

# Be Reasonable: Creating Supportable Forecast Scenarios for CECL

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# CECL requires “reasonable and supportable” forecasts

*“The measurement of expected credit losses is based on relevant information about past events, including **historical experience**, **current conditions**, and **reasonable and supportable forecasts** that affect the collectability of the reported amount. An entity must use judgment in determining the relevant information and estimation methods that are appropriate in its circumstances.”*

*“Amendments **allow** an entity to **revert to historical loss information** that is reflective of the contractual term (considering the effect of prepayments) **for periods that are beyond the time frame for which the entity is able to develop reasonable and supportable forecasts.**”*

*Source: Page 3, Financial Instruments—Credit Losses (Topic 326), FASB, No. 2016-13, June 2016*

# What's “reasonable”? What's “supportable”?

- No definitions in the guidance.
- No technical or statistical definition of “reasonable and supportable” (R&S)

**reasonable** [rēz(ə)nəb(ə)l] *adjective*

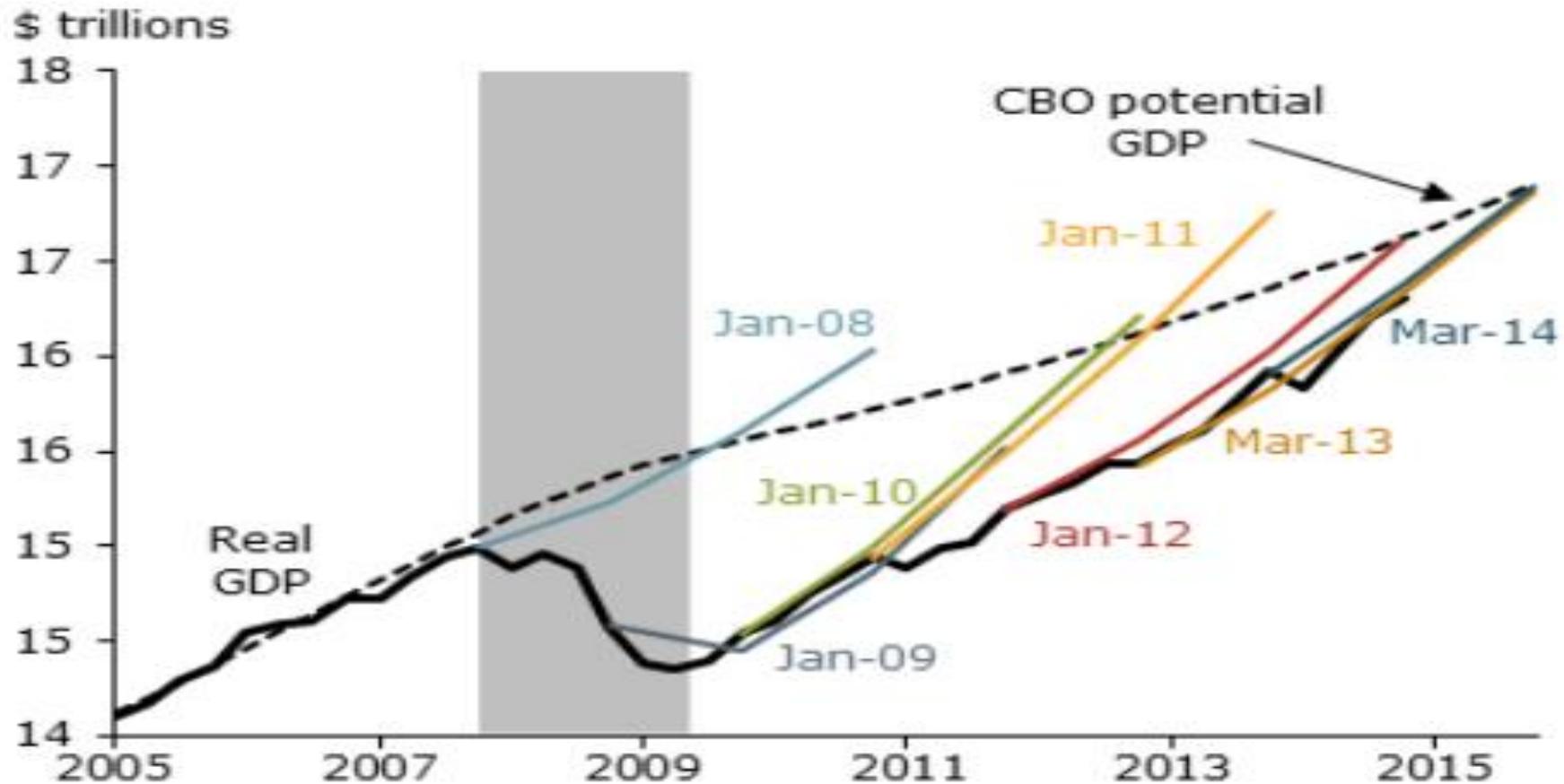
- based on good sense
- *synonyms*: sensible, rational, logical, fair, fair-minded, just

**supportable** [suh-pawr-tuh-buh l, -pohr-] *adjective*

- capable of being defended with good reasoning against verbal attack
- *synonyms*: defensible, defensible, justifiable, maintainable, tenable

