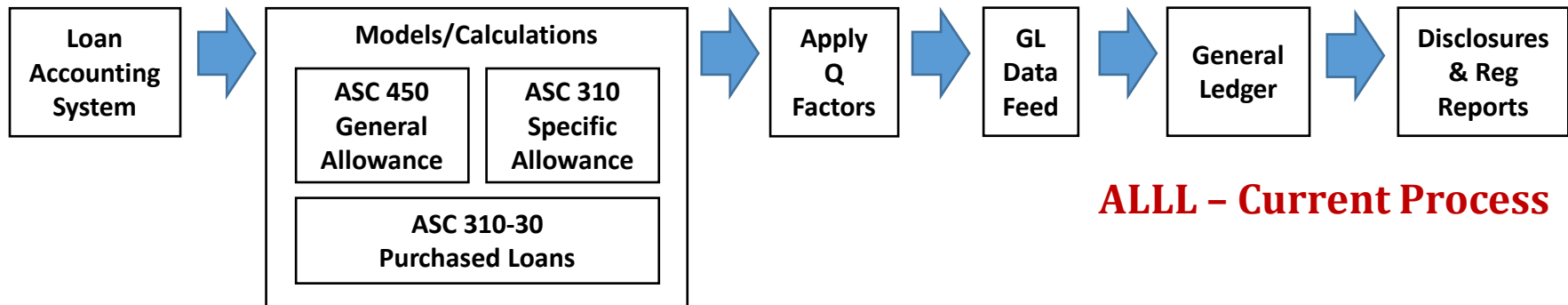


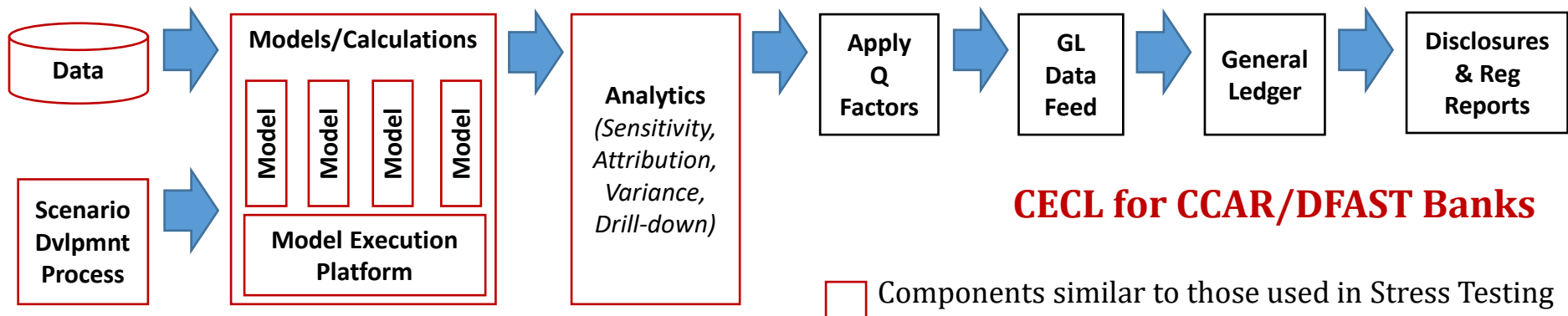
CECL is widely considered to be the most significant accounting change in the last 40 years and is expected to have a wide-ranging impact on banking. CECL is fundamentally different from current ALLL.

- The current ALLL process and methodology has been in place for about 40 years and is based on an “incurred loss” concept - i.e., Impairment is heavily based on historic annualized charge-off rates.
- CECL is fundamentally different in the following ways:
 - **Key Concept 1** - CECL is based on an “expected loss” concept. An event does not have to have occurred, but can be expected in the future.
 - **Key Concept 2** - The historical data that CECL relies upon is not annual loss rates, but rather life of loan or life of portfolio loss rates.
 - **Key Concept 3** - CECL does away with the multiple accounting approaches prevalent in current ALLL – ASC 450 (FAS 5), ASC 310 (FAS 114), ASC 310-30 (SOP 03-3)

As a result of these key differences, the CECL operational process is fundamentally different from current ALLL. It may be possible to leverage many of the methodologies, processes and systems developed for Stress Testing.



