MOODY'S ANALYTICS

MODELING METHODOLOGY

Estimating Commercial Real Estate (CRE) Stressed Loss Measures Under Federal Reserve 2015 Comprehensive Capital Analysis and Review (CCAR) Scenarios

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Abstract

The Comprehensive Capital Analysis and Review (CCAR) program is an annual capital adequacy exercise conducted under the requirements of the Dodd-Frank Wall Street Reform and Consumer Protection Act rules. For the 2015 CCAR program, the Federal Reserve published three macroeconomic and financial scenarios to be used in the stress tests of 31 CCAR financial institutions. In this study, we analyze 22 of these financial institutions, with a total of more than $558 billion in exposures to commercial real estate loans, under the Moody's CMM Stress Testing framework.

This report describes how we derive credit loss estimates for the CRE loan portfolios held by CCAR firms. Our analysis estimates that the expected nine-quarter, cumulative CRE portfolio loss through the end of 2016 is 5.6% under the CCAR 2015 Severely Adverse Scenario. The primary factor behind the slightly higher loss estimate compared to last year's stressed scenario is that the proportion of construction loans in banks' CRE portfolios has started to increase.

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1. Introduction

1.1 Context

The Comprehensive Capital Analysis and Review (CCAR) is an annual exercise conducted under the Dodd-Frank Wall Street Reform and Consumer Protection Act rules. The goal of CCAR is to ensure that the largest financial institutions have: a) robust and forward-looking capital planning processes that account for their unique risks, and b) adequate capital to continue operations during times of economic and financial stress. As part of CCAR, the Federal Reserve evaluates institutions' capital adequacy, internal capital adequacy assessment processes, and capital distribution plans, such as dividend payments or stock repurchases. On the other hand, the Dodd-Frank Act Stress Test (DFAST) is a distinct regulatory tool that differs from CCAR. DFAST requires the Federal Reserve to conduct forward-looking stress tests for financial companies regulated by the Fed to help ensure institutions have sufficient capital in order to absorb losses and support operations during adverse economic conditions. Currently, while only 31 firms participate in CCAR, the DFAST requirements apply to a broader range of companies, including bank holding companies, savings and loan companies, state member banks with total assets greater than the $10 billion, and non-bank financial firms designated by the Financial Stability Oversight Council for supervision by the Federal Reserve.

Although CCAR and DFAST are distinct exercises, the Federal Reserve deems capital planning and stress tests complementary in nature, as they frequently rely upon similar processes, data, supervisory exercises, and requirements. The Fed coordinates these processes in order to reduce duplicative requirements and to minimize burdens. As such, the Fed uses the same CCAR scenarios and assumptions the bank holding companies (BHC) are required to use under the DFAST rules, in order to project revenues, losses, net income, and pro forma capital ratios.[1] Consequently, in the discussions of scenario-based credit loss estimates throughout this paper, there is practically no difference between whether or not they are CCAR scenarios or stressed scenarios under the DFAST rules, because they are the same under the regulatory setting.

For the 2015 CCAR program, the Federal Reserve published three macroeconomic and financial scenarios to be used in stress testing the 31 CCAR financial institutions.[2] The three scenarios include Baseline, Adverse, and Severely Adverse Scenarios. While acknowledging that the Baseline Scenario represents the expectation of private sector forecasters,[3] the Fed has also made it clear that the Adverse and Severely Adverse Scenarios are not forecasts, but rather hypothetical scenarios designed to assess the strength and resilience of CCAR firms during stressful economic and financial environments.[4] For each scenario, a BHC must conduct an assessment of the expected uses and sources of capital over the planning horizon.

An important part of a BHC's submission is the estimates of projected losses by asset classes in each of scenarios; the main objective of this study focuses on credit loss estimates for commercial real estate (CRE) loans.

Key Fed guidelines relevant for our exercise, either current or previously published:

- Loans held in accrual portfolios: "The losses to be estimated for loans held in accrual portfolios in this exercise are generally credit losses due to failure to pay obligations (cash flow losses) …"
- Loan-loss estimates: "BHCs should describe the underlying models and methods used to project loan losses, and provide background on the derivation of estimated losses… Hypothetical behavioral responses by BHC management should not be considered as mitigating factors for the purposes of this analysis."

[1] See "CCAR 2015 Summary Instructions and Guidance," published by the Federal Reserve October, 2014.

[2] The 31 bank holding companies participating in the 2015 CCAR: Ally Financial Inc.; American Express Company; Bank of America Corporation; The Bank of New York Mellon Corporation; BB&T Corporation; BMO Financial Corp.; BBVA Compass Bancshares, Inc.; Capital One Financial Corporation; Citigroup Inc.; Comerica Inc.; Deutsche Bank Trust Corporation; Discover Financial Services; Fifth Third Bancorp; The Goldman Sachs Group, Inc.; HSBC North America Holdings Inc.; Huntington Bancshares Inc.; JPMorgan Chase & Co.; Keycorp; Morgan Stanley; M&T Bank Corp.; MUFG Americas Holdings Corporation; Northern Trust Corp.; The PNC Financial Services Group, Inc.; RBS Citizens Financial Group, Inc.; Regions Financial Corporation; Santander Holdings USA, Inc.; State Street Corporation; SunTrust Banks, Inc.; U.S. Bancorp; Wells Fargo & Company; and Zions Bancorp.

[3] For the CCAR 2015 Baseline Scenario, the Fed comments that "… the baseline scenario is very similar to the average projections from surveys of economic forecasters. For example, the outlook for U.S. real activity and inflation in the baseline is in line with the October 2014 consensus projections from Blue Chip Economic Indicators. The baseline scenario does not represent the forecast of the Federal Reserve."

[4] See various press releases by the Federal Reserve, for example, October 23, 2014: http://www.federalreserve.gov/newsevents/press/bcreg/20141023a.htm. Note, Fed developed scenarios in consultation with the Federal Deposit Insurance Corporation (FDIC) and the Office of the Comptroller of the Currency (OCC), and both will use the same scenarios as the Fed during the upcoming stress testing cycle for their supervised institutions.

» Allowance for loan losses: "BHCs should estimate the portion of the current allowance for loan losses available to absorb credit losses on the loan portfolio for each quarter under each scenario, while maintaining an adequate allowance along the scenario path and at the end of the scenario horizon."

In this paper, we describe how Moody's Analytics' analysis derives credit loss estimates for the CRE loan portfolios held by CCAR firms. Throughout the study, we rely heavily upon Moody's Commercial Mortgage Metrics (CMM), a credit risk measurement model developed and marketed by Moody's Analytics.

1.2 Composition of CRE Portfolios Held by CCAR Banks

Our current analysis focuses on 22 of 31 major CCAR banks: those with more than $3 billion in CRE loans on their balance sheets.

Table 1 CRE HOLDINGS OF THE 22 CCAR BANKS AS OF SEPTEMBER 30, 2014 ($,000)

Financial Institution	Construction loans	Non-farm, Non-residential loans	Multifamily residential loans	Total commercial real estate loans
Bank of America, National Assn.	9,458,000	45,913,000	5,750,000	61,121,000
BMO Harris Bank National Assn	1,068,464	6,411,199	912,369	8,392,032
Branch Banking and Trust Company	4,718,329	22,586,805	2,453,186	29,758,320
Capital One, National Association	2,191,465	11,835,709	9,243,354	23,270,528
Citibank, National Association	1,330,000	6,569,000	2,210,000	10,109,000
Comerica Bank	2,226,299	7,503,951	561,632	10,291,882
Compass Bank	1,980,599	8,007,772	1,508,849	11,497,220
Fifth Third Bank	2,199,703	7,013,590	379,109	9,592,402
HSBC Bank USA, National Association	842,479	6,796,125	1,914,757	9,553,361
JPMorgan Chase Bank, National Assn	4,557,000	27,222,000	48,502,000	80,281,000
KeyBank National Association	1,039,432	6,680,248	2,194,270	9,913,950
M&T Bank	4,959,054	18,446,794	3,381,926	26,787,774
PNC Bank, National Association	7,990,121	22,010,398	3,289,326	33,289,845
RBS Citizens, National Association	762,808	6,320,503	600,790	7,684,101
Regions Bank	2,813,769	11,542,097	1,187,173	15,543,039
SunTrust Bank	2,350,809	13,519,289	888,175	16,758,273
The Huntington National Bank	1,107,209	6,187,662	642,434	7,937,305
The Northern Trust Company	408,960	2,699,327	673,357	3,781,644
U.S. Bank National Association	9,104,673	25,440,852	4,223,873	38,769,398
Union Bank, National Association	1,277,060	9,822,250	3,973,840	15,073,150
Wells Fargo Bank, National Assn	17,807,000	92,247,000	12,473,000	122,527,000
Zions First National Bank	476,013	5,354,004	347,673	6,177,690
22 CCAR Banks Total	80,669,246	370,129,575	107,311,093	558,109,914

Banks hold two types of commercial real estate loans: permanent and construction. Permanent loans are loans backed by existing commercial properties, such as apartments, office buildings, retail stores, hotels, etc., while construction loans are loans for commercial properties under construction. Banks must report their CRE holdings to regulators, including the FDIC and the Federal Reserve. Reported data are publicly available.[5] For reporting purposes, permanent loans are reported in two parts; Non-farm, Non-

[5] FDIC data downloadable from http://www2.fdic.gov/sdi/main.asp, and the Fed's data downloadable from http://www.chicagofed.org/webpages/banking/financial_institution_reports/bhc_data.cfm.

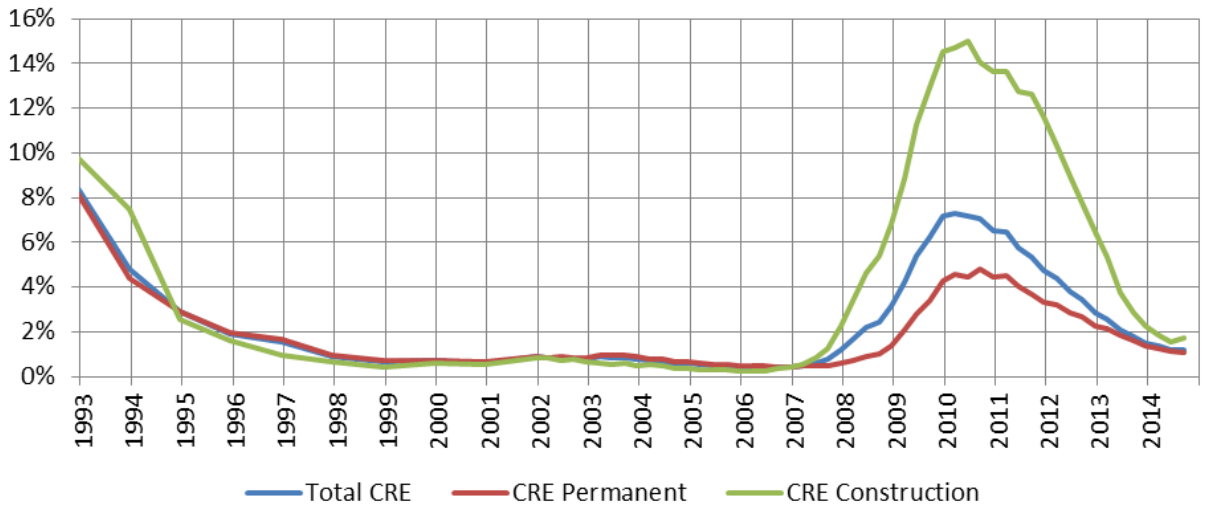
residential, and Multi-family Residential. Table 1 summarizes the CRE holdings of the 22 CCAR banks as of September 30, 2014 from data obtained from FDIC.