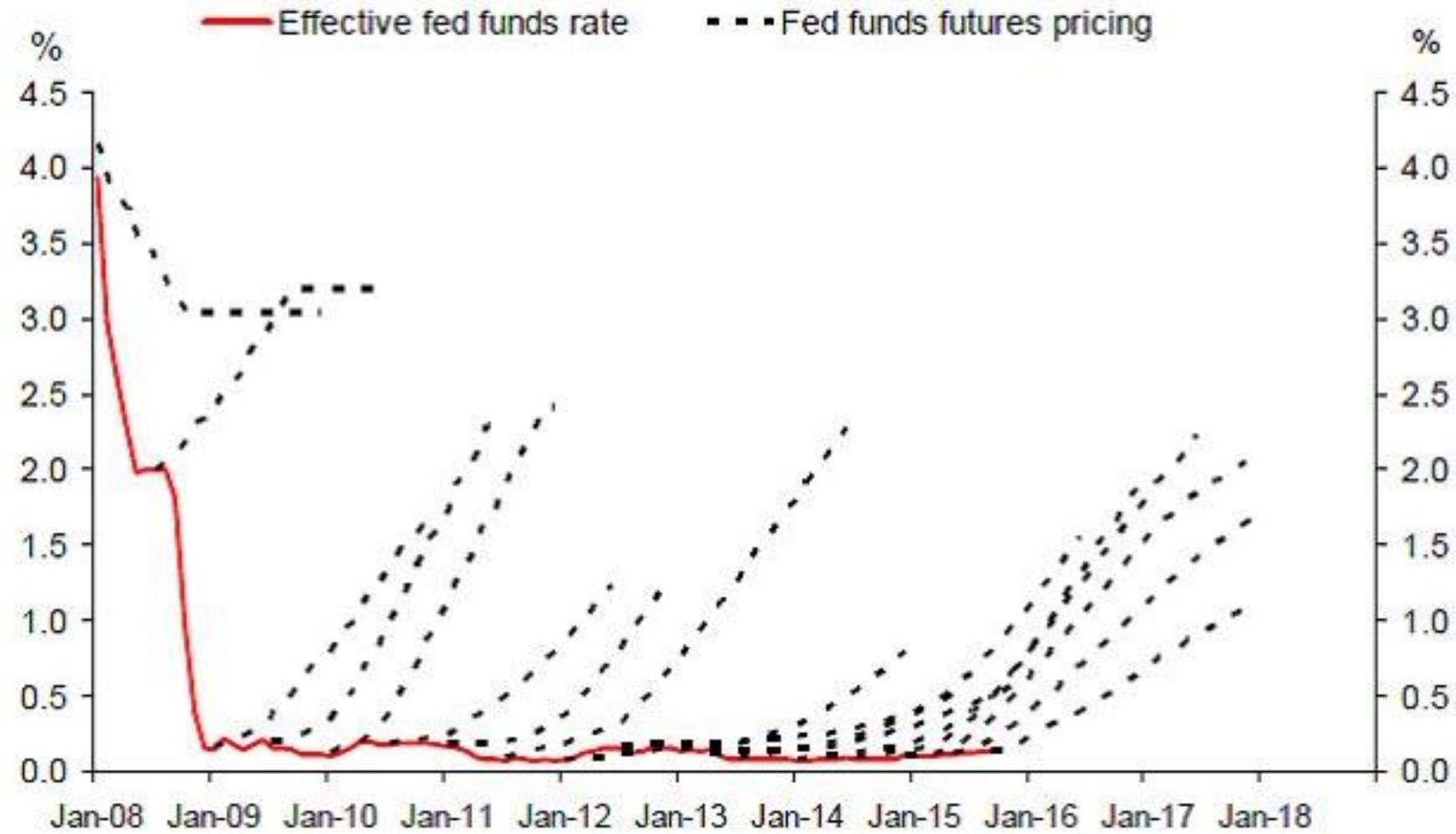
# Federal Reserve: R&S but optimistic in retrospect

Real GDP paths implied by Summary of Economic Projects midpoint forecasts



Source: Federal Reserve Open-Market Committee Minutes, BEA, CBO, Moody's Analytics

# Market Consensus: R&S but also subject to revision



Source: FRB, Bloomberg Finance LP, DB Global Markets Research

[MarketWatch](#)

# Accuracy is desirable but not required

## » Accuracy and audit risk

- FASB does not expect clairvoyance

*...using **terms such as reasonable and supportable does not imply a single conclusion** or methodology upon which an entity must base its estimate. Different parties using different methodologies do not make a particular estimate unreasonable.... **Estimates of credit losses may not precisely predict actual future events and, therefore, subsequent events may not be indicative of the reasonableness of those estimates.** (BC50)*

## » Accuracy and investor relations

- Want to avoid frequent, large revisions to loss allowance
- Need to have a clear explanation when revisions do occur

## » CECL is a different application from policy-making or trading

- Federal Reserve needs to decide policy in real-time with limited information

## » Setting a reserve is a longer-term process

- Federal Reserve or other expert-driven forecasts may not be appropriate

# *What Makes an Economic Forecast Reasonable and Supportable?*

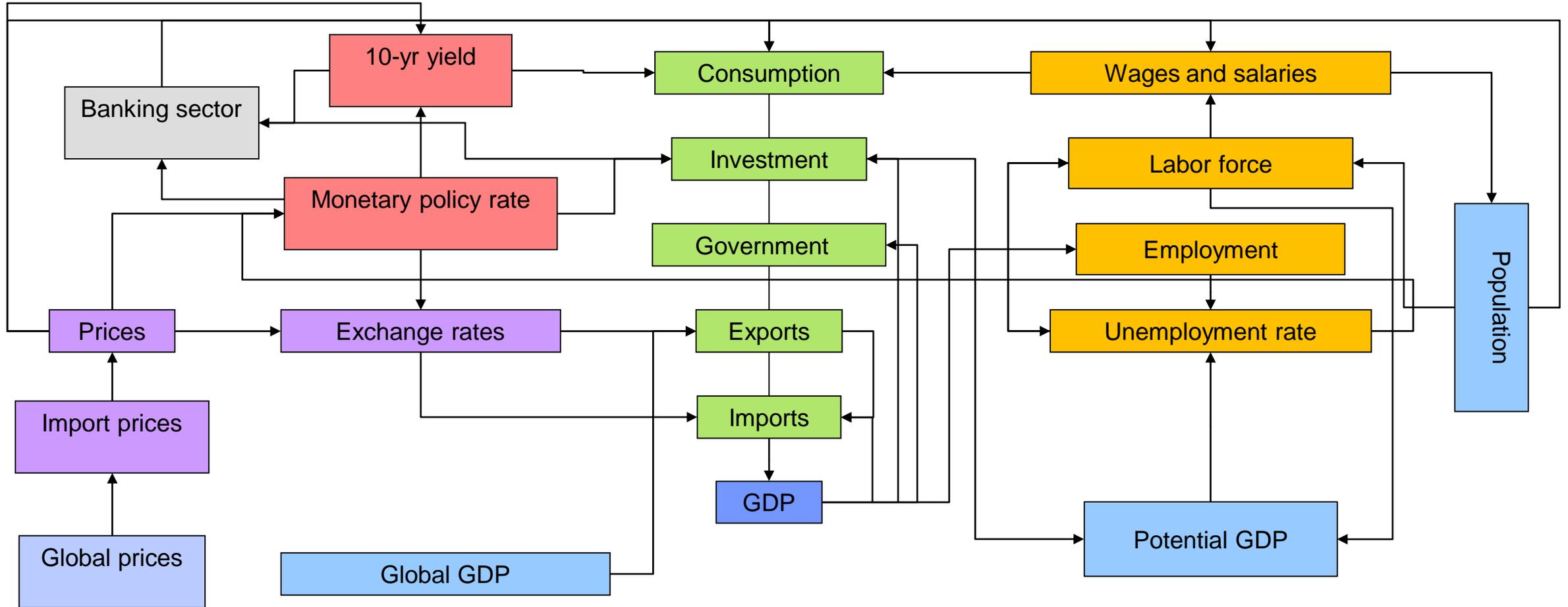
A R&S economic forecast should:

- ☑ **Be theoretically sound, transparent and reproducible**
  - Based on generally accepted economic and statistical theory
- ☑ **Be consistent**
  - Incorporate inter-relationships and feedback effects among variables such that a shock to one factor impacts all other factors over time
- ☑ **Provide broad coverage**
  - Cover a variety of economic indicators
  - Provide information at varying levels of geographic aggregation to capture local economic effects
- ☑ **Quantify uncertainty**
  - Provide alternative scenarios to quantify uncertainty of the forecasts for varying forecast horizons



# Structural Forecast Model Methodology

Approach used by Federal Reserve, IMF, Central Banks



# Example: 10-Year Treasury Forecast Equation

Information for **FRGT10Y\_US**

Scenario: U.S. Macro Baseline [C...]

