RBC USA Holdco Corporation
City National Bank

2018 Annual Company-Run Dodd Frank Act Stress Test Disclosure

Supervisory Severely Adverse Scenario

June 2018

RBC®

Forward-Looking Statements

The 2018 Dodd-Frank Act Annual Stress Test Results Disclosure (the "Stress Test Results") presented herein contains forward-looking projections that represent estimates based on the hypothetical, severely adverse economic and market scenarios and assumptions under the Supervisory Severely Adverse scenario prescribed by the Board of Governors of the Federal Reserve System ("Federal Reserve"). The quantitative outputs and qualitative discussion herein should not be viewed as forecasts of expected outcomes or capital ratios or as a measure of the solvency or actual financial performance or condition of the Company or its U.S. bank operating subsidiary, City National Bank (CNB). Instead, the outputs and discussions are estimates from forward-looking exercises that consider possible outcomes based on hypothetical, highly adverse economic scenarios. In addition, the Stress Test Results are impacted by certain risk factors, many of which are beyond our control and the effects of which can be difficult to predict, including credit risk, market risk, liquidity and funding risk, operational risk, regulatory compliance risk, strategic/competitive risk and legal and regulatory environment risk as discussed in this disclosure

The outputs of the analyses and the discussion contained herein may not align with those produced by the Federal Reserve or other financial institutions conducting similar exercises, even if similar hypothetical stress scenarios were used, due to differences in methodologies and assumptions used to produce those outputs. In addition, the results contained herein may not be comparable to results of prior stress tests conducted by RIHC, the Federal Reserve or other financial institutions due to the evolving regulatory framework, evolving macro economic and market environment and other factors.

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Overview of RBC USA Holdco Corporation

- RBC USA Holdco Corporation (RIHC) is an Intermediate Holding Company (IHC) with total assets of approximately U.S. $142 billion as of December 31, 2017. It is a wholly-owned subsidiary of Royal Bank of Canada (RBC).

- RIHC engages in capital markets, wealth management and personal and commercial banking activities, which are conducted through its four legal entities. U.S. capital market activities are conducted through RBC Capital Markets, LLC (CM LLC), while the personal and commercial banking activities are conducted through its subsidiary banks, City National Bank (CNB) and RBC Bank (Georgia), National Association (RBC Bank). Wealth management activities are conducted through CM LLC and RBC Global Asset Management (U.S.) Inc. (GAM-U.S.).

  - CM LLC is a registered securities broker-dealer which engages in capital markets origination transactions, private placements, collateralized financings, securities borrowing and lending transactions, and domestic and foreign debt and equities securities transactions. CM LLC is also a registered investment advisor. The wealth management business in CM LLC serves institutions and high net worth individuals with a wide-ranging group of investment, trust banking, credit, and other asset management products and services.

  - CNB provides a complete suite of banking, trust, and investment services to high net worth individuals and commercial clients in major metropolitan areas that have high concentrations of strategically targeted clients (e.g. Southern California, San Francisco, New York).

  - RBC Bank provides retail banking products and services to Canadian cross-border retail clients and small businesses. The entity provides a unique direct-banking experience, allowing clients to transfer funds, exchange currencies, and manage accounts through integrated online and telephone banking channels.

  - GAM-U.S. offers various equity, fixed income, cash management, and emerging markets / global equity and fixed income strategies to institutional investors in separate accounts, RBC mutual funds, and other private funds.

Note: All amounts reported in this document are in U.S. dollars.

Overview of Annual Dodd-Frank Act Stress Test

- The 2018 Annual Stress Test Disclosure presents results of the annual stress test conducted by RIHC in accordance with the Dodd-Frank Act Stress Test ("DFAST") requirements.

- The rule requires Covered Companies, like RIHC, to disclose publicly the results of their run of the Federal Reserve's Supervisory Severely Adverse stress scenario, which describes the hypothetical evolution of certain specific macroeconomic and market variables consistent with a severely adverse recession.

- The planning horizon begins with actual results as of December 31, 2017 and includes a nine quarter forecast beginning with the first quarter of 2018 and ending with the first quarter of 2020.

