion (company) to $35.1 billion (Fed). The T-CAST results are $30.0 billion, closer to the Fed's figures.

- Losses on Other Loans range from $12.2 billion (company) to $28.0 billion (Fed). The T-CAST total is between the other two at $20.6 billion.

## Loss Rates by Loan Type

The loss rates for each loan type provide perspective on the relative risk of different areas of lending. Loss dollar amounts are driven by both the size of the exposure and the modeled loss severity on those exposures. As with the loss amounts (in dollars), the loss rates from all three sources are similar. Median loss rates for each loan type are compared below.

- Residential First Lien Mortgage loss rates range from 1.1% (T-CAST) to 3.5% (Fed). The company median loss rate is 1.9%.

- Residential Junior Lien and HELOC loss rates are higher, reflecting the poor quality of collateral in a downturn, and range from 4.6% (company) to 7.1% (Fed). The T-CAST median is 6.4%.

- C&I loss rates fall in a fairly tight range, from 4.3% (company) to 5.6% (T-CAST). The Fed median is 4.8%.

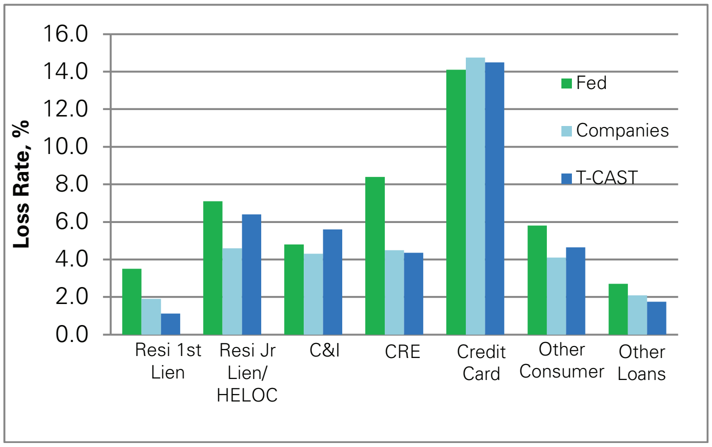
- CRE loss rates range from 4.4% (T-CAST) to 8.3% (Fed). The company median loss rate is 4.5%, in-line with the T-CAST estimate.

- Credit Card loss rates are universally high and in a relatively tight range, from 14.1% (Fed) to 14.8% (company). The T-CAST median is 14.5%. The high loss rates reflect the risk of this loan type in a severe downturn.

- Other Consumer Loan loss rates range from 4.1% (company) to 5.8% (Fed). The T-CAST loss rate is 4.6%.

- Other Loan loss rates are generally low, with the median rate spanning 1.7% (T-CAST) to 2.7% (Fed). The company median is 2.1%.

**Figure 4. Loss Rates by Loan Type, Median 9-Quarter Loss Rate by Loan Type**




## Comparisons to 2014 Results

Last year, Trepp examined loss estimates across the same three sources. One bank, Deutsche Bank Trust, was new to the CCAR test this year. The remaining 30 banks were part of CCAR both years. Deutsche Bank Trust contributed only $0.5 billion in estimated losses, or 0.2% of the total for all 31 of the CCAR banks.

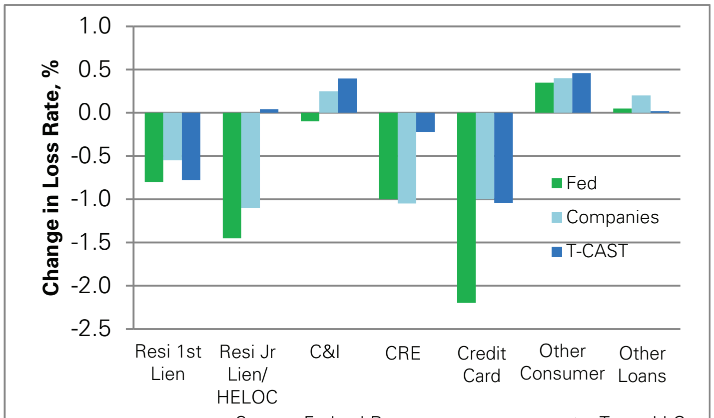
Loss rate estimates for three of the loan types were relatively stable compared to the 2014 results. Median loss rates for C&I, Other Consumer Loans, and Other Loans changed by less than 50 basis points. Loan performance for these loan types has been steady, with delinquency rates falling by approximately 20 basis points from Q3 2013 to Q3 2014. Judging from the slight increase in loss rates, it appears that the models for these loan types have not changed significantly, with perhaps a slight tightening of the loss models.