Summary	
Title	Interest Rates: 10-Year Constant Maturity Securities
Code	FRGT10Y_US
Units	% p.a., NSA
Dependent Variable	FRGT10Y_US
Estimation	LS
Sample	1978Q4 to 2016Q1
Add Factor Type	Residual Shift
Historical	<a href="#">IRGT10YD.IUSA</a>

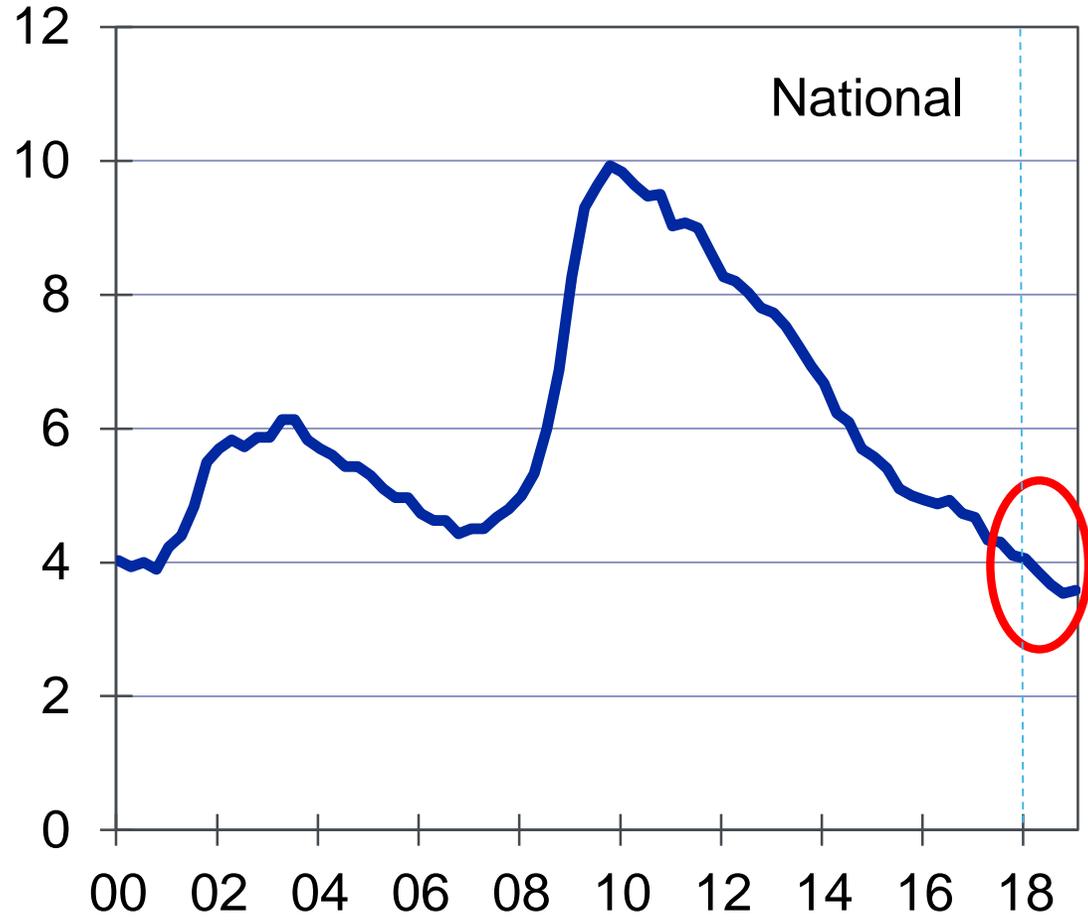
Specification		Coefficient	Std. Error	t-Statistic
FRGT10Y_US(-1)		0.8205226657	0.0300129370	27.338966
FRFED_US		0.1592807393	0.0250811886	6.350605684
FSPVOL_US		-0.0960001261	0.0756213260	-1.269484829
100*(FGTSOPTQ_US(-1)/FGDP_US(-1))		0.0106221149	0.0032119966	3.30701306
@MOVAV(100*(FXMRXQ_US(-1)/FGDP_US(-1)),4)		-0.0242458038	0.0157929954	-1.535225153

