CECL and stress testing

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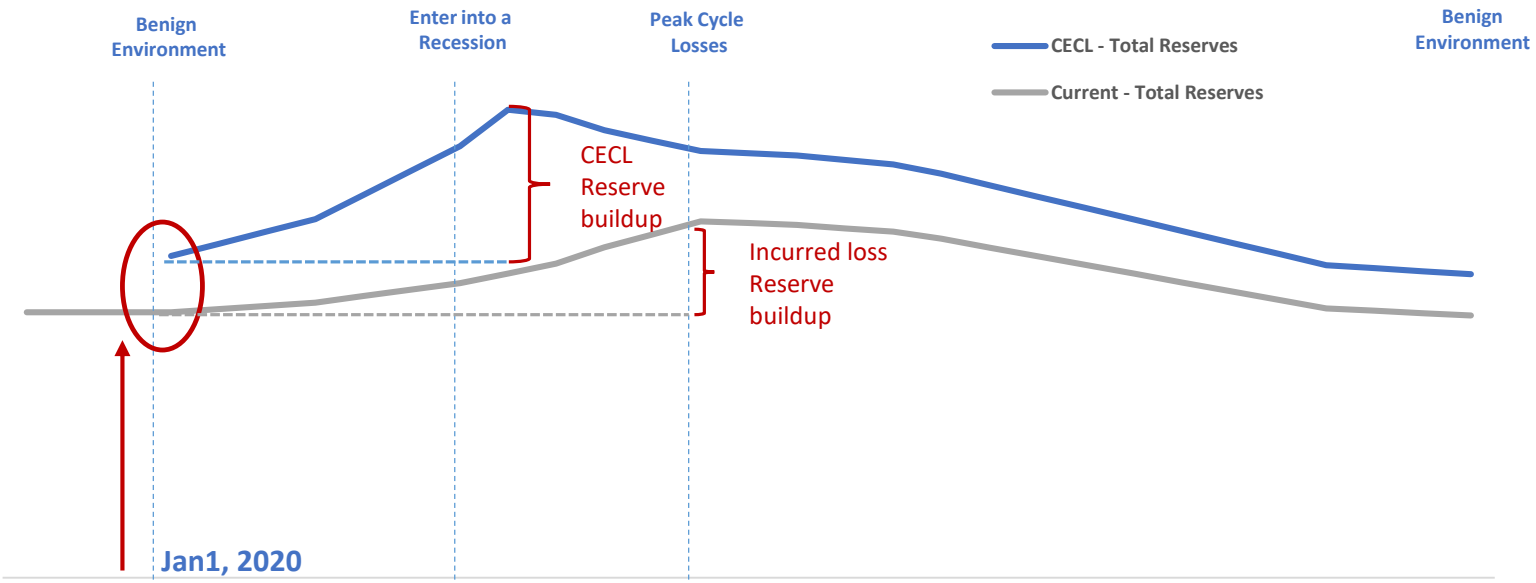
CECL impact on reserves

CECL Reserves forecasts in an economic cycle



Transition impact:
Higher reserves under CECL at transition date

Post transition impact:
Compared to the current incurred loss reserve method, CECL reserve build up in a stress scenario is faster and higher.

- **Transition**
  - CECL reserves are likely to be higher, particularly for consumer portfolios
- **Post transition**
  - Reserves under CECL are more sensitive to economic conditions and, therefore, are likely to vary more across the credit cycle
  - Specifically, reserves under CECL can increase faster and more during a recession than under incurred loss since
    - CECL is forward looking
    - Under CECL, the negative outlook in a recession impacts lifetime credit losses

CECL impact on capital

CECL's impact on capital consists of 2 components: transition impact and post transition impact

- Transition
  - The higher reserves expected at transition will flow through retained earnings and reduce capital (CET1)
  - Regulators have proposed a 3-year transition period for the day one impact on CET1

- Post transition
  - The greater sensitivity of CECL reserves to economic conditions implies that the reserves will increase more under stress scenarios such as the CCAR severely adverse scenario
  - The resulting higher provisions will lead to greater capital depletion and a lower minimum capital ratio
  - Hence, under CECL, the stress capital buffer (SCB) will incrementally increase though the results may vary by institution