- RIHC is required to employ the following assumptions regarding its projected capital actions beginning with the second quarter of the nine quarter planning horizon:

  – Payment of common dividends equal to the quarterly average dollar amount of common stock dividends paid over the past four quarters (including the initial quarter of the planning horizon and prior 3 quarters);

  – Payments on any other instrument eligible for inclusion in the numerator of a regulatory capital ratio equal to the stated dividend, interest, or principal due on such instrument;

  – No redemption or repurchase of any capital instrument eligible for inclusion in the numerator of a regulatory capital ratio; and

  – No issuances of common stock or preferred stock, except for issuances related to expensed employee compensation or in connection with a planned merger or acquisition.

- For the 2018 Comprehensive Capital Analysis and Review (CCAR) cycle, RIHC is not required to apply the Global Market Shock (GMS) Supervisory scenarios. As per Federal Reserve instructions, Supervisory stress shocks will be replaced with a Market Risk add-on loss that captures Trading, Counterparty, Credit Valuation Adjustment (CVA) and Incremental Default Risk (IDR) losses.

- The results of RIHC's stress test, under the Supervisory Severely Adverse scenario are disclosed in the section "Company-Run Dodd-Frank Stress Test Results – RBC USA Holdco".

- The results of CNB's stress test, under the Supervisory Severely Adverse scenario, are disclosed in the section "Company-Run Dodd-Frank Stress Test Results – City National Bank".

Company-Run Dodd-Frank Stress Test Results – RBC USA Holdco (1 of 5)

Capital Ratios, Actual Q4 2017 and Projected Q1 2018 – Q1 2020
Under the Supervisory Severely Adverse Scenario

Regulatory Ratio	Actual Q4 2017	Projected Stressed Capital Ratios[1]		Regulatory Minimum
		Ending	Minimum	
Common Equity Tier 1 Capital Ratio	15.6%	13.7%	12.8%	4.5%
Tier 1 Risk-Based Capital Ratio	15.6%	13.7%	12.8%	6.0%
Total Risk-Based Capital Ratio	16.8%	14.6%	13.7%	8.0%
Tier 1 Leverage Ratio	7.9%	7.4%	7.4%	4.0%

1. U.S. Basel III standardized approach is used to calculate risk-weighted assets (RWA) for credit risk and market risk in the calculations for Common Equity Tier 1, Tier 1, and Total Risk-based Capital ratios.

Risk-Weighted Assets, Actual Q4 2017 and Projected Q1 2020
Under the Supervisory Severely Adverse Scenario

(Billions of U.S. Dollars)

Item	Actual Q4 2017	Projected Q1 2020
RWA[2]	$68.6	$71.2

2. Actual and projected RWA are calculated based on U.S. Basel III standardized approach.

**Projected Losses, Revenues, and Net Income before Taxes through Q1 2020
Under the Supervisory Severely Adverse Scenario**

Item	9 Quarter Total (Billions of U.S. dollars)	Percentage of Average Assets[1]
Pre-Provision Net Revenue[2]	$0.7	0.6%
Other Revenue[3]	-	
Less		
Provision for Loan Losses	1.5	
Realized Losses/Gains on Securities (AFS / HTM)[4]	0.0	
Trading and Counterparty Losses[5]	0.6	
Other Losses/Gains[6]	0.9	
Equals		
Net Income before Taxes	($2.3)	(1.8%)

Memo Items		
Other Effects on Capital	*Q4 2017*	*Q1 2020*
AOCI Included in Capital[7]	0.0	0.0

1. Average assets reflect the nine-quarter average of total assets.
2. Pre-provision net revenue includes losses from operational risk events.
3. Other revenue includes one-time income and (expense) items not included in pre-provision net revenue.
4. Represents available-for-sale (AFS) securities and held-to-maturity (HTM) securities.
5. Trading and counterparty losses include mark-to-market and CVA losses and losses arising from the counterparty default scenario component applied to derivatives, securities lending, and repurchase agreement activities.
6. Other losses/gains includes projected change in fair value of loans held for sale (HFS) and loans held for investment (HFI) measured under the fair-value option, and goodwill impairment losses.
7. RIHC is not an Advanced Approaches institution and, as afforded by the Final Capital Rule, elected to opt-out of including most unrealized gains (losses) reported as part of accumulated other comprehensive income (AOCI) in its calculation of regulatory capital from March 31, 2017 onwards.