The largest change was in credit card loss rates. The median loss rate from the Fed fell by 220 basis points, which compares to a 100-basis-point decline for both the company and T-CAST models. The large drop likely indicates a model change, especially since loan performance has only improved slightly, by 20 basis points since Q3 2013.

Loss estimates for Residential First Lien Mortgages fell for all three models, with the median loss rates falling by 60 to 80 basis points. Loan performance has improved significantly, with delinquency rates at large banks falling by 250 basis points since Q3 2013.

For the Residential Junior Lien/HELOC and Commercial Real Estate (CRE) loan types, the loss rates for the Fed and company models fell by 100 to 150 basis points, while the median T-CAST loss rates were relatively stable. The shift in the Fed and company loss rates suggest potential model "loosening," as these drops were larger than seem warranted by the improvement in loan performance during 2014. ■

**Figure 5. Change in Median Loss Rates by Loan Type, 2015 Median Minus 2014 Median**




Source: Federal Reserve, company reports, Trepp LLC

## Appendix: Individual Company Results

**Model Summary - Individual Company Results**
**Severely Adverse Scenario, $ in Billions**

| Bank Name | Ticker | Tot. Assets (Q3 2014) | Avg of 3 Models: Loss Amt | Avg of 3 Models: Loss Rate % | Loss Amount: Fed | Loss Amount: Company | Loss Amount: Trepp | Loss Rate %: Fed | Loss Rate %: Company | Loss Rate %: Trepp |
|---|---|---|---|---|---|---|---|---|---|---|
| Ally Financial Inc. | - | $149.2 | $4.3 | 4.4 | $5.1 | $3.0 | $4.9 | 5.0 | 3.4 | 4.9 |
| American Express Company | AXP | $153.9 | $10.1 | 9.4 | $10.5 | $10.4 | $9.5 | 9.2 | 10.5 | 8.5 |
| Bank of America Corporation | BAC | $2,126.1 | $41.3 | 4.6 | $45.7 | $29.1 | $49.1 | 4.9 | 3.6 | 5.3 |
| The Bank of New York Mellon Corporation | BK | $386.3 | $1.1 | 1.9 | $1.4 | $0.4 | $1.6 | 2.3 | 1.0 | 2.5 |
| BB&T Corporation | BBT | $187.0 | $5.0 | 4.0 | $6.0 | $4.9 | $4.2 | 4.6 | 3.9 | 3.5 |
| BBVA Compass Bancshares, Inc. | - | $79.2 | $2.5 | 4.7 | $3.2 | $2.2 | $2.1 | 5.7 | 4.4 | 3.9 |
| BMO Financial Corp. | - | $119.8 | $2.9 | 5.2 | $2.7 | $3.4 | $2.7 | 4.6 | 6.4 | 4.7 |
| Capital One Financial Corporation | COF | $300.4 | $19.3 | 9.5 | $22.2 | $16.5 | $19.1 | 10.8 | 8.3 | 9.4 |
| Citigroup Inc. | C | $1,882.8 | $39.3 | 6.0 | $48.3 | $30.1 | $39.5 | 7.2 | 4.9 | 5.9 |