General principles for implementing CECL in CCAR

- CCAR models a bank's balance sheet and income statement under a stress scenario with the purpose of ensuring that the bank's capital remains above statutory requirements, i.e. it continues to be a going concern

- This implies that any accounting rule changes, including CECL, that affect the relevant parts of a bank's financial statements can impact the results of CCAR, i.e. a bank's SCB

- Key principles in application of CCAR are
  1. Consistency of CCAR rules so that the results are comparable across banks
  2. Realism of CCAR rules so that they are similar enough to those used to determine capital adequacy under real life conditions to ensure that stress testing is meaningful

- Since the CECL standard provides considerable flexibility around the choice of loss forecasting approaches, the need for consistency in CCAR would require that the methodology to implement CECL in CCAR have the following characteristics:
  - Simplicity
    - For example, assume a single scenario, consistent with the stress scenario, at each quarter followed by reversion to a long run average
  - Standardization
    - Choose a standard CECL methodology - for length of reasonable and supportable period, duration of reversion period and choice of long run averages

- The extent of simplicity and standardization in the methodology has to be balanced with the need to maintain realism, i.e. the resulting methodology cannot significantly depart from the methodology used for business as usual (BAU) financial reporting

Key Issues in developing CECL methodology for CCAR

- **Absent modifications, perfect foresight assumption results in an unusually large spike in reserves and provision in the first forecast quarter**
  - Due to the forward-looking nature of CECL, the highest change in reserves and the highest provision are likely to occur in the 1st forecast quarter and, accordingly, the **capital ratio is likely to decline by a significant amount in that quarter**
  - If the institution's minimum capital ratio occurs early on in the 9Q forecast period, the impact on capital adequacy (SCB) could be quite high

- **New volume assumptions have significantly higher impact on reserves**
  - The modeling assumptions around **credit loss content** (e.g. credit quality, maturity) **of new volume** have a much bigger impact on CCAR reserves under CECL due to CECL's consideration of lifetime losses

- **The potential for a wider range of acceptable practices to determining reserves under CECL can affect comparability of CCAR results across banks, leading to need for**
  - **Normalizing** for variation in reserves across banks
  - **Standardizing** CECL reserve methodology within CCAR

Potential solutions

- **Treatment of non-perfect foresight**
  - Given observed behavior of expectations of future economic conditions (see Appendix for example during 2006-2009), it is more realistic to allow for a gradual recognition of the intensity of the severely adverse scenario
  - Fed currently has an approach to spread large increases in first quarter provision, which can be considered for the case of CECL
  - An alternative to consider is to have the severely adverse (SA) scenario start out as a weighted average of the SA and adverse scenarios with the weighting on the SA scenario progressively increasing during the 9-quarter forecast period*
    - Another alternative is to use a weighted average of the SA and Base scenario
  - This can lead to more realistic increases in provision
- **Treatment of new volume assumptions**
  - Standardize the assumptions around new volume
    - Assume that its credit loss content (e.g. credit quality, maturity) is based on expected and historic lending behavior
    - Set assumption by product or asset class
- **Treatment of other key assumptions**
  - Standardize the CECL modeling assumptions
    - reasonable and supportable forecast period - assume between 9 to 12 quarters
    - reversion period – duration and other assumptions
    - Long run averages by product or asset class

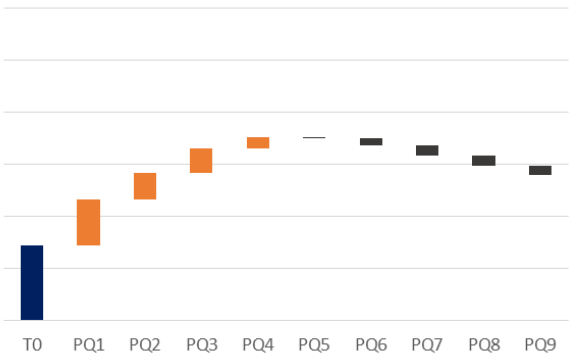
*** It may be operationally easier to weight the losses from the SA and adverse scenarios so the existing loss forecasts can be directly used**