Compared to the CRE holdings of the 22 CCAR banks in 2013, the total CRE portfolio size increased by 3.2%. Last year, construction loans reached its lowest percentage level in the 22 banks' total CRE portfolio since the end of 1995. As of 3Q2014, the construction sector has shown an increasing trend, rising by 7.8% to $80.7 billion. The 22 CCAR banks also added $12 billion of multifamily residential loans, which suggests a significant increase in demand for those loans. The rising composition of construction loans reflects banks' willingness to take on more risk after pulling back construction lending programs since the housing/financial crisis.

1.3 CRE Loan Performance Status

Corresponding to the economic recovery underway, commercial real estate markets have improved during the last couple of years. As a result, the credit performance of banks' CRE portfolios has improved across both construction and permanent loans, as shown in Figure 1. The total nonaccrual rate of all CRE loans is 1.2%, as of third quarter of 2014, about 17% of the 7.2% nonaccrual rate reached at the end of 2009.

Figure 1 Non-accrual rates of the total CRE holdings of the 22 CCAR Banks, using FDIC data.



CRE loan portfolio improvement is visible for individual CCAR banks as well over the past two years, as seen in Figure 2. This change stems from the fact that CRE markets have improved for most parts of the country, and financial institutions have also been more stringent with new CRE loan originations compared to the pre-financial crisis era. Also, new originations during the last year or two have not yet reached the peak default seasoning curve. Additionally, with time, bad loans have been worked out or liquidated, and older, lower quality loans are maturing or amortizing themselves.

Figure 2 Non-accrual rates of the total CRE holdings of the 22 CCAR Banks in recent quarters, using FDIC data.

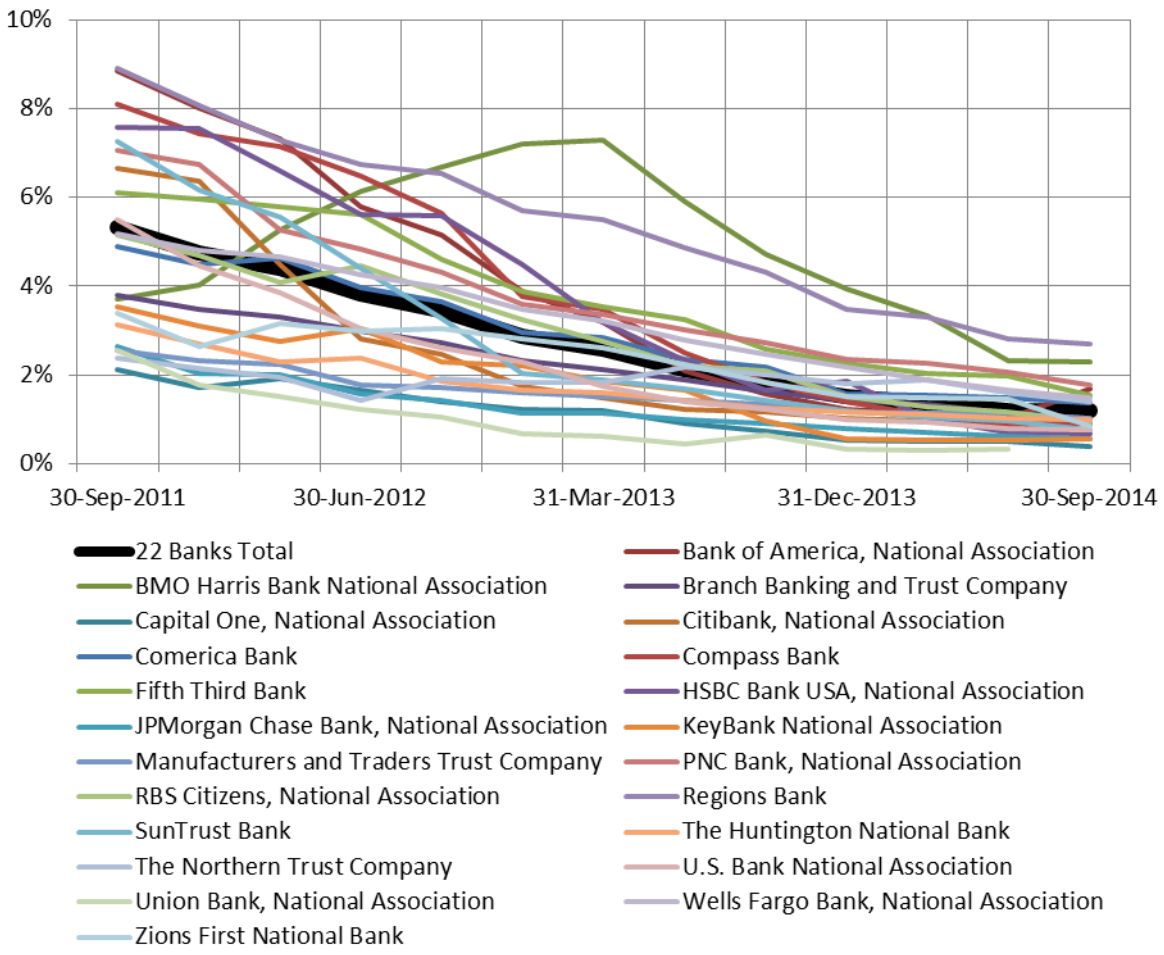


Figure 2 shows that, for all the major banks, CRE non-accrual rates continue to drop. The four quarter, average non-accrual rates are also lower at present, compared to what they were a year ago, in late 2013, for all the major banks. Similar patterns are observed with charge-off rates as well.

1.4 CCAR 2015 Scenarios and the CCAR 2014 Scenarios

Similar to CCAR 2014, for the 2015 CCAR program, the Federal Reserve presents three macroeconomic scenarios: Baseline Scenario, Adverse Scenario, and the Severely Adverse Scenario. While the Baseline Scenario reflects the Federal Reserve's interpretation of market expectations, the other scenarios are constructed as hypothetical scenarios for stress testing purposes. The CCAR 2015 Severely Adverse Scenario is comparable to the CCAR 2014 Severely Adverse Scenario, in terms of the decline in Real GDP, increase in unemployment, etc., and other macroeconomic factors, as shown in the graphs below and in Appendix A.

Figure 3 Real GDP growth under CCAR 2014 and CCAR 2015 Scenarios.

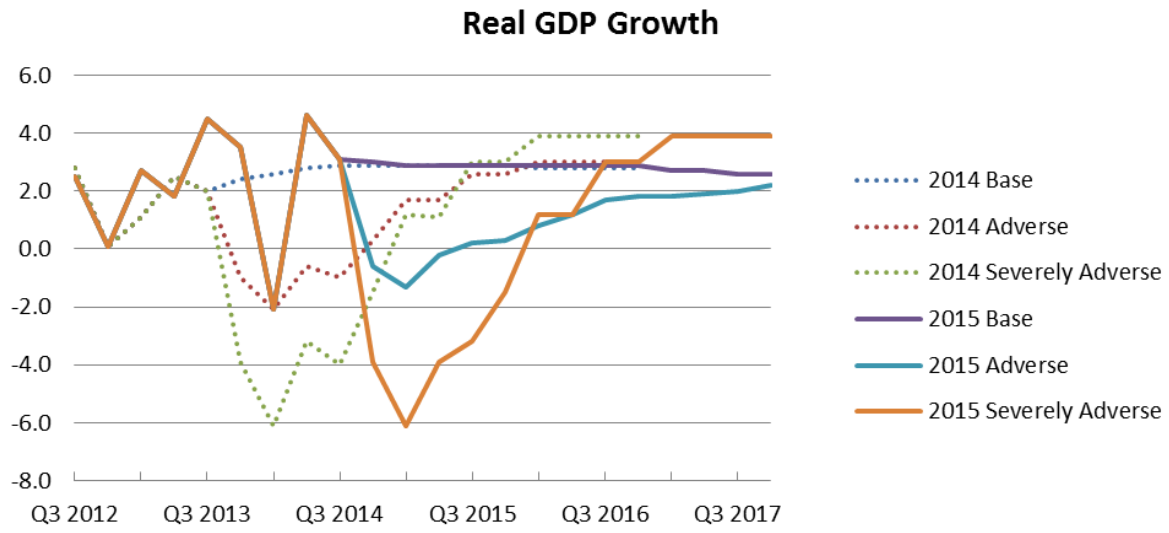


Figure 4 Unemployment rates under CCAR 2014 and CCAR 2015 Scenarios.

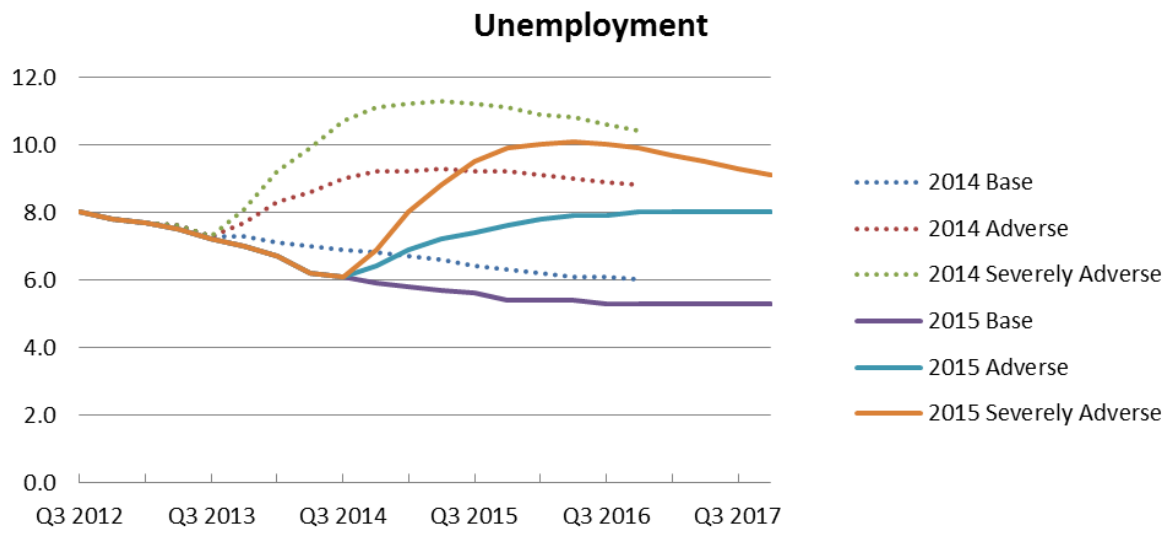
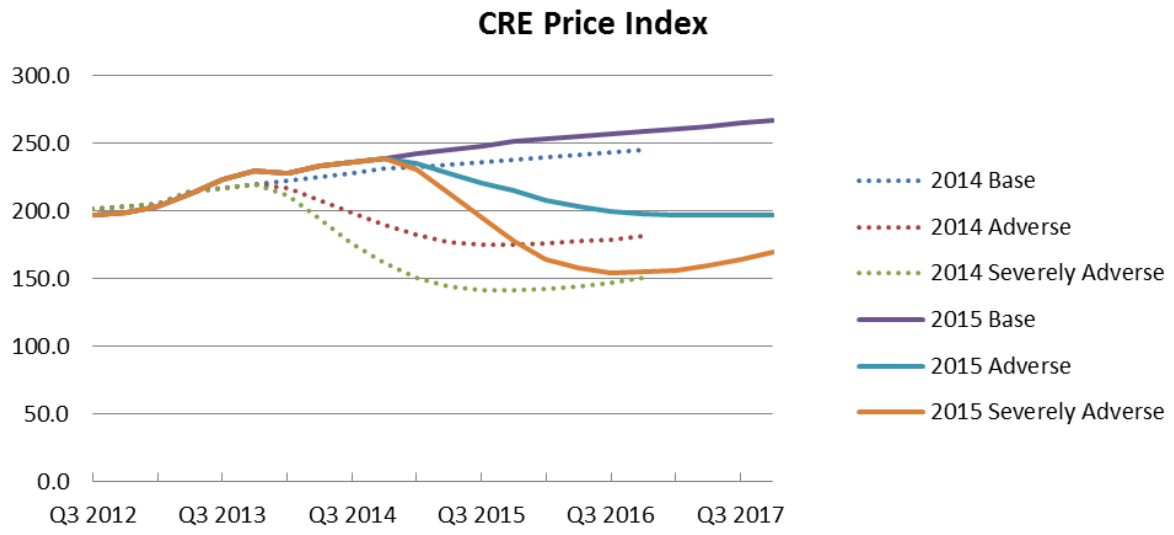


Figure 5 CRE Price Index under CCAR 2014 and CCAR 2015 Scenarios.