ALLL - Current Process



CECL for CCAR/DFAST Banks

Components similar to those used in Stress Testing

Each of these methodologies, processes and systems will need to be evaluated to determine the modifications necessary to meet CECL requirements. In performing this evaluation, its important to consider the following.

CECL Timeline v. CCAR Timeline

- Stress Testing is a bi-annual process performed over a 3 month period.
 - CCAR Banks are required to use data as of the end of December
 - The Federal Reserve publishes details on the Regulatory Scenarios in the first week of February
 - The Capital Plan needs to be submitted in the first week of April.
- Stress Testing is a broader exercise and includes several processes such as PPNR, NII and Capital Planning that are not relevant for CECL.
- In addition, the time available for specific processes can vary by institution. Even so, it is not unusual for the Scenario Development process, Data Extraction and Model Execution to be performed over a few weeks.
- In contrast, the entire CECL is a quarterly process that needs to be completed in a few days.
- While Banks can adopt strategies such as an early close – calculate ALLL a few weeks ahead of quarter end and then perform a “true-up” at quarter end – in order to give themselves more time, the fact remains that CECL has to completed in a much more compressed time-frame.

Each of these methodologies, processes and systems will need to be evaluated to determine the modifications necessary to meet CECL requirements. In performing this evaluation, its important to consider the following (Cont'd)

The critical importance of Governance and Controls

Internal Control Over Financial Reporting (ICFR)

- Since ALLL is a key Financial Statement entry, it falls under the purview of ICFR – a process designed to provide reasonable assurance that the Financial Statements are prepared in accordance with GAAP.

Key Concepts / Definitions

- Design Effectiveness: The right person, using the right information to make the right decision in a timely manner, to mitigate identified key risks.
- Operational Effectiveness: The consistent application, without exception, of an effectively designed control.

Key Components of ICFR

- Entity Level Controls
- Transaction Level Controls
- IT General Controls

Logical Access Controls	Program Change Controls	Bus. Process Controls
<ul style="list-style-type: none">• User Access and Privileges• Segregation of Duties• Restricted Access to Over-ride Controls• Tracing and tracking of decisions	<ul style="list-style-type: none">• Configuration and Change Management	<ul style="list-style-type: none">• Data matching and business rules• Control totals and error checks

IT General Controls

Each of these methodologies, processes and systems will need to be evaluated to determine the modifications necessary to meet CECL requirements. In performing this evaluation, its important to consider the following (Cont'd).

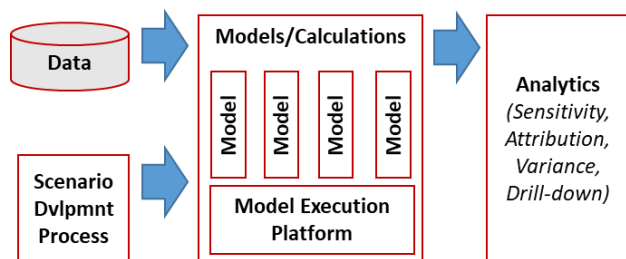
The critical importance of Governance and Controls (Cont'd)

Recent relevant pronouncements from Audit Bodies and Regulators on Governance & Control that are relevant for CECL

Body	Pronouncement	Why its significant
Public Company Accounting Oversight Body (PCAOB)	<i>Proposed Auditing Standard – Auditing Accounting Estimates including Fair Value Measurements</i>	<p>This is only a proposal at this point and no adoption date has been published.</p> <p>The Proposal stresses the need for professional skepticism during audits and the need to challenge any potential bias in management’s judgments and assumptions.</p> <p>This could result in the need for significant additional documentation to support any of the assumptions (such as forecast period, reversion method, etc.) made during CECL.</p>
Global Public Policy Committee (GPPC)	<i>The Implementation of IFRS 9 Impairment Requirements by Banks</i>	<p>While this guidance is for IFRS 9, the section on Governance and Controls will be directly relevant for CECL. A similar publication for CECL is expected.</p> <p>The Guidance emphasizes the importance of the following: Data Quality & Availability, Methodologies and Modeling, Systems, Processes and Internal Controls.</p>

Leveraging Stress Testing Processes and Systems

Data Infrastructure: Banks should be able to leverage their current Stress Testing data infrastructure. Data Infrastructure will need to be extended to incorporate additional data elements. Automation and Controls are critical.