Treatment of Non-perfect Foresight - Weighting scenarios

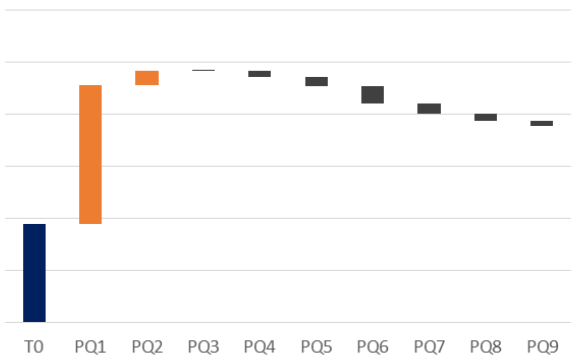
Example of assumption on weighting stress scenarios:

- PQ1: Adverse (A)
- PQ2: 20% SA + 80% A
- PQ3: 50% SA + 50% A
- PQ4: 90% SA + 10% A
- PQ5-PQ9: 100% SA

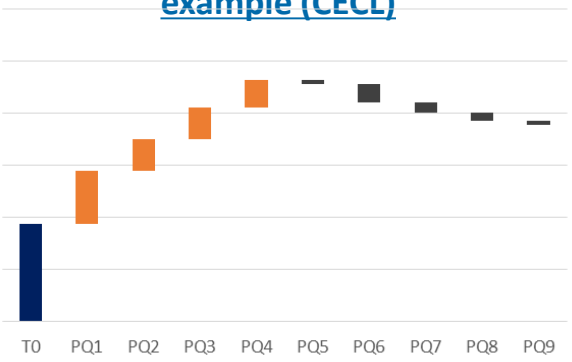
Change in reserves (non-CECL)



Change in reserves under perfect foresight (CECL)



Change in reserves under non-perfect foresight with weighting of scenarios example (CECL)



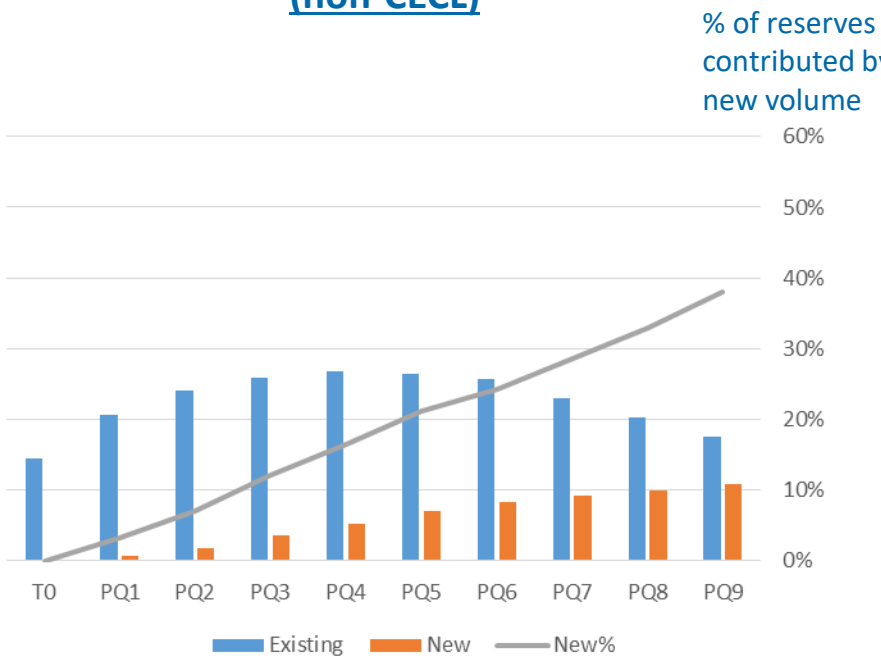
Proposed

- Assuming perfect economic foresight, the highest change in reserves occurs in the 1st forecast quarter due to the forward-looking nature of CECL – reserves peak in the first forecast quarter followed by reserve releases in subsequent quarters