Summary Statistics

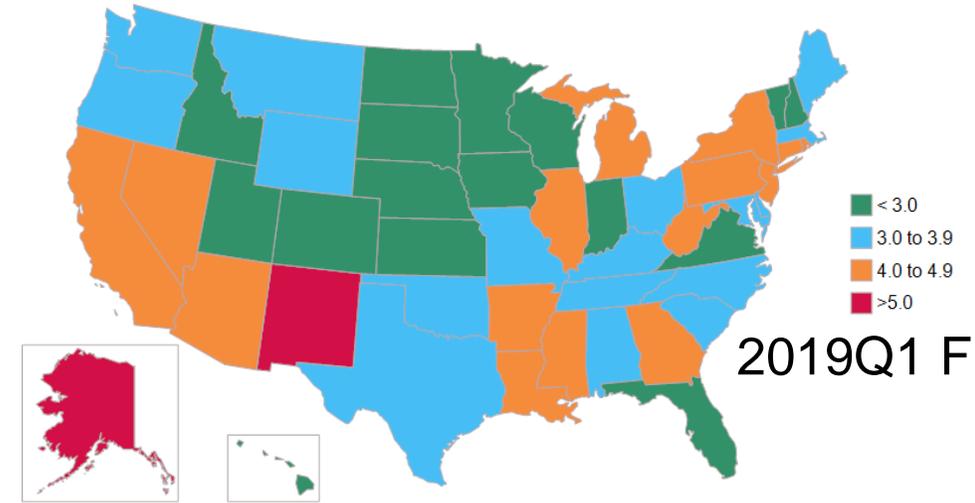
R-squared: 0.9786676012

# Integrated National, State and Metro-level Forecasts

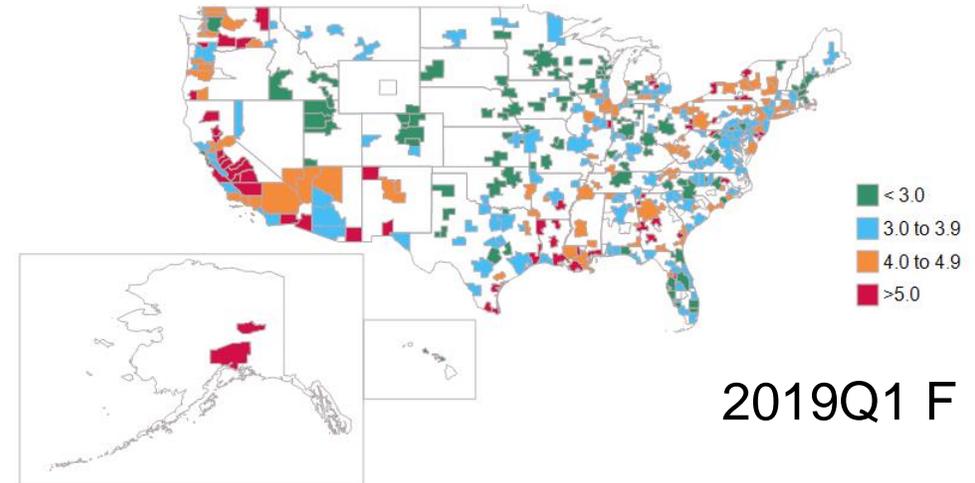
Unemployment rate, %



State

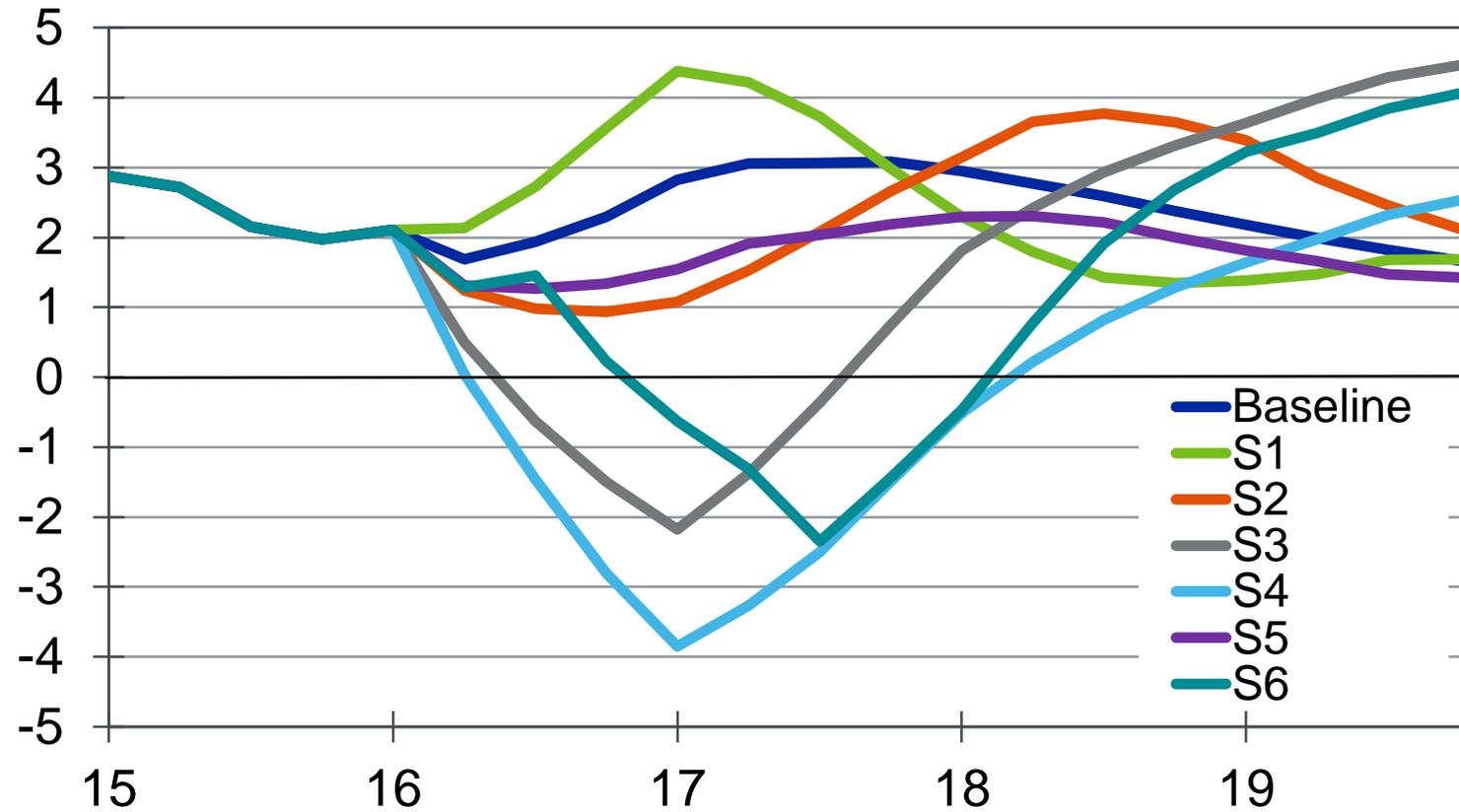


Metro



# Scenarios Covering A Range of Outcomes

Monthly updates with narratives and probability weights  
 Real GDP, % change yr ago



Source: Moody's Analytics



## Scenario Inventory

### BAU/CECL-Driven

- BL Baseline Forecast (50<sup>th</sup> pctile)
- CB Consensus Baseline
- S0 Strong Upside (4<sup>th</sup> pctile)**
- S1 Stronger Near-Term Rebound (10<sup>th</sup> pctile)
- S2 Slower Near-Term Recovery (75<sup>th</sup> pctile)
- S3 Moderate Recession (90<sup>th</sup> pctile)
- S4 Protracted Slump (96<sup>th</sup> pctile)
- S5 Below-Trend Long-Term Growth
- S6 Stagflation
- S7 Next-Cycle Recession
- S8 Low Oil Price
- CS Constant Severity
- CB Consensus Baseline