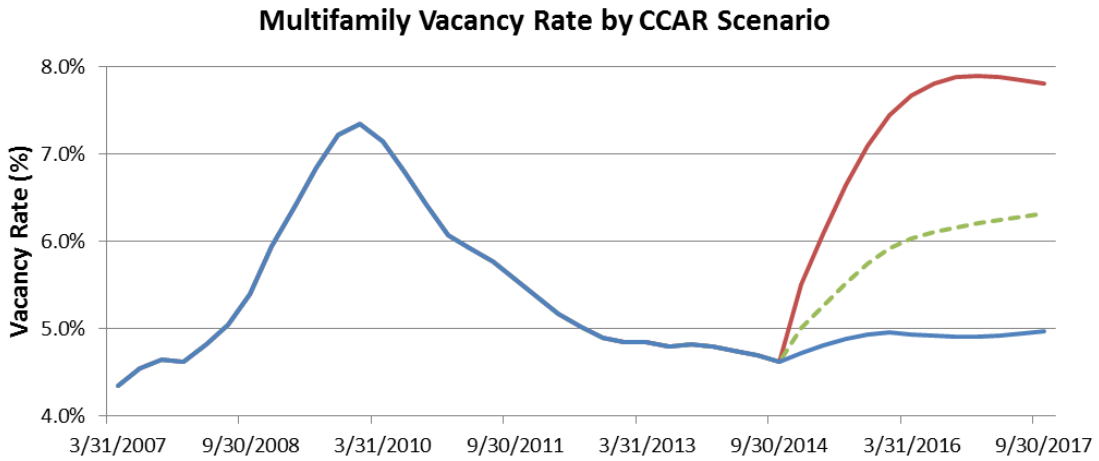
As shown in the above figures, the economy improved during the past year. Real GDP growth rate was well-aligned with market expectations. Unemployment rate declined faster than projected, and the CRE Price Index continued to outperform the forecast under CCAR 2014's Baseline Scenario. The CCAR 2015 Baseline Scenario's forecasts suggest that the economy is expected to keep improving. The increase in unemployment rate and declines in real GDP growth and CRE price index under Severely Adverse Scenario this year are comparable to those of last year.

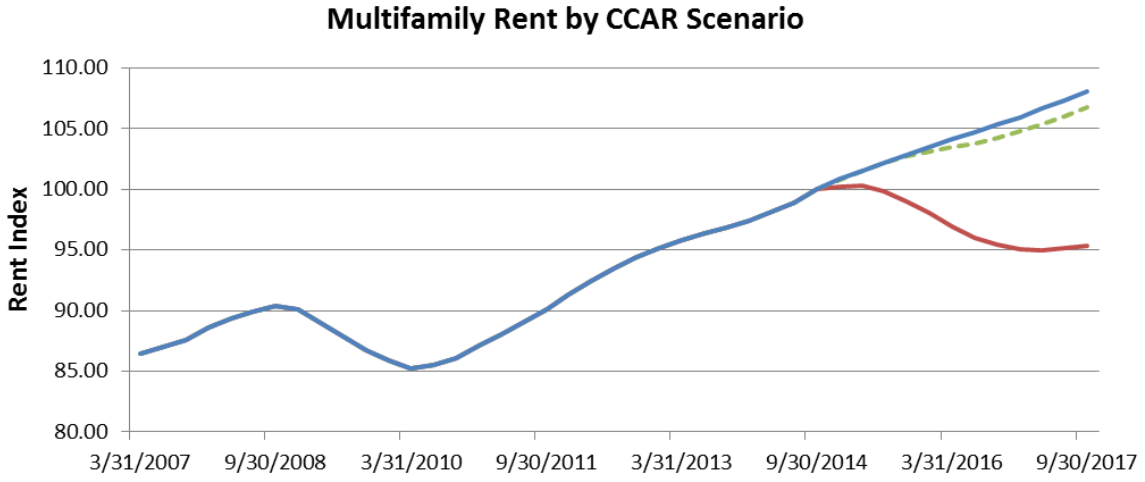
2. Translating CCAR Scenarios into Specific CRE Scenarios

The Fed's CCAR guideline only describes the macroeconomic and financial variables in the scenarios. As described in our earlier papers,[6] Moody's Analytics has developed a proprietary methodology to translate the macroeconomic scenarios into market factors specific to the CRE industry: vacancy rates, rental growth rates, NOI growth rates, and cap rates. The following graphs present the forecasted national average vacancy rates, rental growth rates, NOI growth rates, and cap rates for Multifamily and Office properties for the three 2015 CCAR scenarios.

The graphs indicate that the stress to the CRE industry resulting from the Fed's Severely Adverse Scenario is comparable to the stress seen during the Great Recession of 2009. Multifamily and Office vacancy rates are projected to increase by similar magnitude over the Severely Adverse Scenario as they did during the recent Great Recession. Similarly, the decrease in rent and NOI estimated for the Multifamily and Office properties over the Severely Adverse Scenario compares to the decrease in the respective rent and NOI observed during the Great Recession. It is also worth noting that, in the 2015 Adverse Scenario, inflation rates are assumed to stay elevated while the economy enters a mild recession. In this particular scenario (a "stagflation" style recession), the commercial real estate space market may not suffer much, because real estate is an inflation-hedging asset, and therefore, both rents and NOIs would not decline as much as in a typical low-inflation recessionary scenario. As such, we expect rents and NOIs to be mostly stagnant instead of declining in the high-inflation Adverse Scenario.

Figure 6 Multifamily property vacancy rates, rent, and NOI by CCAR Scenario.





[6] See Chen and Cai (2011), Chen, Cai, and Zhang (2011) and Chen, Cai, and Watugala (2013).

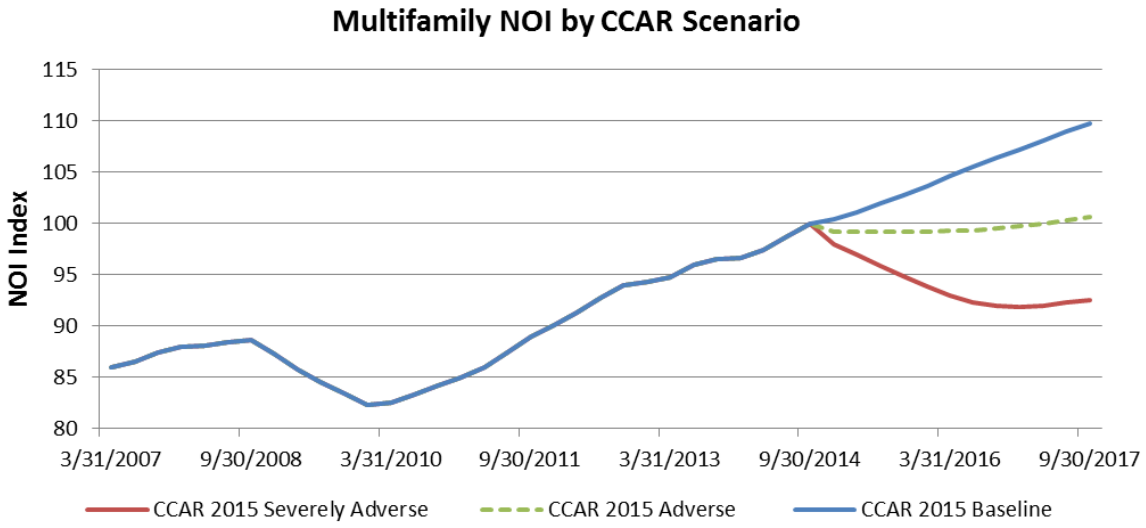
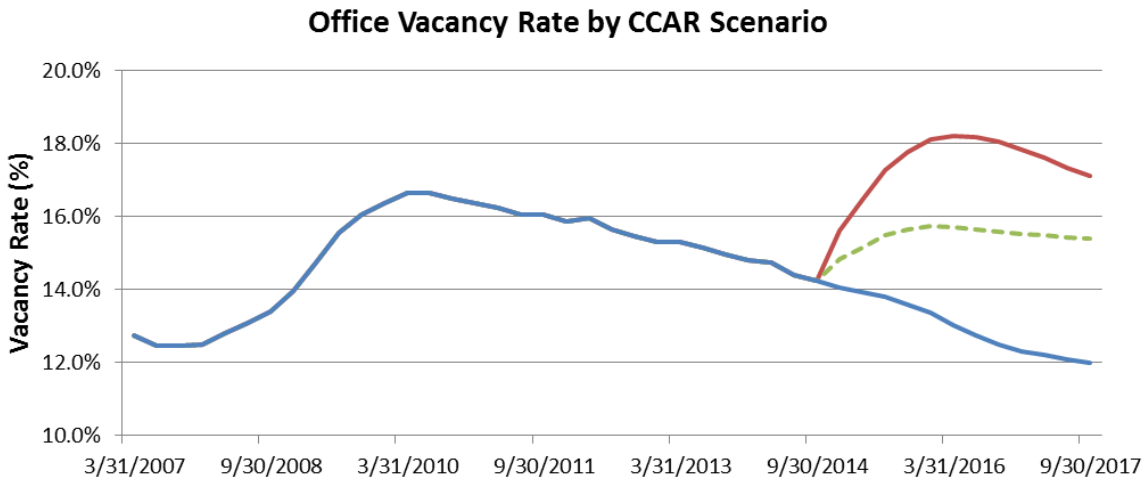
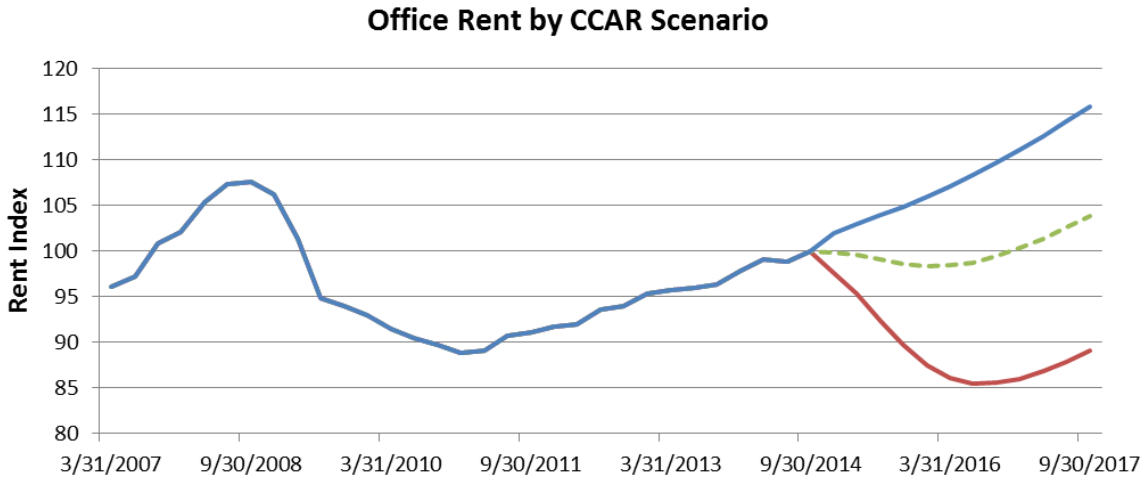
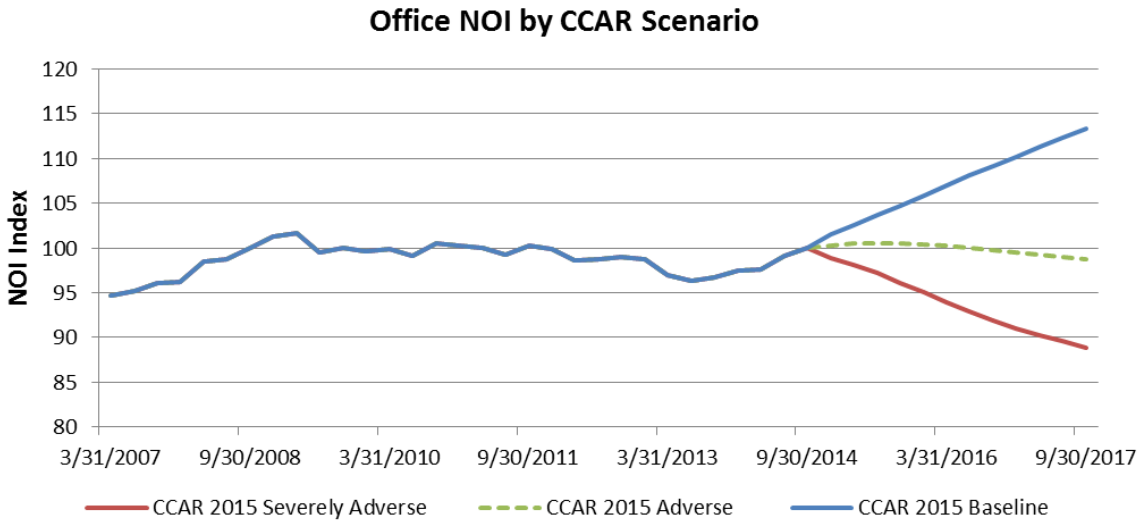