Projected Loan Losses, by Type of Loan, Q1 2018 – Q1 2020
Under the Supervisory Severely Adverse Scenario

Loan Type	9 Quarter Total (Billions of U.S. dollars)	Portfolio Loss Rates (%)[1]
First-Lien Mortgages, Domestic	$0.1	0.6%
Junior Liens and HELOCs, Domestic	0.0	1.5%
Commercial and Industrial[2]	0.5	5.1%
Commercial Real Estate, Domestic	0.3	3.8%
Credit Cards	0.0	8.9%
Other Consumer	0.1	4.5%
Other Loans[3]	0.2	2.4%
Total Projected Loan Losses	$1.2	2.9%

1. Portfolio loss rates represent cumulative portfolio losses as a percentage of the average loan portfolio balance over nine quarters. Average loan balances used to calculate portfolio loss rates exclude HFS loans and HFI loans under the fair-value option.
2. Commercial and industrial loans include small- and medium-enterprise loans and corporate cards.
3. Other loans include loans for purchasing or carrying securities (secured or unsecured) and loans to depositories and other financial institutions.

**Key Drivers of Common Equity Tier 1 (CET1) Capital Ratio
Under the Supervisory Severely Adverse Scenario**
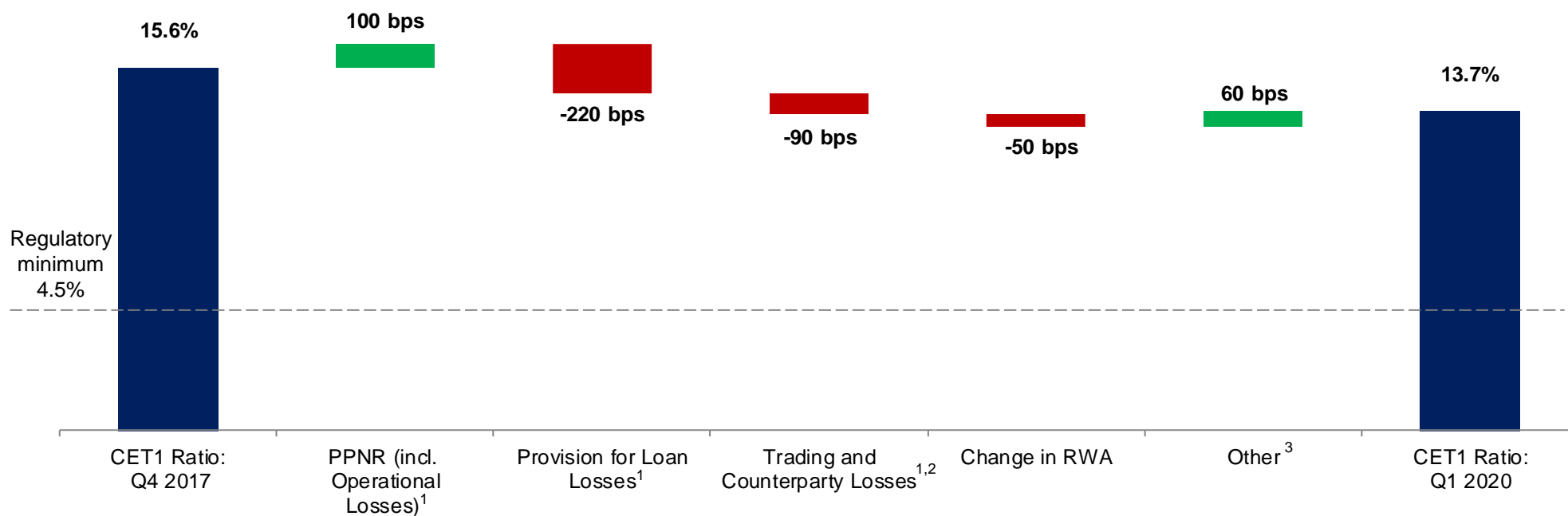
Increase

Decrease

15.6%

100 bps

-220 bps

-90 bps

-50 bps

60 bps

13.7%

Regulatory
minimum
4.5%

CET1 Ratio:
Q4 2017

PPNR (incl.
Operational
Losses)[1]

Provision for Loan
Losses[1]

Trading and
Counterparty Losses[1,2]