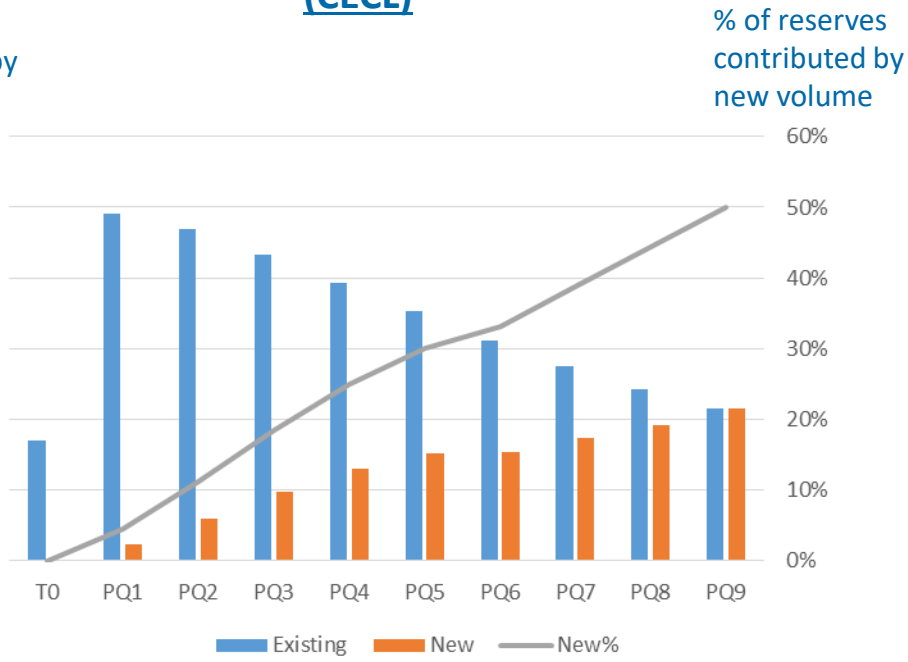
- When using a weighted average of losses from the SA and adverse scenarios over a 4-quarter window as specified in the example above, the reserve build in the first several quarters is more gradual - reserves peak only in the 4th forecast quarter and reserve release starts in the 5th forecast quarter

Treatment of New Volume Assumptions
New volume contributes more to overall reserves under CECL*

Reserves by new and existing (non-CECL)



Reserves by new and existing (CECL)



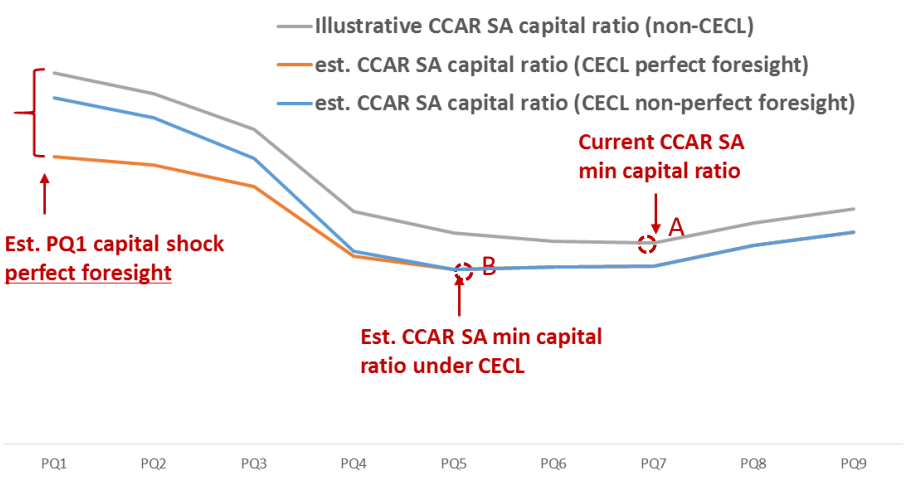
- The modeling of new volume would have a much bigger impact on CCAR reserves under CECL due to the consideration of lifetime losses. Important new volume assumptions include:
  - Credit quality
  - Maturity
- Need to standardize credit quality and maturity assumptions for the new volume