Figure 7 Office property vacancy rates, rent, and NOI by CCAR Scenario.






Office NOI by CCAR Scenario
NOI Index
120
115
110
105
100
95
90
85
80
3/31/2007
9/30/2008
3/31/2010
9/30/2011
3/31/2013
9/30/2014
3/31/2016
9/30/2017
CCAR 2015 Severely Adverse
CCAR 2015 Adverse
CCAR 2015 Baseline

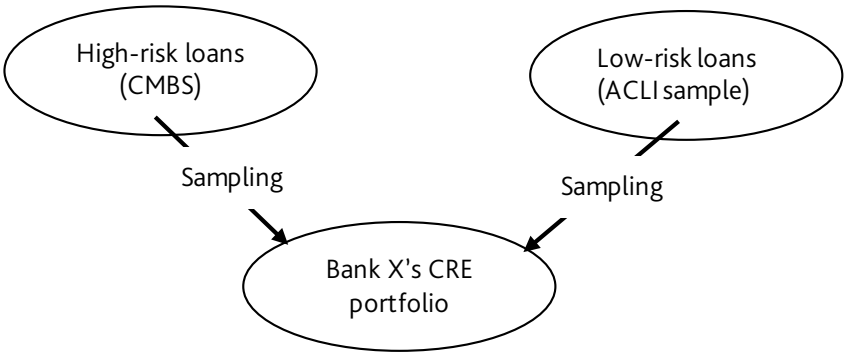
3. Major Banks Total Expected Loss in CRE Assets for CCAR 2015

3.1 Reconstructing a Bank's CRE Loan Portfolio

Statistics related to banks' loan portfolios, such as non-accrual rates, charge-off rates, 30-day delinquent rates, 90-day delinquent rates, etc., are available by asset class, including CRE. However, we do not have loan level details on an individual bank's holdings. Thus, we construct hypothetical portfolios for each bank, such that, each of the portfolios matches with the reported credit performance measures of the bank. It should be noted that we perform this process in such a way as to align the reported average measures of the banks with the average measures of the constructed portfolio. In constructing a loan portfolio that can be used for stress testing on CMM, we need loan-specific details such as geography, property type, and other financial information such as LTV, DSCR, coupon rate, etc. To this end, we simulate banks' CRE loans by referencing loans in the CMBS universe and the insurance sector.

In the commercial mortgage industry, three major sectors compete for CRE loan business: commercial banks, life insurance companies, and CMBS. At present, the risk profiles of the commercial banks' CRE loans fall in between that of life insurance companies and that of CMBS — life insurance companies are perceived to originate low-risk loans, and CMBS is the largest originator of high-risk loans,[7] with commercial banks somewhere in the middle. Fortunately, loan-specific details are available in the CMBS universe, while average loan specific details are available in the insurance space by originations,[8] from which we can construct a portfolio representative of the insurance sector. Then, by appropriately sampling the detailed loans available in the CMBS and insurance spaces, we can simulate the CRE holdings of the major banks. As noted earlier, these portfolios will, by construction, match the reported average credit performance measures from which the sampling process was based upon.

Figure 8 Illustration of the sampling method used to construct Bank X's CRE portfolio.



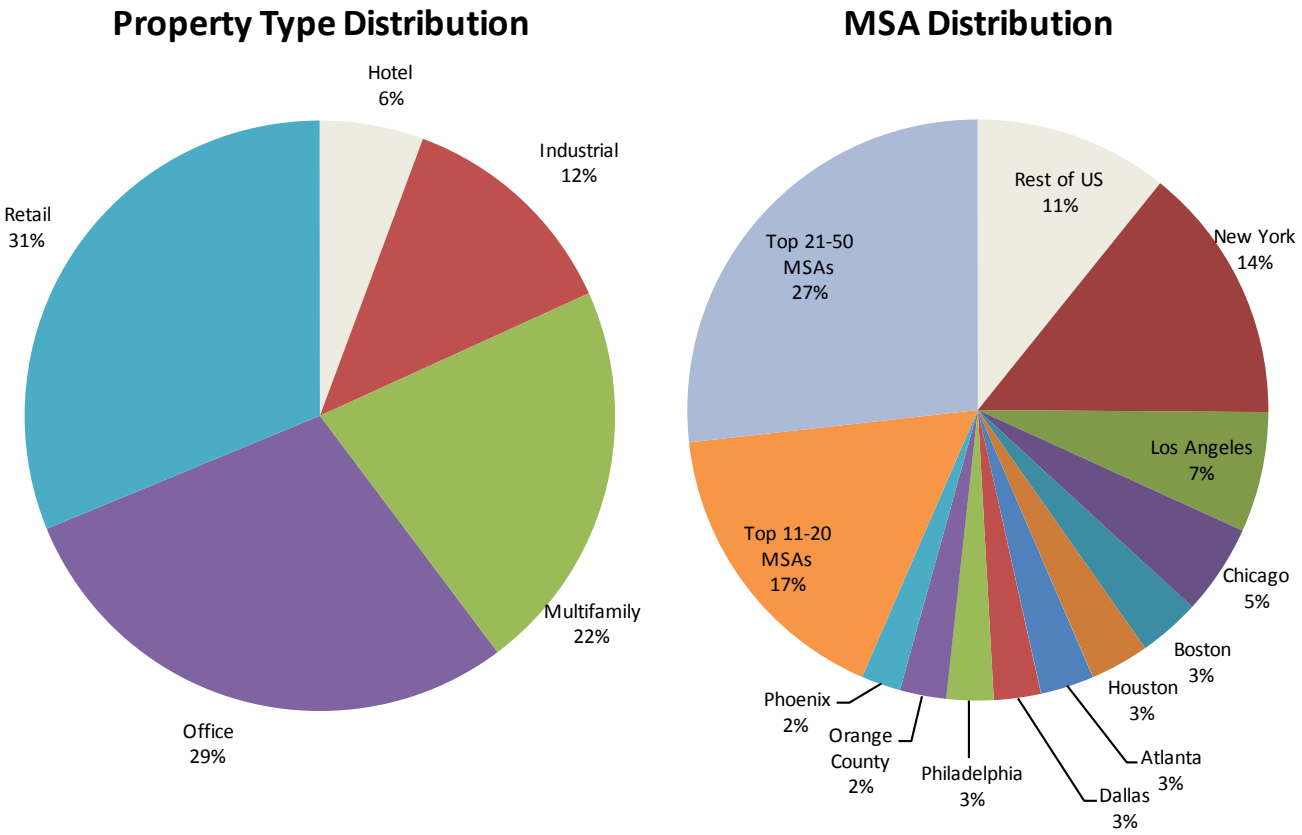
The non-accrual rate of a particular bank is also a reflection of the quality of the holdings still performing. A bank currently demonstrating a high non-accrual rate would be expected to possess a lower quality portfolio, as it was the underlying portfolio that caused the loans now falling into the non-accruable state. As such, we use the average of the past four quarters reported non-accrual rates as a proxy measure for the quality of a bank's CRE holdings. This parameter is used to determine the ratio of which CMBS and ACLI portfolios' loans were sampled to construct the bank CRE portfolio of loans in performing status. The percentage of CMBS loans that account for an average bank's CRE portfolio is about one-third, based on the non-accrual rates as of September 30, 2014.

The simulated CRE portfolio, all banks included, is reasonably diversified across property type and geographic locations. See the summary statistics below.

[7] At least, historically speaking. The newer originations ("CMBS 2.0") reportedly have seen improved underwriting quality. We have yet to see enough actual credit performance data to confirm or reject this hypothesis.

[8] Data published by American Council of Life Insurers (ACLI).

Figure 9 Property type and MSA distributions of an average CCAR bank's CRE portfolio.



3.2 Stress Testing the Constructed Bank Portfolios

Using a similar process to that used to estimate the total expected loss for CMBS and the insurance space (explained in Appendix B), we estimate the total expected loss for the selected major banks for the various CCAR 2015 scenarios. Public filings of these banks also provide information on the share of construction loans in their CRE portfolio, including non-accruals in construction loans and permanent loans. Such information is used to create bank-specific construction and permanent CRE portfolios to be modeled accordingly. Using the constructed bank portfolios, the first step estimates the total expected loss attributable to the current CRE loans of the bank.[9] Table 2 summarizes the results for the average bank portfolio of the analysis.

Having estimated the total loss contributed by currently performing loans, the next step estimates the total loss resulting from loans in non-accrual status. Using the bank's latest published non-accrual rates data obtained from the FDIC, LGDs from the CMM Stress Testing runs, and appropriately assumed roll rates, we calculate the loss attributable to loans currently in non-accruable states. The table below presents the total expected loss for the average bank through the various CCAR 2015 scenarios.[10]

[9] This is effectively the accrual portion of a bank's portfolio, as reported by the Federal Reserve and the FDIC.

[10] CCAR 2015 guidelines require that institutions estimate the expected loss through the end of 2016 (nine quarters (Q9) from 2014Q3) and make provisions for an additional year, through to the end of 2017 (thirteen quarters (Q13) from 2014Q3). For CCAR stress testing purposes, as we are concerned with the results at Q9 and Q13, the tables and charts in this paper present those results.

Table 2 TOTAL EXPECTED LOSS FROM AN AVERAGE CCAR BANK'S CRE PORTFOLIO FOR CCAR 2015 SCENARIOS

22 CCAR Banks	Portfolio Composition %	Fed Baseline		Fed Adverse		Fed Severely Adverse	
		Q9 ('16Q4)	Q13 ('17Q4)	Q9 ('16Q4)	Q13 ('17Q4)	Q9 ('16Q4)	Q13 ('17Q4)
Permanent Performing	84.85%	0.34%	0.43%	0.89%	1.26%	2.73%	3.44%
Construction Performing	13.97%	0.44%	0.56%	4.09%	5.80%	20.27%	25.73%
Permanent Non-accrual	0.93%	17.33%	17.33%	20.89%	20.89%	37.00%	37.00%
Construction Non-accrual	0.26%	17.33%	17.33%	25.46%	25.46%	57.12%	57.12%
CRE Total	100.00%	0.56%	0.65%	1.59%	2.14%	5.64%	7.01%

Results show that, for the 22 major banks selected for our CCAR 2015 stress testing analysis, the expected loss from their CRE portfolios after nine quarters for the Severely Adverse Scenario is 5.6%, while, after thirteen quarters, we expect the loss to increase to 7.0%. In the Baseline Scenario, the expected loss is 0.6% and 0.7% at the end of nine and thirteen quarters, respectively.