| Citizens Financial Group, Inc. | - | $131.5 | $4.0 | 4.4 | $4.8 | $3.1 | $4.1 | 5.1 | 3.4 | 4.6 |
| Comerica Incorporated | CMA | $68.9 | $2.1 | 4.5 | $2.2 | $1.9 | $2.3 | 4.5 | 4.2 | 4.8 |
| Deutsche Bank Trust Corporation | - | $60.7 | $0.5 | 2.7 | $0.8 | $0.3 | $0.4 | 4.5 | 1.3 | 2.2 |
| Discover Financial Services | DFS | $80.6 | $7.8 | 11.6 | $8.3 | $6.7 | $8.4 | 12.2 | 10.1 | 12.5 |
| Fifth Third Bancorp | FITB | $134.2 | $4.3 | 4.6 | $5.2 | $3.4 | $4.2 | 5.6 | 3.7 | 4.5 |
| The Goldman Sachs Group, Inc. | GS | $869.0 | $2.8 | 4.2 | $2.2 | $1.9 | $4.3 | 3.2 | 4.5 | 4.9 |
| HSBC North America Holdings Inc. | - | $280.3 | $6.7 | 7.0 | $8.2 | $6.8 | $5.0 | 8.6 | 7.1 | 5.2 |
| Huntington Bancshares Incorporated | HBAN | $64.3 | $2.0 | 4.2 | $2.0 | $2.0 | $1.9 | 4.2 | 4.4 | 4.1 |
| JPMorgan Chase & Co. | JPM | $2,527.0 | $42.6 | 5.6 | $49.7 | $37.4 | $40.7 | 6.4 | 5.0 | 5.3 |
| KeyCorp | KEY | $89.9 | $2.8 | 4.8 | $3.0 | $2.8 | $2.6 | 5.0 | 5.0 | 4.4 |
| M&T Bank Corporation | MTB | $97.2 | $3.2 | 4.2 | $4.4 | $2.1 | $3.0 | 5.2 | 2.7 | 4.6 |
| Morgan Stanley | MS | $814.5 | $2.6 | 3.4 | $2.6 | $2.0 | $3.2 | 4.0 | 2.7 | 3.5 |
| MUFG Americas Holdings Corporation | - | $110.9 | $2.7 | 3.6 | $3.8 | $2.1 | $2.2 | 5.0 | 3.0 | 2.9 |
| Northern Trust Corporation | NTRS | $111.2 | $1.1 | 3.5 | $1.5 | $0.9 | $0.9 | 4.9 | 2.9 | 2.8 |
| The PNC Financial Services Group, Inc. | PNC | $334.6 | $8.7 | 4.3 | $9.6 | $5.9 | $10.5 | 4.7 | 3.1 | 5.1 |
| Regions Financial Corporation | RF | $119.3 | $4.0 | 5.2 | $5.4 | $3.2 | $3.4 | 6.9 | 4.3 | 4.4 |
| Santander Holdings USA, Inc. | - | $113.5 | $5.5 | 7.8 | $7.2 | $1.7 | $7.6 | 9.6 | 3.6 | 10.2 |
| State Street Corporation | STT | $274.8 | $0.4 | 2.4 | $0.6 | $0.3 | $0.4 | 3.3 | 1.6 | 2.3 |
| SunTrust Banks, Inc. | STI | $186.9 | $5.5 | 4.1 | $6.1 | $5.3 | $5.1 | 4.5 | 4.1 | 3.8 |
| U.S. Bancorp | USB | $391.3 | $14.0 | 5.7 | $16.2 | $15.1 | $10.8 | 6.5 | 6.2 | 4.4 |
| Wells Fargo & Company | WFC | $1,636.9 | $37.5 | 4.4 | $48.8 | $26.1 | $37.6 | 5.8 | 3.2 | 4.3 |
| Zions Bancorporation | ZION | $55.5 | $1.9 | 4.7 | $2.6 | $1.5 | $1.6 | 6.5 | 3.7 | 3.9 |

For inquiries about the data analysis conducted in this research, contact press@trepp.com or call 212-754-1010. For more information about Trepp's commercial real estate data, contact info@trepp.com.

## About Trepp

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