Change in RWA
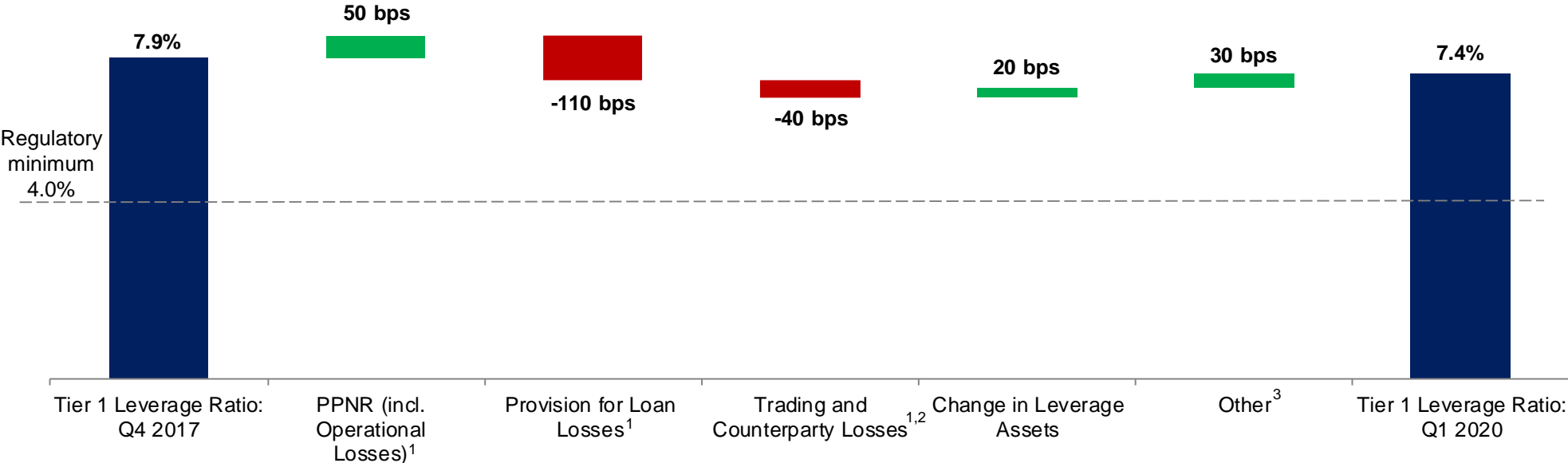
Other[3]

CET1 Ratio:
Q1 2020

Note: Numbers may not sum due to rounding

1. Reflects pre-tax impact.

2. Federal Reserve Market Risk add-on losses.

3. Other includes increase in capital associated with the transfer of another RBC entity to RIHC, taxes including net operating losses, changes in CET1 deductions over the planning horizon and other capital items.

Key Drivers of Tier 1 Leverage Ratio
Under the Supervisory Severely Adverse Scenario

Increase

Decrease

50 bps

7.9%

-110 bps

-40 bps

20 bps

30 bps

7.4%

Regulatory
minimum
4.0%

Tier 1 Leverage Ratio:
Q4 2017

PPNR (incl.
Operational
Losses)[1]

Provision for Loan
Losses[1]

Trading and
Counterparty Losses[1,2]

Change in Leverage
Assets

Other[3]

Tier 1 Leverage Ratio:
Q1 2020

Note: Numbers may not sum due to rounding

1. Reflects pre-tax impact.

2. Federal Reserve Market Risk add-on losses.

3. Other includes increase in capital associated with the transfer of another RBC entity to RIHC, taxes including net operating losses, changes in CET1 deductions over the planning horizon, and other capital items.

Key Risks Captured in Dodd-Frank Stress Test

The below risks are those inherent in RIHC's business activities and included in the Supervisory Severely Adverse scenario.

Risk Type	Description
Credit Risk	Credit risk is the risk of loss associated with an obligor's potential inability or unwillingness to fulfill its contractual obligations on a timely basis. Credit risk may arise directly from the risk of default of a primary obligor (e.g., issuer, debtor, counterparty, borrower or policyholder), or indirectly from a secondary obligor (e.g., guarantor or reinsurer). Credit risk includes counterparty credit risk from both trading and non-trading activities.
Market Risk	Market risk is defined to be the impact of market prices upon RIHC's financial condition. This includes potential gains or losses due to changes in market determined variables such as interest rates, credit spreads, equity prices, commodity prices, foreign exchange rates, and implied volatilities. This also includes the impact of market shocks with associated risks such as basis risk, illiquid market risk, and wrong way risk.
Liquidity and Funding Risk	Liquidity and funding risk is the risk that RIHC may be unable to generate sufficient cash or its equivalents in a timely and cost-effective manner to meet its commitments as they come due. Liquidity risk arises from mismatches in the timing and value of on-balance sheet and off-balance sheet cash flows.
Operational Risk	Operational risk is the risk of loss or harm resulting from people, inadequate or failed internal processes and systems or from external events. Examples include cyber risk, internal fraud risk, natural/man-made disaster risk, IT infrastructure risk, process & execution risk, model risk, and third party services disruption risk.
Regulatory Compliance Risk	Regulatory compliance risk is the risk of potential non-conformance with laws, rules, regulations, prudential standards, and prescribed practices in any jurisdiction in which RIHC operates.
Strategic/ Competitive Risk	Strategic risk is the risk that the enterprise or particular business areas will make inappropriate strategic choices, or will be unable to successfully implement selected strategies or related plans and decisions. Competitive risk is the risk of an inability to build or maintain sustainable competitive advantage in a given market or markets. These include but are not limited to acquisitions, divestitures and integration from a strategic view and products, services and pricing from a competitive view.
Legal and Regulatory Environment Risk	Legal and regulatory environment risk is the risk that new or modified laws and regulations, and the interpretation or application of those laws and regulations, will negatively impact the way in which RIHC operates. This includes litigation (actual and potential lawsuits filed) and legal & fiduciary risks (the risk that an agreement or arrangement, either establishing or modifying a legally binding relationship, does not reflect the business activities or commitments or fails to comply with applicable laws).