4. Concluding Remarks

Table 3 summarizes the average expected loss, given the CCAR 2015 scenarios for the 22 CCAR banks selected for our analysis.

Table 3 22 BANKS' TOTAL EXPECTED LOSS BY CCAR 2015 SCENARIO

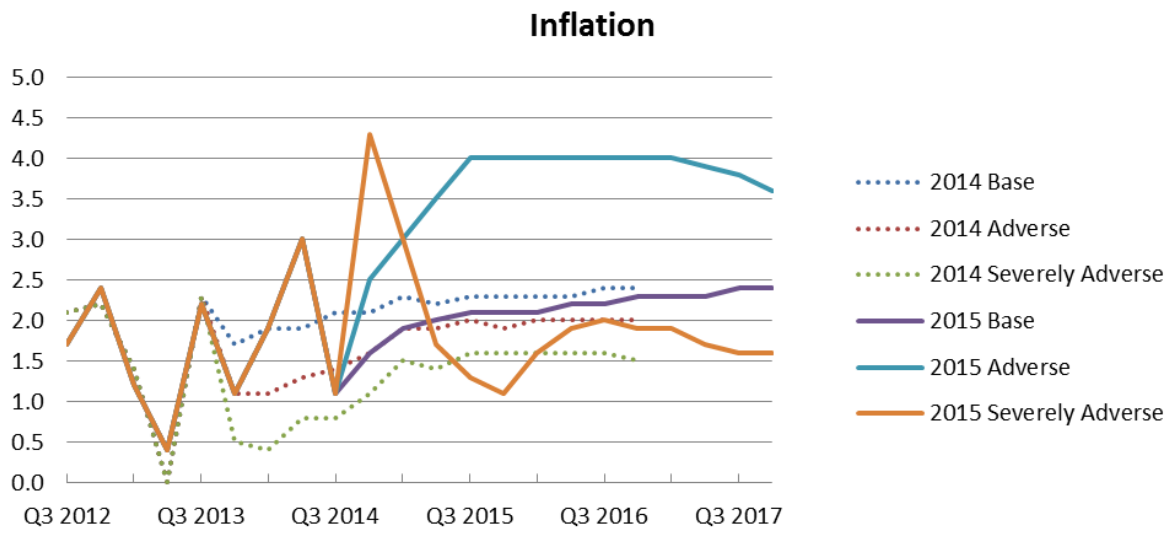
CCAR 2015 Scenario	9-quarter Expected CRE Loss	13-quarter Expected CRE Loss
Fed Baseline	0.6%	0.7%
Fed Adverse	1.6%	2.1%
Fed Severely Adverse	5.6%	7.0%

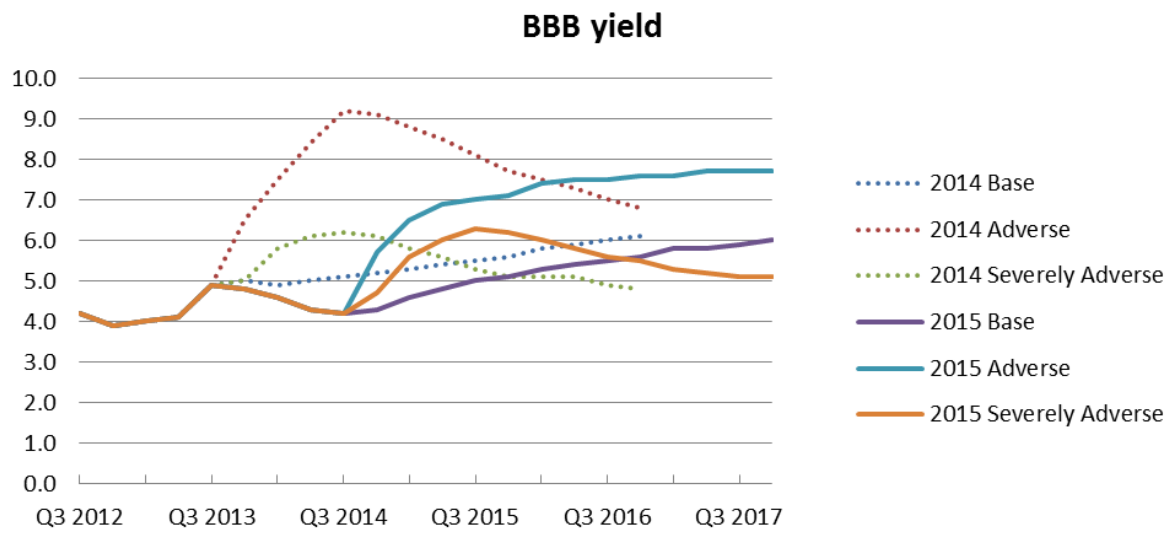
The nine-quarter expected loss estimated for the Severely Adverse Scenario for CCAR 2015 is slightly higher than the corresponding figures from the CCAR 2014 analysis, although the nine-quarter expected loss predicted under the Baseline Scenario for CCAR 2015 is the same as that for CCAR 2014. This finding is the cumulative result of several counterbalancing factors. As described earlier, the size of construction loans in banks' CRE portfolios is larger than that of last year, which suggests that banks are bringing more risk into their portfolios. This is the primary factor leading to higher excepted losses for the CCAR 2015 Severely Adverse Scenario. Another factor that contributes to higher expected losses in the current analysis is that there has been some deterioration of underwriting quality in the last year or so given the intense market pressure. On the other hand, decreases in the reported banks' non-accrual rates and the improvement in the underlying commercial real estate markets over the past year contribute to lower the expected loss forecast. Overall, the increased proportion of construction loans in reported banks' portfolio resulted in slightly higher expected losses under the Severely Adverse Scenario for CCAR 2015, relative to the corresponding CCAR 2014 analysis.

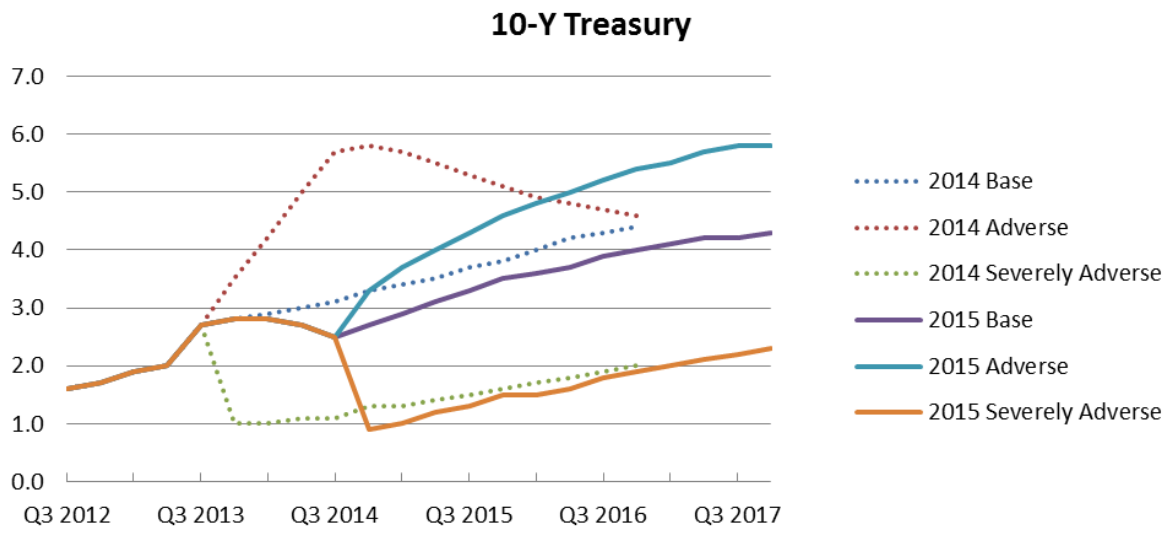
Appendix A CCAR 2015 Scenarios and the CCAR 2014 Scenarios

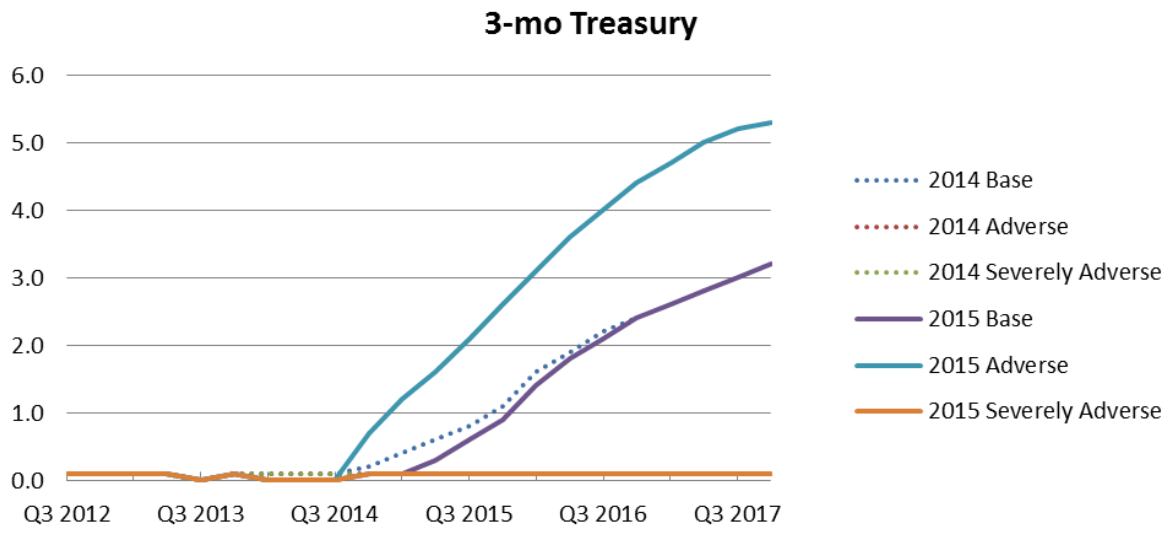
The figures below compare some of the key macroeconomic variables published by the Fed under the CCAR 2014 and CCAR 2015 scenarios.

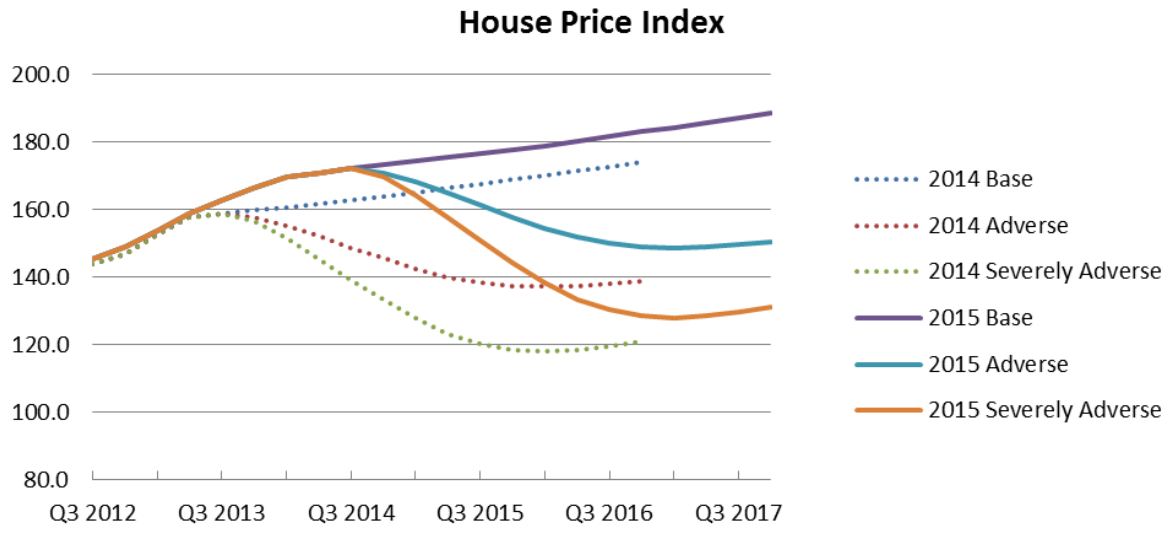
Figure 10 CCAR 2015 and CCAR 2014 scenario comparisons.