### Compliance-Driven

- FB Fed Baseline
- FA Fed Adverse
- FS Severely Adverse Scenario

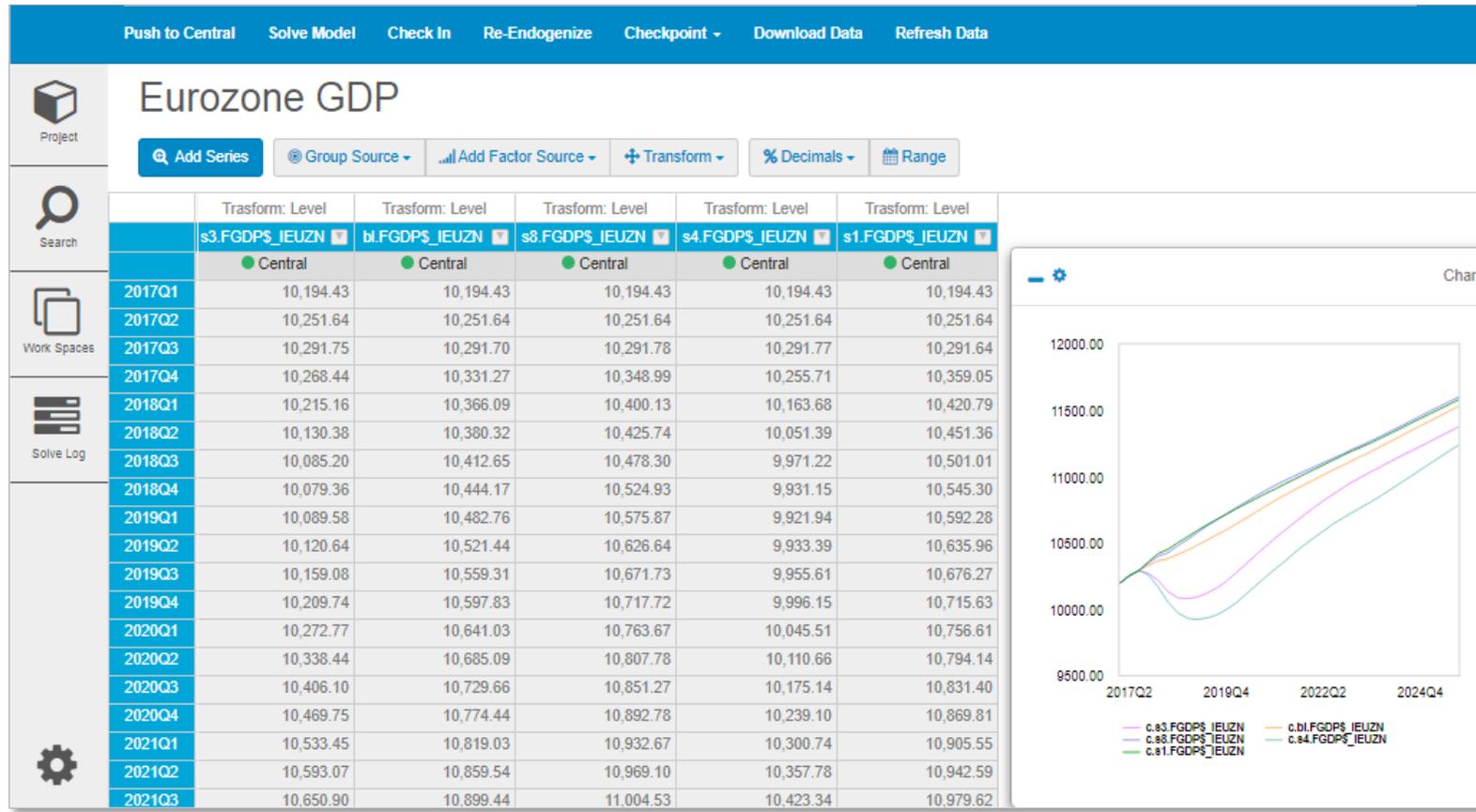
BC Bank-Specific Scenario

# *Should We Use Customized or Standard, Off-the-Shelf Scenarios?*

- **No specific recommendations** in the guidance.
- Our IFRS 9 experience revealed a **mix of approaches**
  - Small to mid-size banks opted to use **multiple, standard scenarios**
  - Larger institutions used **custom and standard scenarios** to test sensitivity
- **Transparency and applicability of scenarios is critical**
  - Need to understand the scenarios and defend choices to auditors and regulators

# How Can We Confidently Create Our Own Scenarios?

## Moody's Analytics Scenario Studio



- » Web-based application to develop scenarios
- » Uses Moody's Analytics macro models
- » Collaborate with colleagues or Moody's Analytics economists on the same forecast
  - Simultaneous read/write access
- » Forecast governance built into the application
  - Audit trail of edits to assumptions
  - Test edits in a sandbox environment before committing them to the "official" forecast
  - Transparency of equations and assumptions

# How Many Scenarios Do We Need for CECL?

- » **No specific guidance**
- » Could use IFRS9 experience as a guide
  - **IFRS9 requires multiple, probability-weighted scenarios**
- » Measuring losses under **multiple scenarios is a best practice**
  - “Average” economic forecast won’t generate the “average” level of losses
  - Multiple scenarios approximate the loss distribution

Consider an experiment...

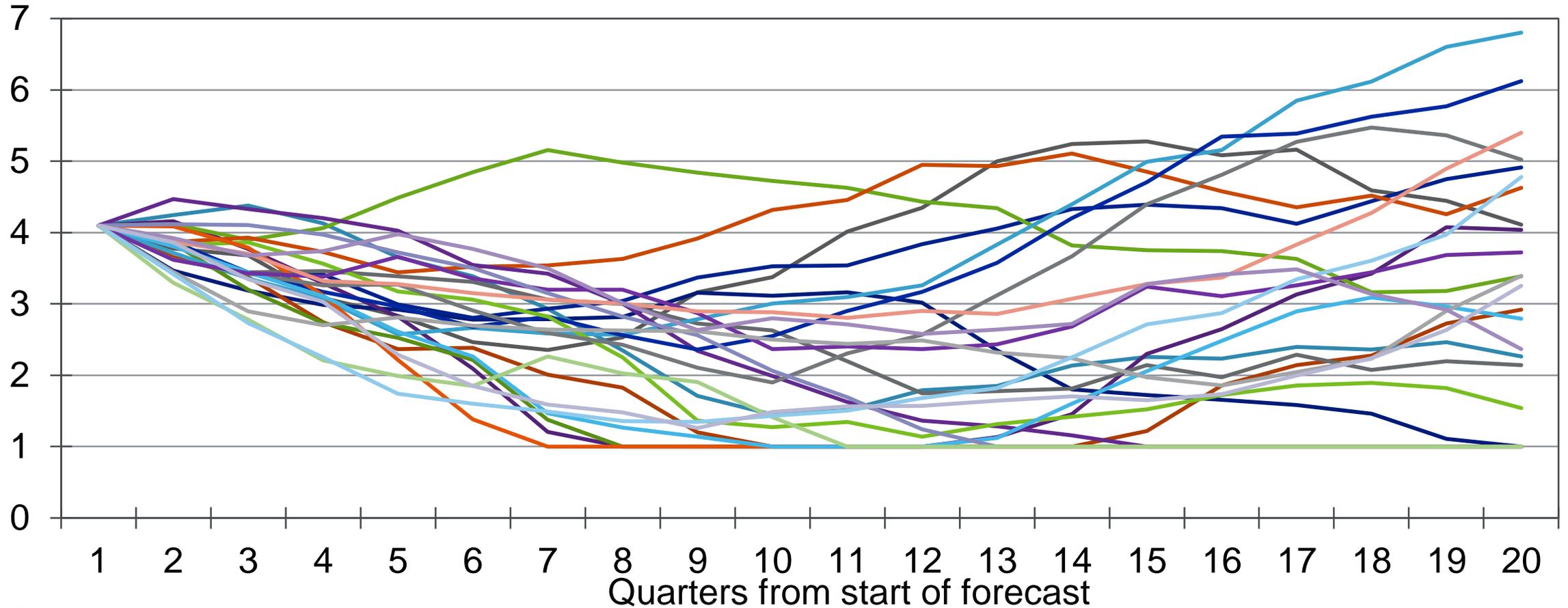


# Given no constraints, how would we forecast credit losses?

- Suppose we run a hot new FinTech that is offering consumers 5 year personal loans
- We want to estimate credit losses in order to set interest rates on our loans
  - Need to charge enough to cover:  $\text{Expected Loss} + \rho \text{Stress Loss} + \text{Servicing/Admin Cost}$
- Suppose there are no recoveries in the event of a default
- Assume default is a function of the unemployment rate (+) and GDP growth (-)
- Generate a distribution of potential losses
  1. Simulate 1000 paths of unemployment and GDP
  2. Compute Probability of Default under each path to generate a distribution
  3. Compare distribution results to losses under specific economic scenarios