Overview

- The key RIHC forecasting approaches used to project financial performance and capital ratios include:

- Quantitative Model approach: A quantitative model is a method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates.

- Qualitative Methodology approach: A qualitative methodology is a forecasting approach that incorporates qualitative elements and business assumptions which may supplement or replace quantitative modeling. A qualitative approach may address new businesses, modeling limitations, and idiosyncratic portfolio risks that are not adequately represented in existing data.

Pre-Provision Net Revenue (PPNR)

- PPNR includes the estimation of the balance sheet, Net Interest Income, Non-interest Revenue and Non-interest expense.

- Net Interest Income is composed primarily of interest income generated from portfolio loans, trading and securities assets and reverse repurchase agreements and is partially offset by interest expense driven by interest-bearing deposits, trading shorts, repurchase agreements and borrowings. The NII forecast is linked to macroeconomic variables through quantitative and qualitative methodologies.

- Non-Interest Revenue is earned through the execution of investment banking, sales & trading, wealth management services and other fee-related business activities, which are forecasted through a series of quantitative and qualitative methodologies using macroeconomic variables.

- Non-Interest Expense consists of variable and fixed costs, and includes compensation and non-compensation expenses which are linked to the business and revenue growth.

Operational Risk

- A combination of quantitative and qualitative approaches is used to estimate operational risk losses. These losses result from inadequate or failed internal controls, processes, people, systems or external events. For operational risk event types in which a sound statistical relationship exists, a quantitative regression model is used to estimate the operational risk loss, otherwise qualitative approaches are used.

- Scenario analysis is one of the main components used in the forecast. These scenarios align to the firm's material operational risks. Additionally, a loss component was developed to account for potential future legal exposure that is not present in the historical dataset.

Credit Risk

- Credit risk loss projections are based on the composition of wholesale and consumer loan portfolios across asset classes and customer segments. Projection strategy for loan portfolios is driven by product type and the underlying business model.

- Credit risk loss is projected predominantly using quantitative models, while a qualitative approach is used in a few instances. Quantitative models were developed for material portfolios. Several quantitative models are developed for different loan types to consider credit migration and transition in delinquency status, both of which are driven by underlying macroeconomic factors. Credit risk forecasts includes projections of provision for credit losses (PCL), allowance for loans and lease losses (ALLL), non-performing loans (NPL), and net charge-offs (NCO).

Market Risk

- Market Risk stress testing includes:
- A set of instantaneous shocks applied to the trading book and other fair value exposures.
- Nine-quarter Other Comprehensive Income (OCI[1]) and Other than temporary impairment (OTTI) projections applied to the AFS and HTM securities portfolio.

Trading Book and Fair Value exposures

- As per Federal Reserve Board instructions, for the 2018 CCAR cycle RIHC was not subject to the GMS Supervisory scenarios. The Supervisory stress shocks were replaced with Market Risk add-on loss that captured Trading, Counterparty, CVA and IDR losses.

- For RIHC's internal stress scenario: An instantaneous shock was applied in the first quarter. The shocks were comprised of a set of variables, such as interest rates and credit spreads. For most products, a full revaluation approach was applied by employing pricing models. For securitized products and equities a relative market value shock was applied.