10-Y Treasury
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Q3 2012
Q3 2013
Q3 2014
Q3 2015
Q3 2016
Q3 2017
2014 Base
2014 Adverse
2014 Severely Adverse
2015 Base
2015 Adverse
2015 Severely Adverse


3-mo Treasury
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Q3 2012
Q3 2013
Q3 2014
Q3 2015
Q3 2016
Q3 2017
2014 Base
2014 Adverse
2014 Severely Adverse
2015 Base
2015 Adverse
2015 Severely Adverse


House Price Index
200.0
180.0
160.0
140.0
120.0
100.0
80.0
Q3 2012
Q3 2013
Q3 2014
Q3 2015
Q3 2016
Q3 2017
2014 Base
2014 Adverse
2014 Severely Adverse
2015 Base
2015 Adverse
2015 Severely Adverse

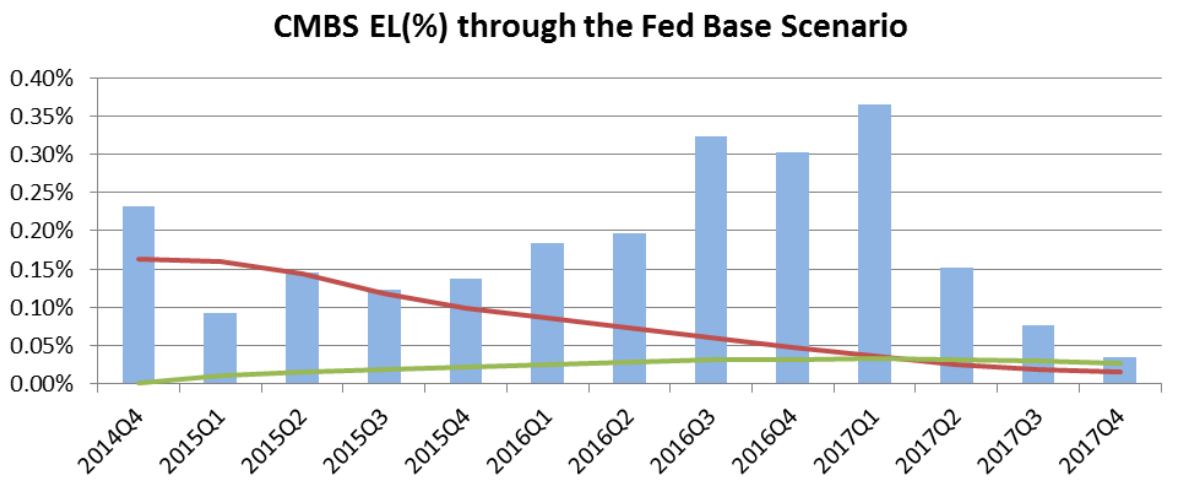
Appendix B Stress Testing the CMBS and Insurance Portfolios

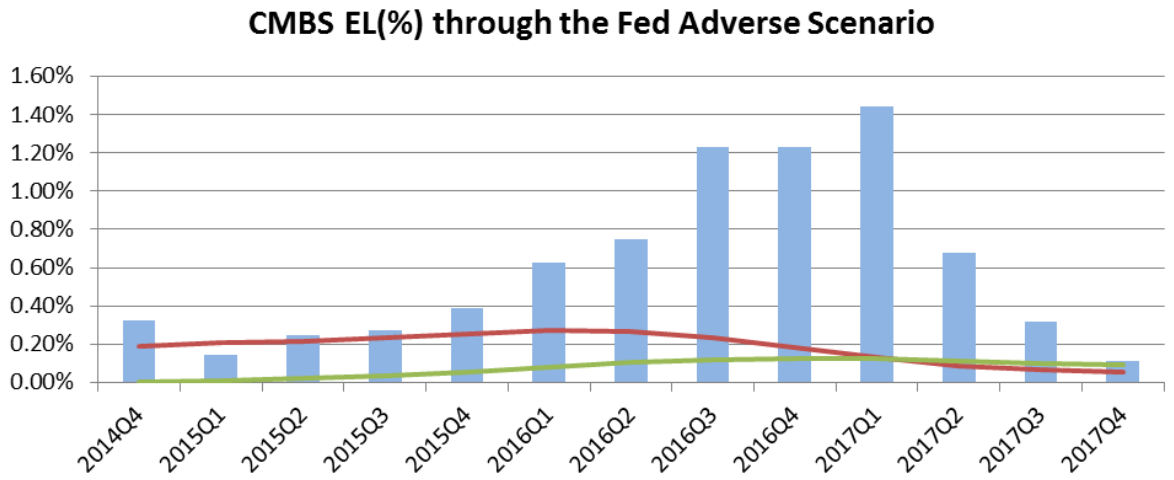
Total Expected Loss from Performing (Non-delinquent and Accrual) Loans

As explained earlier, we use loans from the CMBS and life insurance portfolios to simulate banks' portfolios. We explain the CCAR stress testing process here for the CMBS and insurance portfolios, which, in turn, guide the process for the bank portfolios.

We first run the CMBS and insurance portfolios' performing loans through the CMM. This analysis calculates the term risk and maturity risk of the current loans of the existing CMBS and insurance universe. However, this process ignores the risk associated with new loan originations during the stress period. It is advised that the stress testing process keeps the exposure at default (EAD) when estimating the total risk. Thus, using the CMM Stress Testing outputs, we generate risk measures for the portfolios, assuming the size of the portfolio remains constant through the stress horizon. We achieve this goal by assuming that during every quarter new loan originations equal the amount of loans that mature or amortize during that quarter. Using the quarterly default risk estimates obtained for the existing portfolio via the CMM Stress Testing process, appropriately adjusted default risks are assigned to the new originations. For a given portfolio, credit risk incurs from default during the term of the loan (term risk) and default at maturity (maturity risk) when the remaining principal is to be paid. The figures below show the term and maturity expected losses, as well as the expected loss from new loan originations, for the currently-performing portion of CMBS and ACLI sample through the various stress horizons. Given the large proportions of 2005–2007 vintages set to mature in the next few years, the CMBS maturity risk is projected to be higher than term risk under all three scenarios, with the most critical period being 2016–2017, corresponding to the maturing 2006–2007 vintages.

Figure 11 CMBS (Annualized) Term EL, Maturity EL, and EL from New Originations under CCAR 2015 Scenarios.





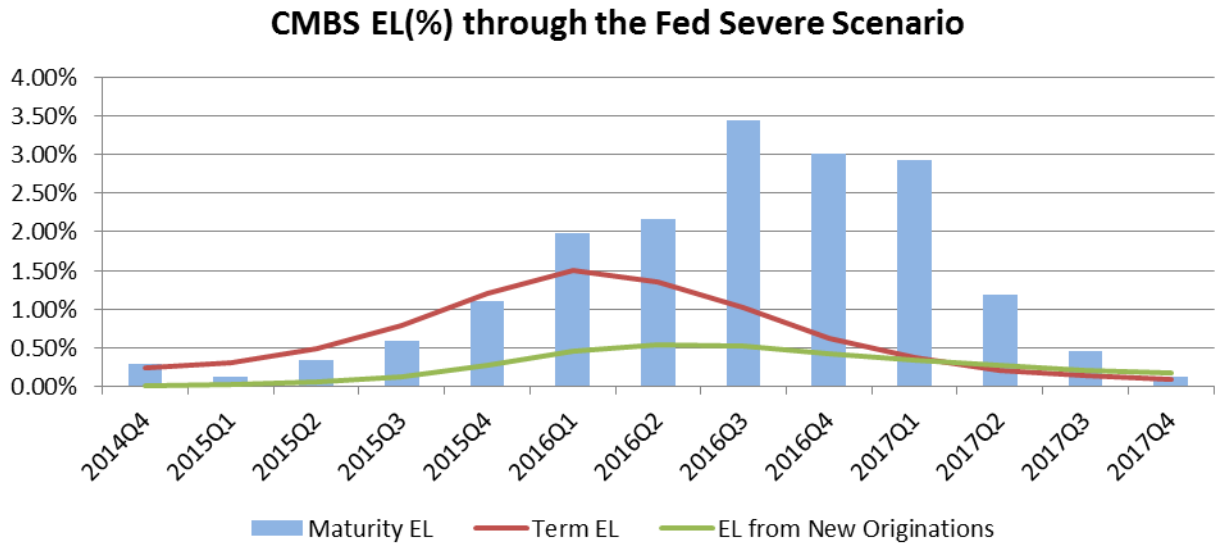
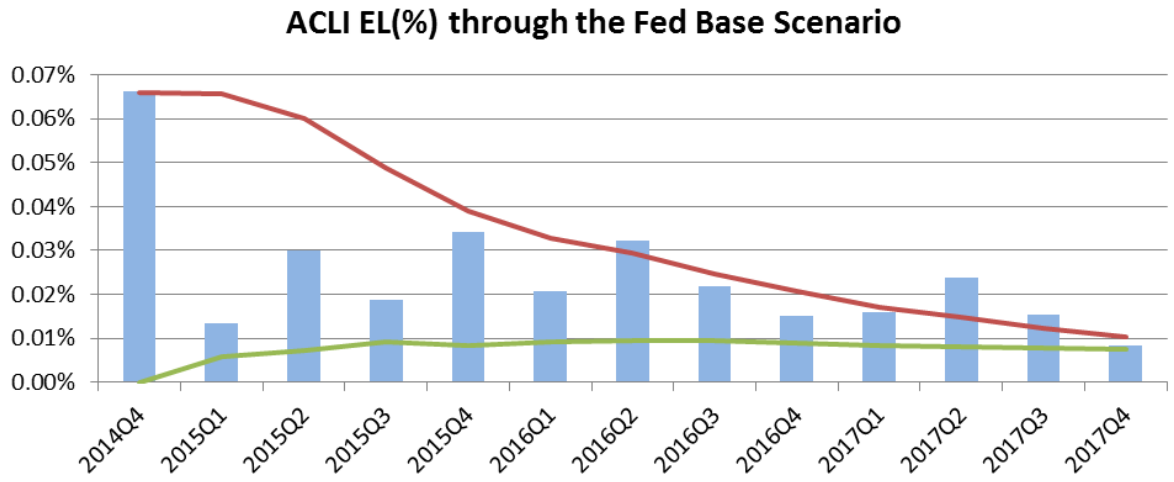
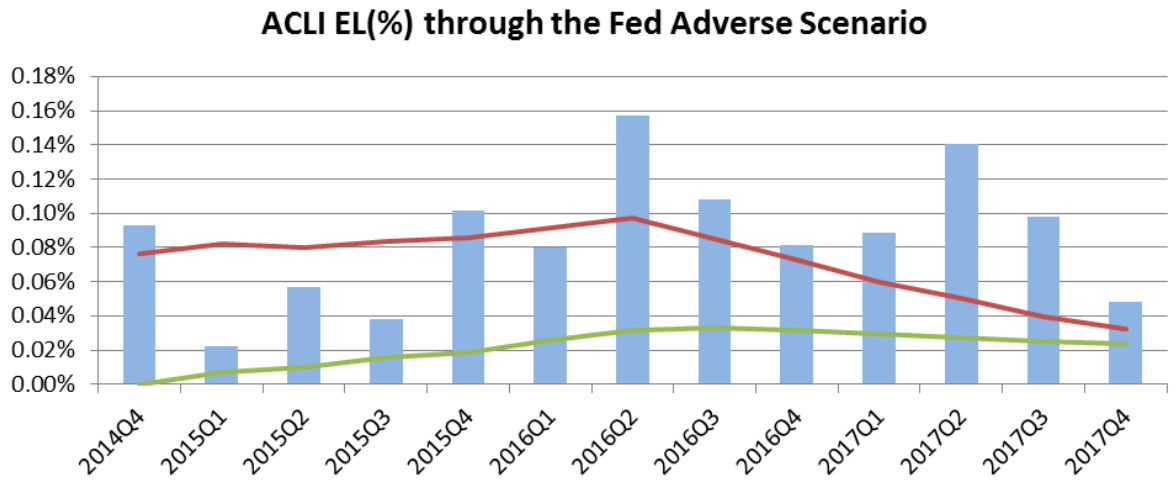
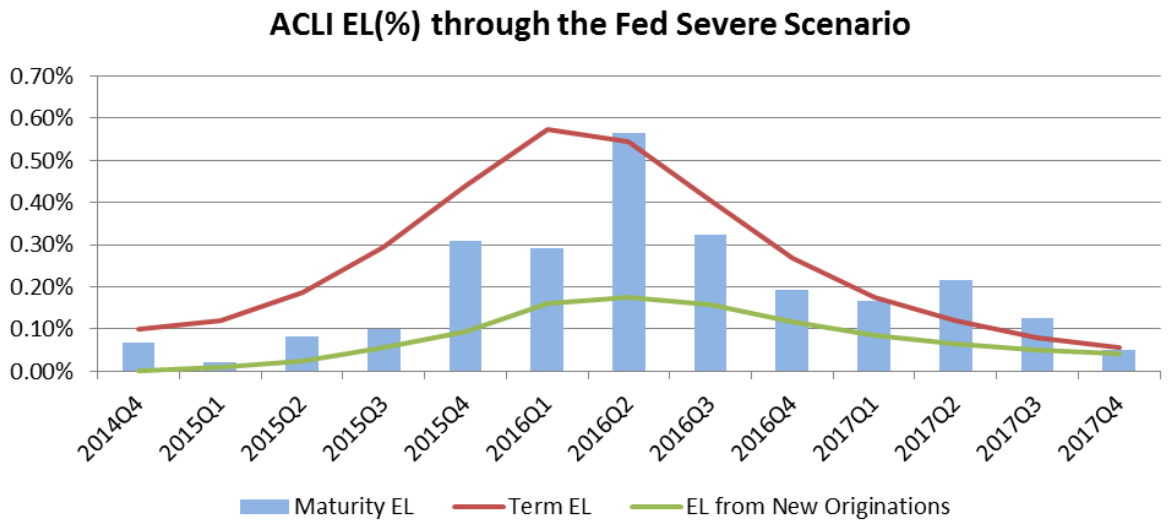