* Assume neutral balance in SA scenario

Treatment of Non-perfect Foresight - Impact on CCAR capital planning

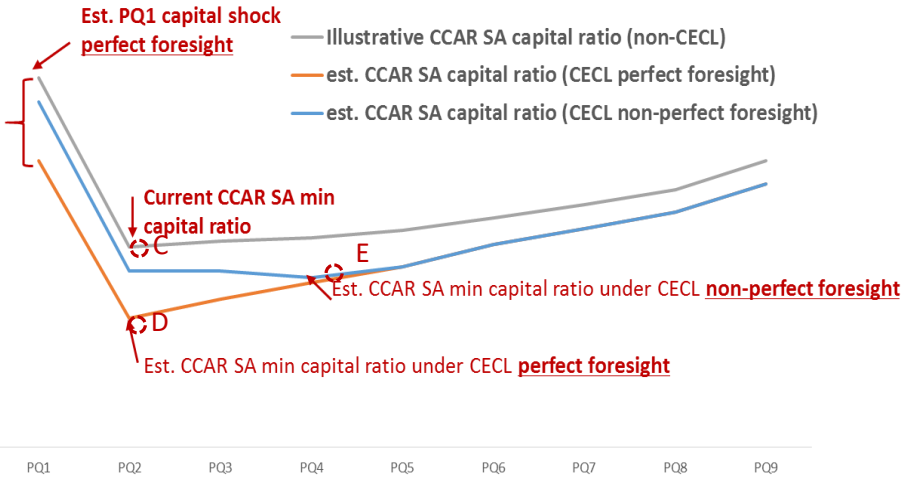
Example 1:

institution's min capital ratio occurs later on in the forecast period



Example 2:

institution's min capital ratio occurs early on in the forecast period



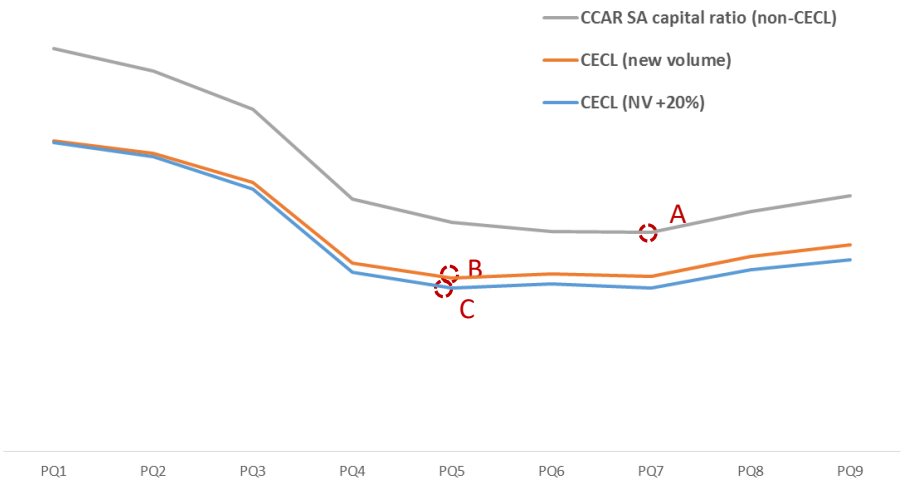
- The incremental impact of CECL on CCAR is evaluated by comparing the minimum capital ratio (CET1) over the 9 forecast quarters under CECL with the corresponding minimum capital ratio (CET1) without CECL

- If an institution's minimum capital ratio occurs **later on** in the 9Q forecast period (illustrative example 1)
  - Minimum CET1 under CECL can decline and the extent is measured by the vertical distance between points A and B
  - The use of a weighting technique in the early quarters may have only a small impact on the minimum capital ratio and, therefore, the SCB