# Unemployment Rate Simulations (25 out of 1000)

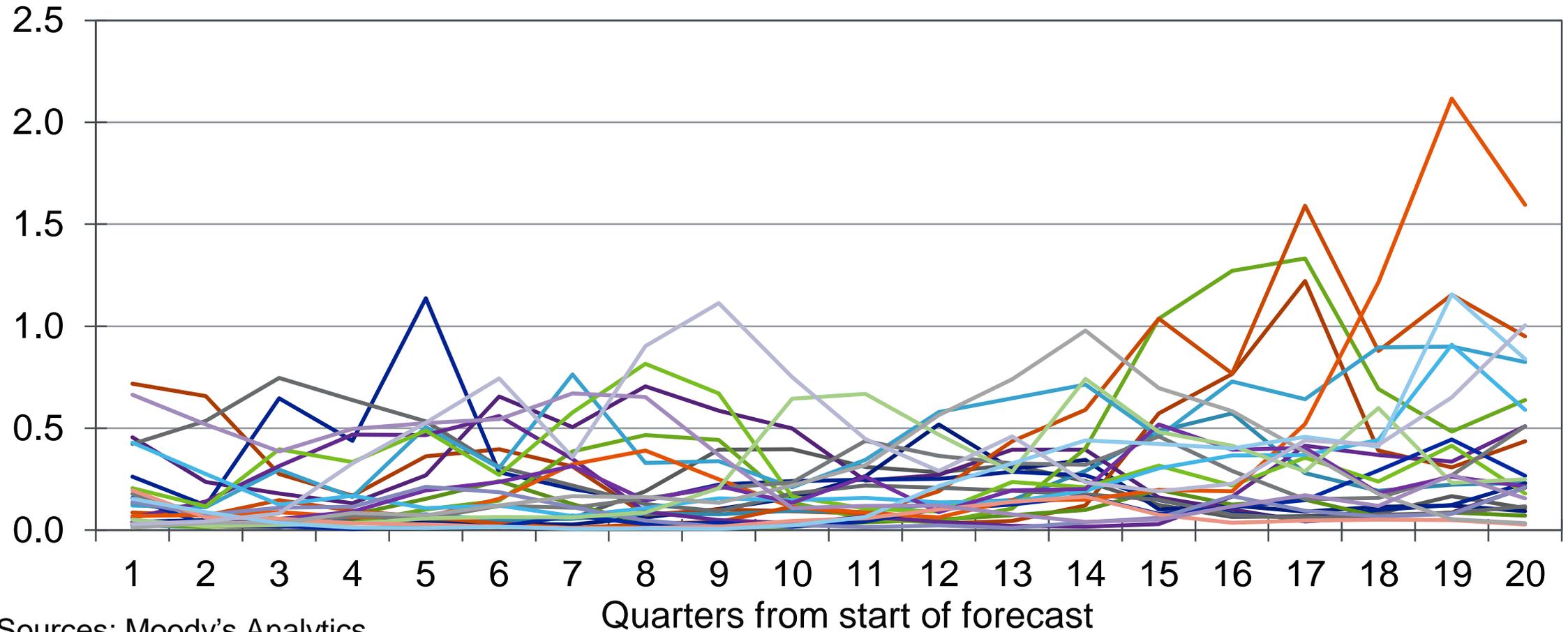
Unemployment rate, %



Sources: BLS, Moody's Analytics

# Estimated Prob of Default Simulations (25 out of 1000)

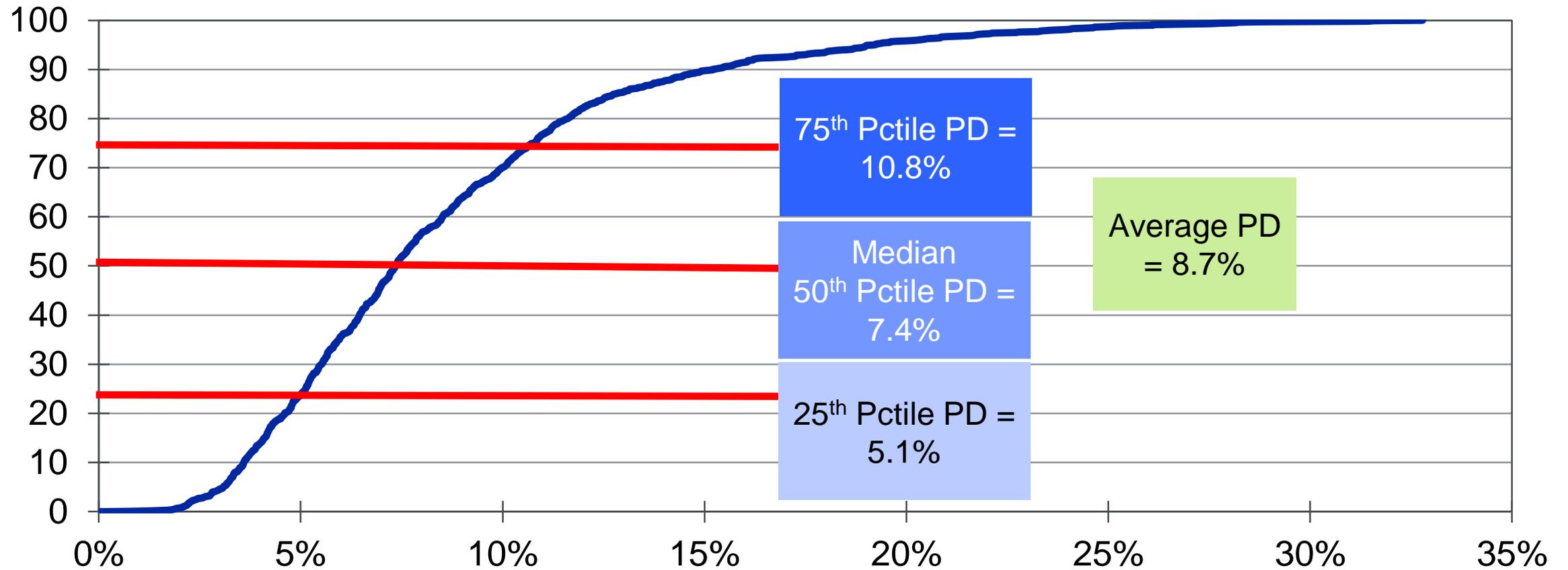
Quarterly conditional probability of default, %