Figure 12 ACLI (Annualized) Term EL, Maturity EL and EL from New Originations under CCAR 2015 Scenarios.







Total Expected Loss from Non-performing (Non-accruable or Delinquent) Loans

Having estimated the total loss contributed by currently performing loans, the next step estimates the total loss resulting from loans currently delinquent.[11] Data on the delinquency rates of the ACLI and CMBS portfolio are available. In the earlier step, via the CMM Stress Testing run, we obtained the loss given default (LGD) for the existing portfolios for each of the stress scenarios. Using the resulting LGDs from the previous analysis and the appropriately assumed roll rates,[12] we find the loss attributable to currently delinquent loans. Table 4 presents the total expected loss from the CMBS and insurance space for the various CCAR 2015 scenarios.

[11] In the case of the bank portfolios, we have their non-accrual rates, treated similarly.

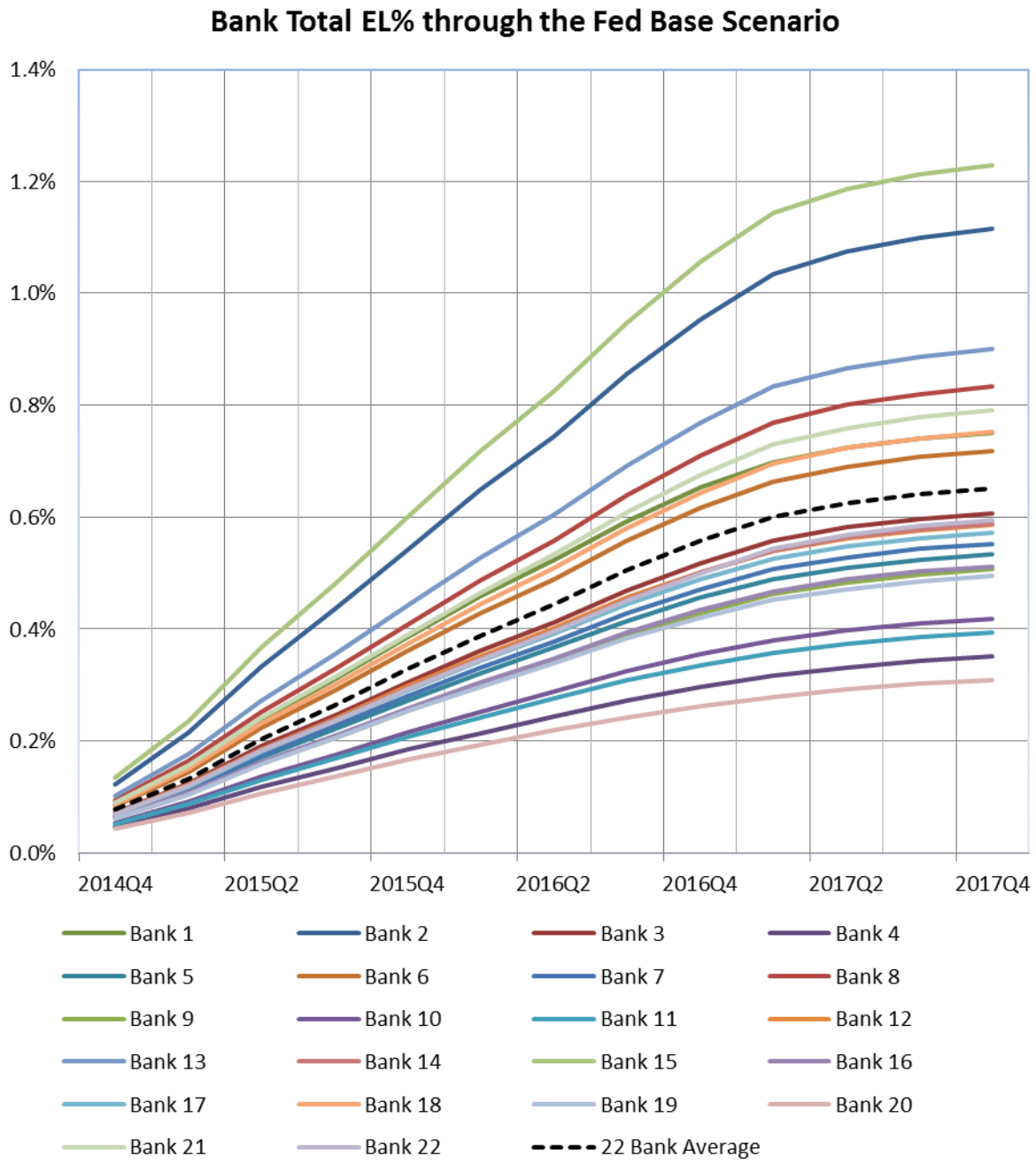
[12] Roll rate is the fraction of delinquent loans that will end in (roll into) default.