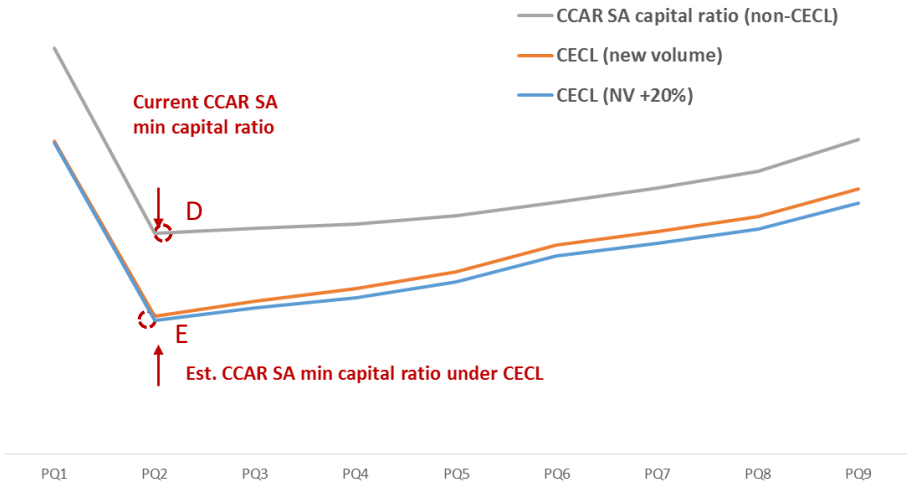
- If an institution's minimum capital ratio occurs **early on** in the 9Q forecast period (example 2)
  - Minimum CET1 under CECL can decline significantly more with perfect foresight (vertical distance between C and D), as opposed to the decline with weighting (vertical distance between C and E)

Treatment of New Volume Assumptions
New volume* sensitivity testing: impact on capital

Example 3:
institution's min capital ratio occurs later on in the forecast period



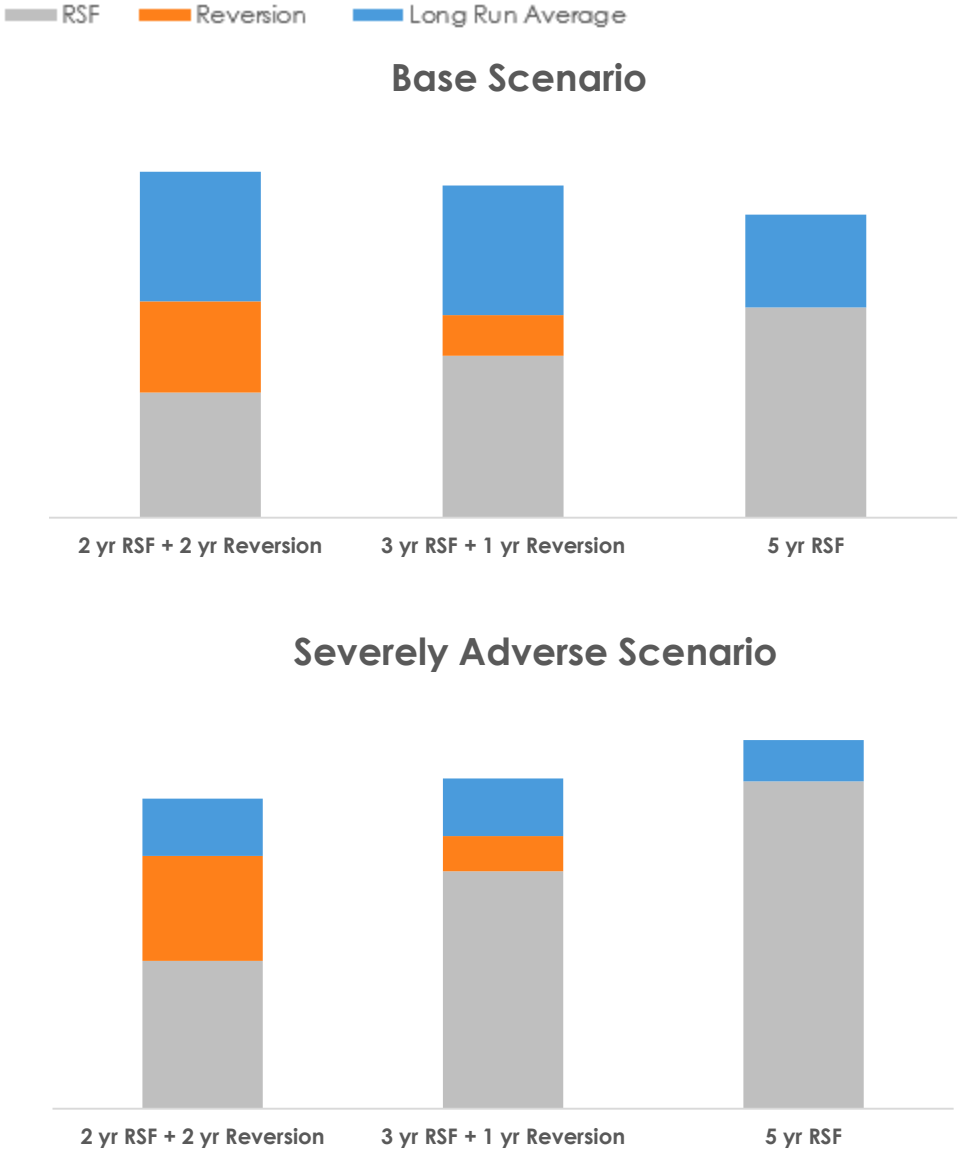
Example 4:
institution's min capital ratio occurs early on in the forecast period