Sources: Moody's Analytics

# Estimated Cumulative Probability of Default Across Paths

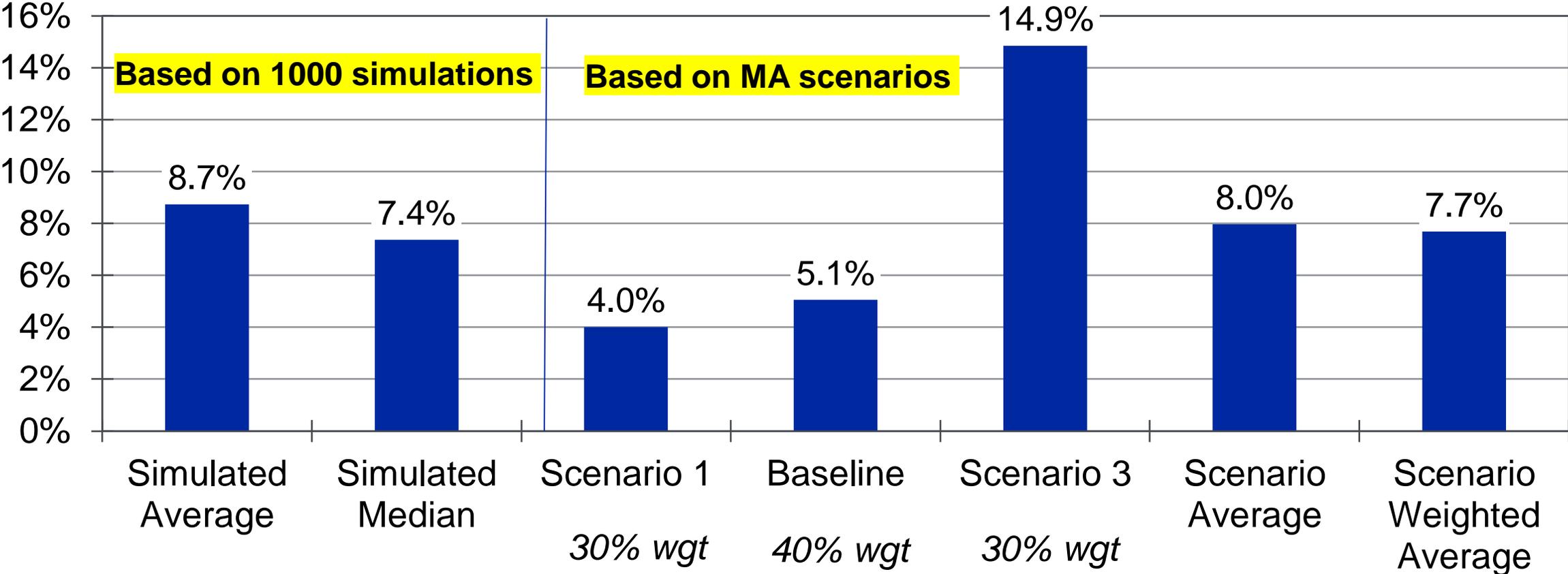
Probability of Default (x-axis) vs. cumulative percent of population (y-axis)



Source: Moody's Analytics

# Comparing Cumulative Probability of Default

Probability of Default under different scenarios/simulations



Source: Moody's Analytics

# Why Might You Want to Run More Than One Scenario?

- **Credit losses are nonlinear:**
  - Scenario 1 (4.0% Loss) < Baseline (5.1% Loss) << S3 (14.9% Loss)
- According to **Jensen's Inequality** and our experiment:
  - PD in an average economy < Average PD across all economies
- Loss estimates under **single scenarios can be more volatile** than probability weighted estimates
- If you do run just one scenario, Baseline or Consensus **may understate losses**. Either:
  - Make an on-the-top qualitative adjustment
  - Select a more downside scenario such as Scenario 2 to approximate the nonlinearity

# *What's the Appropriate Forecast Horizon for CECL?*

Depends on BOTH the credit loss models and the economic scenario inputs

## **Credit Loss Estimates**

- » Is the length of observed historical performance sufficient to project losses?
- » Is observed history of performance relevant for the future time horizon?
- » Is the methodology used reasonable and supportable over the time horizon?

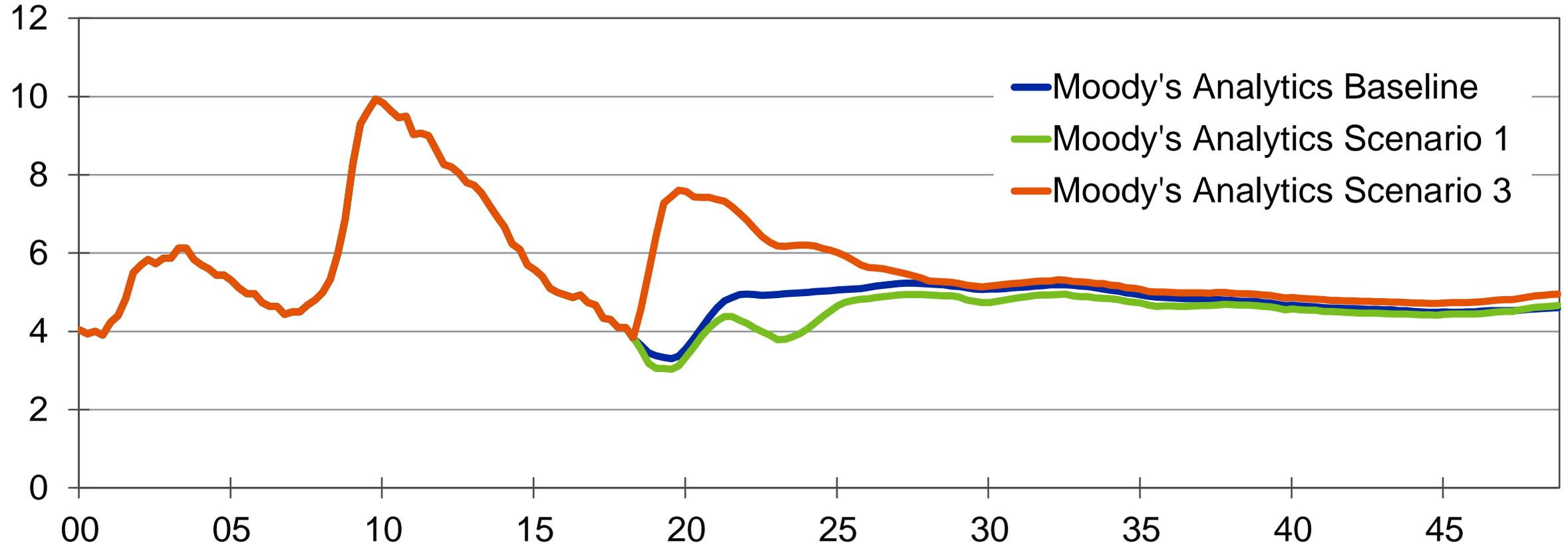
## **Economic Forecasts/Scenarios**

- » Are forecasts for forward-looking drivers econometrically determined?
- » Are data with limited history being extrapolated?
- » Are economic cycles being forecasted in a reasonable fashion?