AFS and HTM securities

- OCI[1] and OTTI was projected for the macroeconomic nine quarter supervisory and internal stress scenarios. OCI was generated for AFS securities only and used the same pricing models employed for the trading book. OTTI was projected for both AFS and HTM securities.

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(1) RIHC is not an Advanced Approaches institution and, as afforded by the Final Capital Rule, elected to opt-out of including most unrealized gains (losses) reported as part of accumulated other comprehensive income (AOCI) in its calculation of regulatory capital from March 31, 2017 onwards.

Counterparty Risk / Credit Valuation Adjustment Risk / Incremental Default Risk

- As per Federal Reserve Board instructions, for the 2018 CCAR cycle RIHC was not subject to the GMS Supervisory scenarios. The supervisory stress shocks were replaced with Market Risk add-on loss that captured Trading, Counterparty, CVA and IDR losses.

For RIHC's internal scenario:

- The counterparty default scenario involved estimating the potential losses associated with the instantaneous and unexpected default of a counterparty with zero recovery. The counterparty default loss was determined by applying the internal GMS scenario to determine the stressed exposure for each counterparty. Qualitative factors were applied to determine which counterparty defaults and the potential contagion impacts.

- CVA is an adjustment to the mark-to-market valuation of trading derivatives that accounts for the risk of adverse changes in counterparty credit quality. CVA losses were estimated primarily through a Monte Carlo simulation approach.

- The trading IDR model estimated losses associated with the issuer defaults of securitized products and other credit sensitive products held in the trading portfolio. Loss projections are based on probability of default (PD) and loss given default (LGD) models via a Monte Carlo simulation.

Capital

- RHC's capital position is projected on a quarterly basis based on capital impacts of the revenue and loss estimates as described above.

Credit RWA

- Credit RWA calculation adheres to the US Basel III standardized RWA methodology. RWA projection is based on projected movements in on-balance sheet and off-balance sheet exposures, and risk weightings.

Market RWA

- The Market RWA projection methodology is consistent with the methodology employed for spot market RWA calculations: general market risk (Value at risk and Stressed Value at Risk), specific risk, and de minimis exposures.

- VaR and SVaR projections represent the general market risk components. Specific risk captures credit default and rating migration risk. Projected RWAs reflect the impact of the macroeconomic environment; for example, changes in volatilities and credit spreads were incorporated into our calculation of projected RWAs.

Company-Run Dodd-Frank Stress Test Results – City National Bank

- The Office of the Comptroller of the Currency (OCC) requires covered companies, including CNB, to conduct the DFAST.

- For the 2018 DFAST, the OCC required the use of the same hypothetical Supervisory Severely Adverse Scenario as the Federal Reserve Board in Comprehensive Capital Analysis and Review.

- CNB represents RIHC's primary subsidiary U.S. depository institution and accounted for approximately 34% of RIHC's overall U.S. GAAP assets as of December 31, 2017.

- CNB used the same methodologies as used in RIHC's CCAR (Pre-provision Net Revenue, Stress Losses and Capital Position).

Company-Run Dodd-Frank Stress Test Results – City National Bank

Capital Ratios, Actual Q4 2017 and Projected Q1 2018 – Q1 2020
Under the Supervisory Severely Adverse Scenario

Regulatory Ratio	Actual Q4 2017	Projected Stressed Capital Ratios[1]		Regulatory Minimum
		Ending[2]	Minimum	
Common Equity Tier 1 Capital Ratio	10.4%	10.9%	9.5%	4.5%
Tier 1 Risk-Based Capital Ratio	10.4%	10.9%	9.5%	6.0%
Total Risk-Based Capital Ratio	13.1%	13.5%	12.1%	8.0%
Tier 1 Leverage Ratio	7.3%	6.0%	5.9%	4.0%

1. U.S. Basel III standardized approach is used to calculate RWA for credit risk and market risk in the calculations for CET1, Tier 1, and Total Risk-based Capital ratios.

2. The drivers of any declines in the capital ratios in the hypothetical severely adverse stress scenario reflect the combined impact of the following:

   – The projected level of credit losses and provision for credit losses has a negative impact on retained earnings.

   – An increase in deposits, based on the regression models, results in an increase in total assets and RWA.

Projected Cumulative Results, Q1 2018 – Q1 2020
Under the Supervisory Severely Adverse Scenario

Item	9 Quarter Total (Billions of U.S. dollars)
Pre-Provision Net Revenue	1.7
Net Income	0.4
Charge-offs	1.1
Loan Loss Provision	1.2