- The impact of assumptions on new volume loss content is most pronounced in the later forecast quarters as by then the portfolio mix would have a significant proportion as new volume
- If the institution's minimum capital ratio occurs later on in the 9Q forecast period (example 3), the new volume impact is likely to be more significant (vertical distance between A and C as opposed to the vertical distance between A and B)

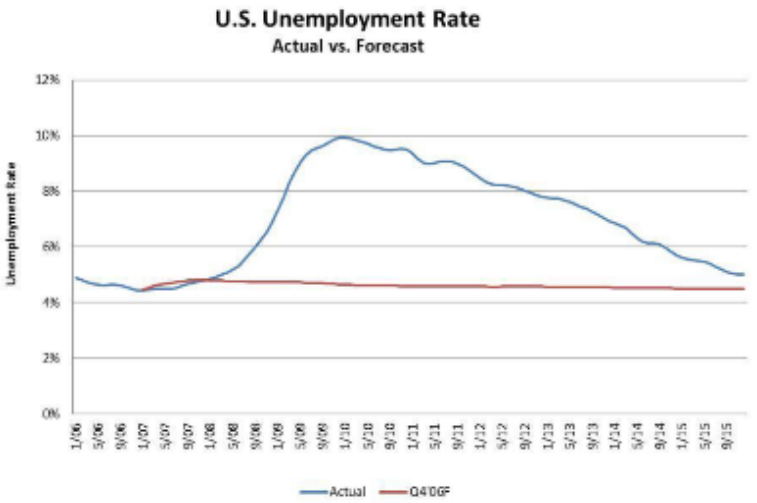
* Assume neutral balance in SA scenario

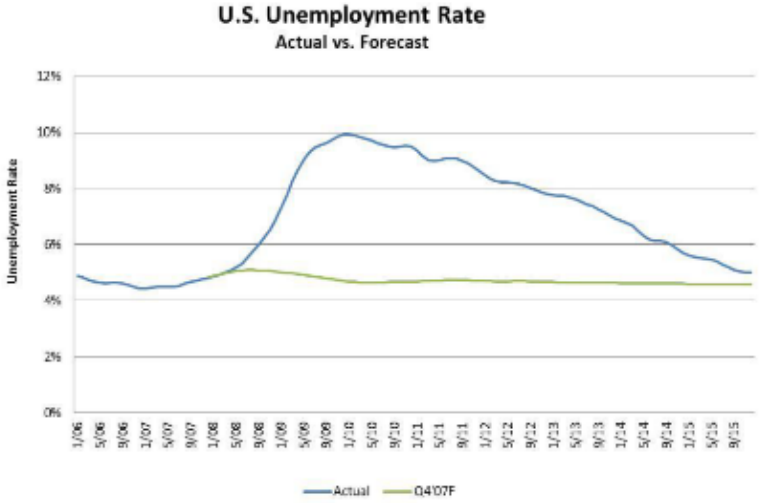
Treatment of Other Key Assumptions
CECL Reserve Estimates Sensitivity to Key Assumptions