Moody's Analytics scenarios revert to historical trends in the long-run.

# Unemployment Rate Scenario Reversion

Unemployment rate, %



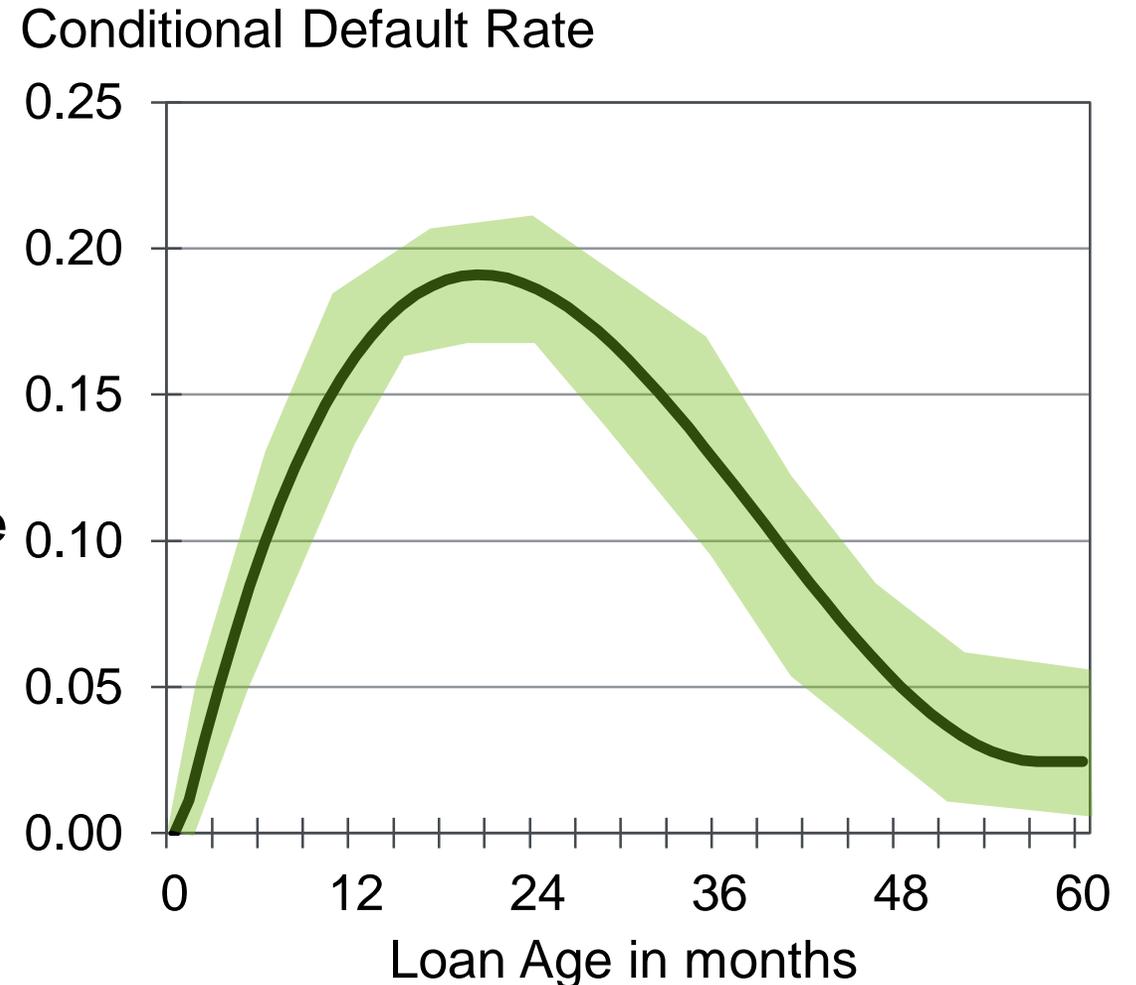
Sources: BLS, Moody's Analytics

# *How should we handle mean reversion after the forecast horizon to estimate life time losses?*

- » Guidance directs institutions to “**revert to historical loss information**” after reasonable and supportable forecast period.
- » What is this directive addressing?
  - Forecast uncertainty. This can be addressed in several ways including multiple scenarios.
- » **Options**
  - **Option 1:** No need to revert **externally** if the loss forecasting model extrapolates to long term trends
  - **Option 2:** Revert to historical loss rates **immediately** after the determined forecast horizon
  - **Option 3:** Revert to historical loss rates **gradually** after the determined forecast horizon
- » How should “historical loss information” be defined? Over which time period? Controlling for credit quality? Product? Age? Etc.
  - May be easier and more efficient to incorporate controls in the ECL model than through an external reversion process.

# A Reasonable and Supportable Forecast Horizon

- **Lenders have needed to project lifetime losses** before CECL
- **Many econometric techniques**
  - Account-level survival analysis such as discrete-time hazards with competing risks
  - Vintage-level i.e. “loss curves”
- Well-specified models **project the full lifecycle**
  - May **extrapolate where data are thin** in an unbiased fashion
  - **Confidence intervals widen but forecasts remain “reasonable and supportable”**



# Topic 326's Comments on Reversion

***...for periods beyond which the entity is able to make or obtain reasonable and supportable forecasts of expected credit losses, an entity shall revert to historical loss information ...An entity shall not adjust historical loss information for existing economic conditions or expectations of future economic conditions for periods that are beyond the reasonable and supportable period. An entity may revert to historical loss information at the input level or based on the entire estimate. An entity may revert to historical loss information immediately, on a straight-line basis, or using another rational and systematic basis (326-20-30-9 )***

***...some entities will use this reversion technique, while others may have the systems and processes in place to forecast over the estimated life of the financial asset on a reasonable and supportable basis. (BC53)***

# For More Information...

[www.moodysanalytics.com/cecl](http://www.moodysanalytics.com/cecl)



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## CECL's Forward-Looking Requirement: The Impact Could Be Substantial

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**MOODY'S**  
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## WHITEPAPER

### How Much Will CECL Impact Reserves for First Mortgage Portfolios?

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Ever since the Financial Accounting Standards Board announced that accounting standards for loss reserves will move from an incurred-loss method to a forward-looking approach there has been much speculation on how lending institutions will be impacted. To the best of our knowledge, there has been no study that quantifies this impact in a rigorous manner for the industry as a whole, although a few individual lending institutions have conducted their own analysis.

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## WHITEPAPER

### Economic Scenarios: What's Reasonable and Supportable?

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Contact Us

Introduction

The world is awash in forecasts. Politicians, pundits, analysts and even economists are constantly filling the airwaves with their views on economic issues and how the future is bound to unfold. Forecasts often come with an agenda or other motivation in order to nudge policymakers in a particular direction. But even more neutral analysts can differ in their

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