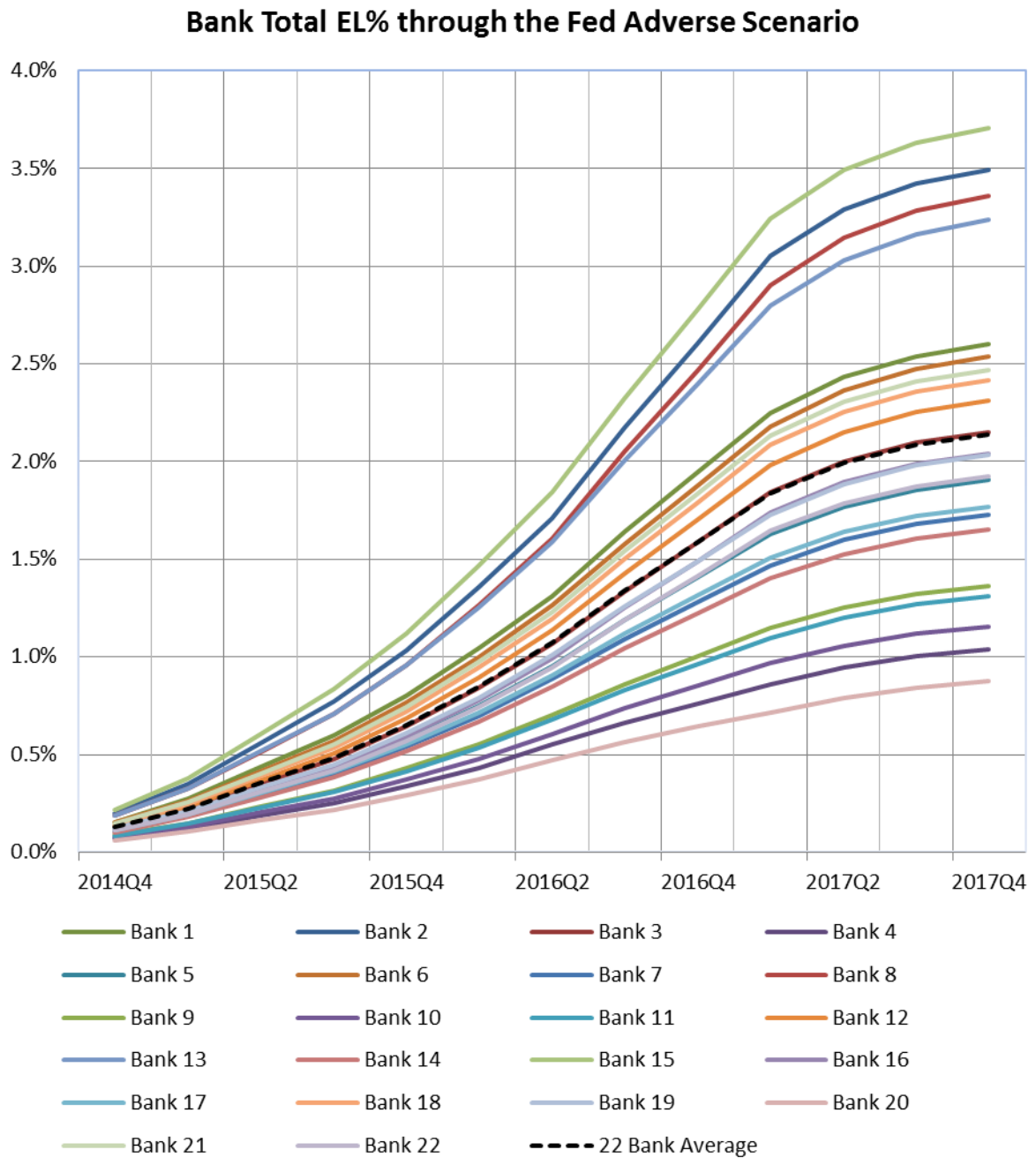
Table 4 TOTAL EXPECTED LOSS FROM THE CMBS AND INSURANCE SPACE FROM CCAR 2015

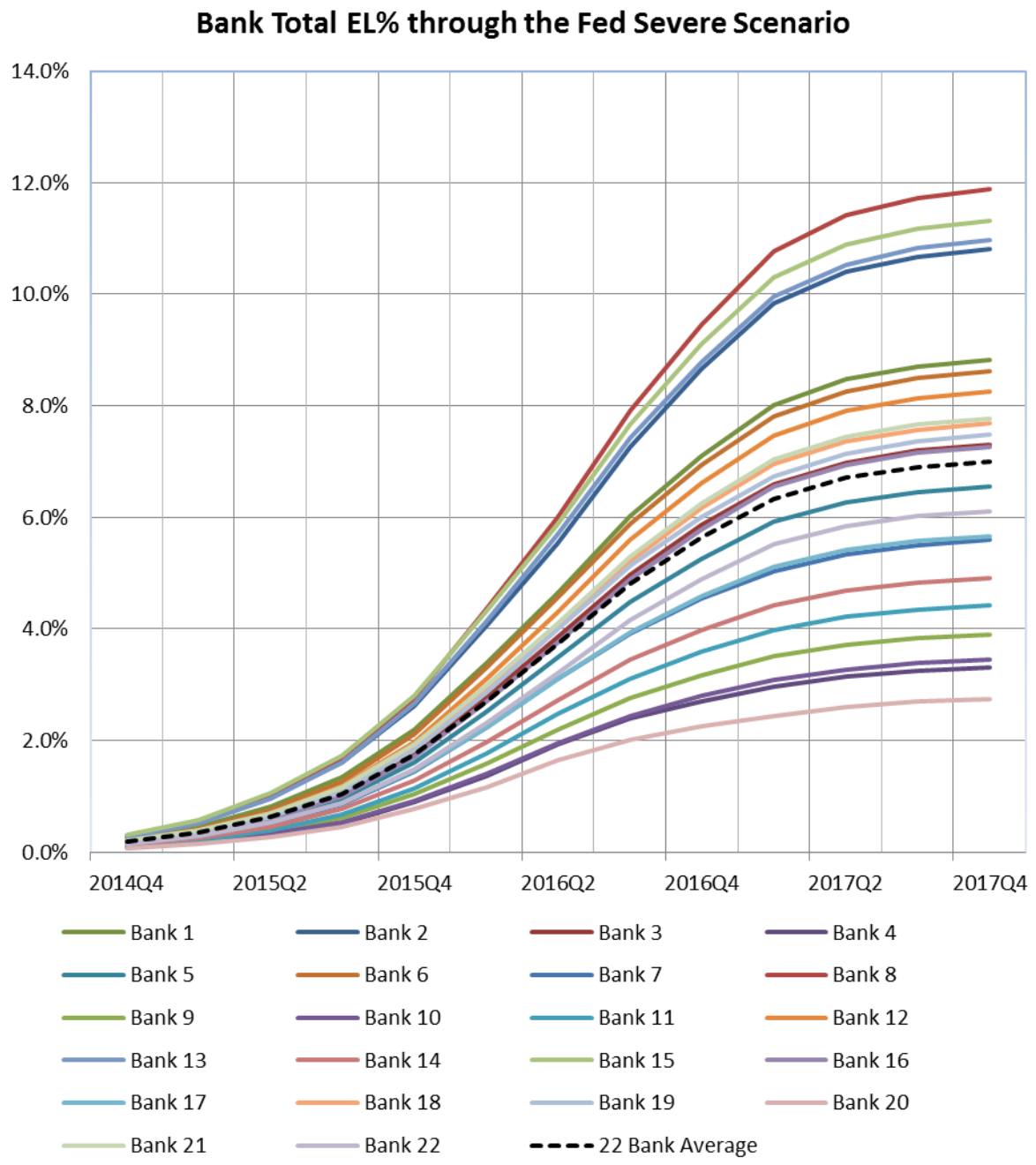
CCAR 2015 Scenario	Quarter from 2014Q3	CMBS			ACLI		
		Performing Loans %	Non-accrual %	Total %	Performing Loans %	Non-accrual %	Total %
		94.5%	5.5%	100%	99.9%	0.1%	100%
Fed Baseline	Q9	0.7%	16.9%	1.6%	0.2%	34.9%	0.2%
Fed Adverse	Q9	2.0%	21.5%	3.0%	0.4%	45.3%	0.5%
Fed Severely Adverse	Q9	5.7%	39.4%	7.5%	1.4%	89.6%	1.5%
Fed Baseline	Q13	0.9%	16.9%	1.8%	0.2%	34.9%	0.3%
Fed Adverse	Q13	2.8%	21.5%	3.8%	0.6%	45.1%	0.6%
Fed Severely Adverse	Q13	7.3%	39.4%	9.1%	1.7%	89.3%	1.8%

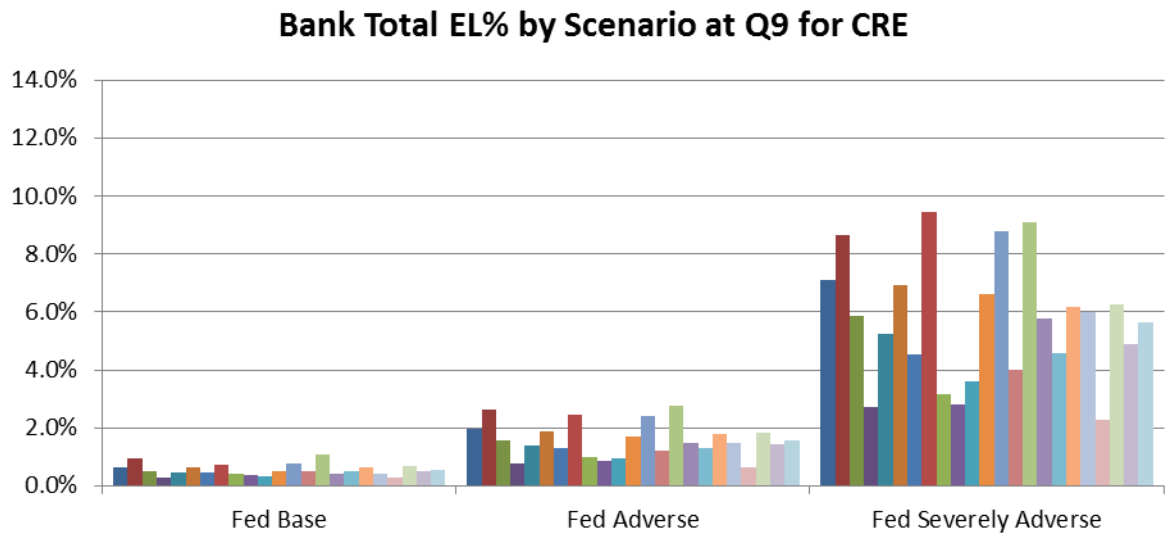
Appendix C Total Loss from Banks' CRE Portfolio, CCAR 2015

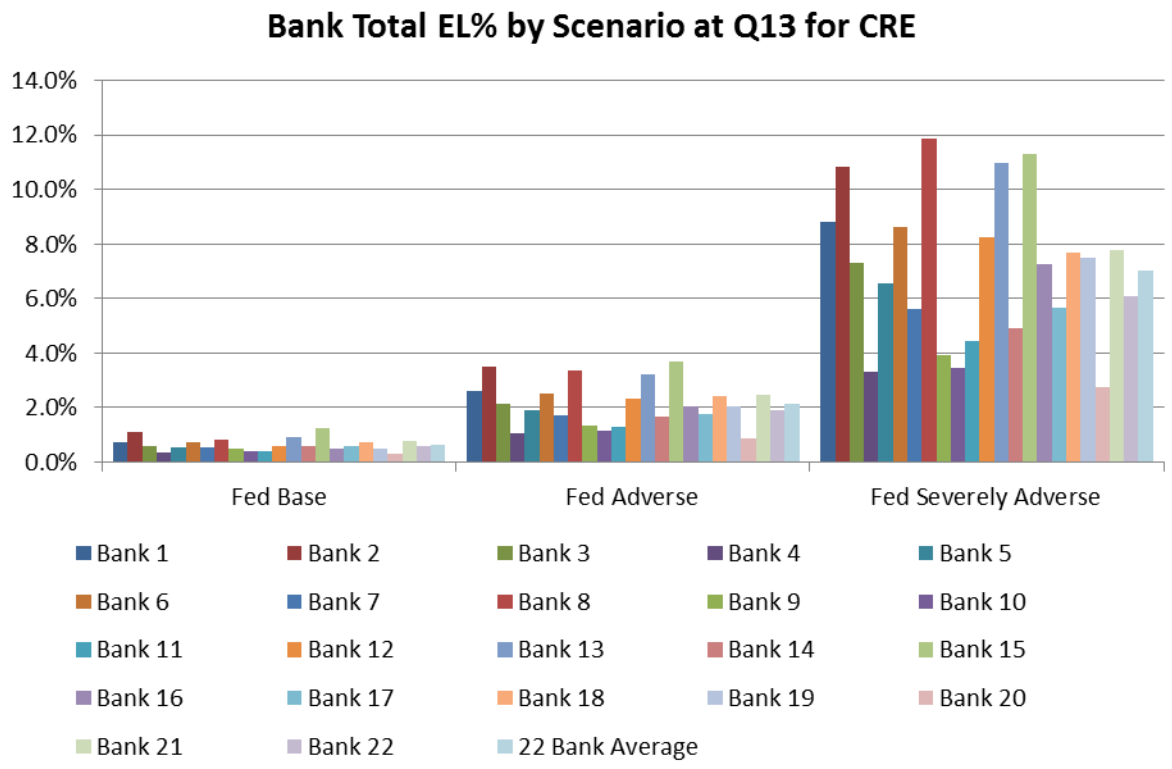
The following figures show details of total loss, in the various categories, for each bank's CRE portfolios for the 2015 CCAR stress testing scenarios.




Bank Total EL% through the Fed Adverse Scenario
4.0%
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
2014Q4
2015Q2
2015Q4
2016Q2
2016Q4
2017Q2
2017Q4
Bank 1
Bank 2
Bank 3
Bank 4
Bank 5
Bank 6
Bank 7
Bank 8
Bank 9
Bank 10
Bank 11
Bank 12
Bank 13
Bank 14
Bank 15
Bank 16
Bank 17
Bank 18
Bank 19
Bank 20
Bank 21
Bank 22
22 Bank Average


Bank Total EL% through the Fed Severe Scenario
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
2014Q4
2015Q2
2015Q4
2016Q2
2016Q4
2017Q2
2017Q4
Bank 1
Bank 2
Bank 3
Bank 4
Bank 5
Bank 6
Bank 7
Bank 8
Bank 9
Bank 10
Bank 11
Bank 12
Bank 13
Bank 14
Bank 15
Bank 16
Bank 17
Bank 18
Bank 19
Bank 20
Bank 21
Bank 22
22 Bank Average


Bank Total EL% by Scenario at Q9 for CRE
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Fed Base
Fed Adverse
Fed Severely Adverse


Bank Total EL% by Scenario at Q13 for CRE
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Fed Base
Fed Adverse
Fed Severely Adverse
Bank 1
Bank 2
Bank 3
Bank 4
Bank 5
Bank 6
Bank 7
Bank 8
Bank 9
Bank 10
Bank 11
Bank 12
Bank 13
Bank 14
Bank 15
Bank 16
Bank 17
Bank 18
Bank 19
Bank 20
Bank 21
Bank 22
22 Bank Average

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