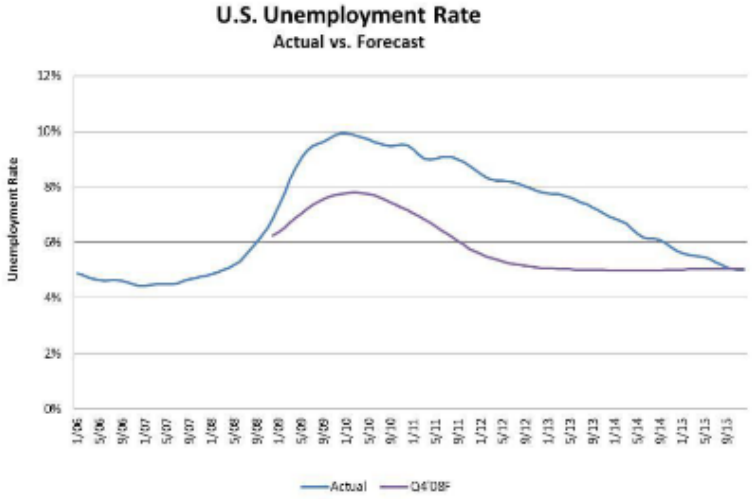


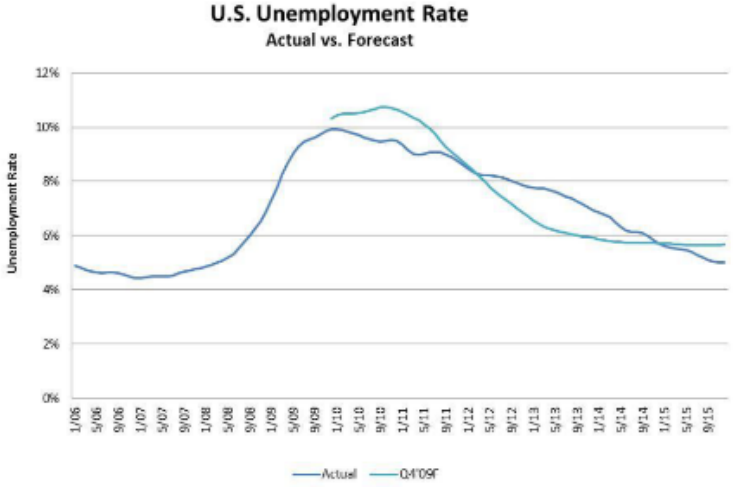
- **CECL estimates are sensitive to key assumptions**
  - Length of reasonable and supportable (R&S) forecast period
  - Length of reversion to historical long run average
  - Assumption of historical long run average
- **Reserve impact may vary by scenario**
- **Under current economic conditions**
  - In base scenario, a longer R&S period will lead to lower reserves
  - In severely adverse scenario, a longer R&S period will lead to higher reserves
- **There's a need to standardize for variation in CECL techniques** – R&S period, reversion and long run average.

Appendix: Non-perfect Foresight – Review of Historical Economic Forecasts









- In general, expectations about economic conditions reflect far from perfect foresight and, instead, evolve slowly as conditions change
  - The forecasts of unemployment prior to and during the 2008 recession were slow to reflect the rise in unemployment and, at the peak of the recession, projected a further rise in unemployment whereupon unemployment started declining

Source: Federal Reserve bank of St. Louis and Moody's Analytics