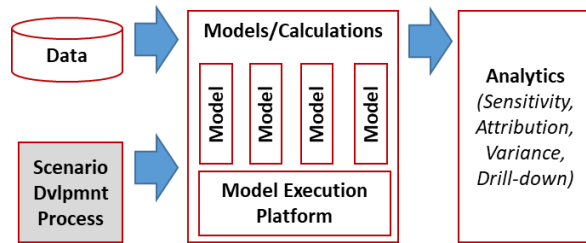


- New data elements required by CECL will need to be sourced and data extracts created. Some of this data (e.g., Commercial loan origination data) may reside in physical files and will need to be input into a database.
- Since CECL impacts the financial statement, the existing CCAR data infrastructure will need to be evaluated for compliance with SOX controls, specifically IT General Controls.
- Automation will be key due to the following reasons:
 - The data extract will need to be run often – at least on a quarterly basis.
 - Given the compressed timeline, the data extract will need to be available the day following the close.

Data Type	Data Fields
Origination Information	<ul style="list-style-type: none"> • Date (vintage) • Maturity/term of installment loans • Credit score • Loan to Value (LTV) ratio • Fixed or variable rate • Geography
Other Loan Information	<ul style="list-style-type: none"> • TDR loans and dates • Renewal • Modification • Current Credit Score • Current LTV • Conditional v. Non-Conditional • Term extensible by Institution or Client
Loss Given Default (LGD) Information	<ul style="list-style-type: none"> • Current Collateral Values • Workout/Recovery
For revolving loans or lines of credit	<ul style="list-style-type: none"> • Credit limits • Draws • Utilization rates • EAD
Ongoing changes to credit risk status	<ul style="list-style-type: none"> • Delinquencies • Defaults • Prepayments • Payoffs • Credit ratings/grades

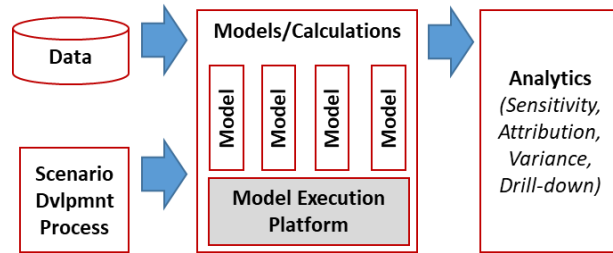
New Data Fields for CCAR - Sample

Scenario Development: Banks should be able to leverage the CCAR scenario development process. Need to assess for controls adherence. Given the compressed timeline, parts of the process will need to be streamlined.



- Banks can choose to leverage the CCAR BHC Baseline scenario as well as the scenario development process.
- The scenario will need to be re-assessed and “walked forward” on a quarterly (or monthly) basis.
- The scenario development process will need to be executed on at least a quarterly basis.
- Because of the time constraints, some aspects of the process, such as variables expansion and localization, will need to be re-assessed, streamlined and model driven.
- Documenting the scenario design process will be crucial, including details on the options considered as well as the rationale for the scenario/s that were selected.
- All assumptions will need to be comprehensively documented and supported.
- The process will need to be brought under the purview of ICFR, specifically Transaction Level Controls and IT General Controls.

Model Execution Platform: Given the compressed timeline, it will be critical to have an execution platform where models can be run in a controlled and timely manner. Automation is key.



Model Execution Platform: It is critical that the platform support the following capabilities:

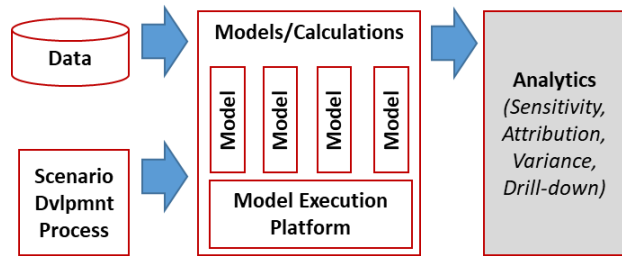
- The capability to bring together loan level data, models and forecast parameters. (macro-economic scenarios) to define and execute runs in a controlled and repeatable manner.
- The capability to execute as many runs as required, using any combination of inputs (i.e, run this quarter's data set against last quarter's model, etc.). All results, inputs and code should be automatically packaged in a controlled manner and be available for analysis and comparisons across runs.

- The capability to define and execute qualitative adjustments in a controlled and repeatable manner.
- Quick and easy integration of existing models.
- This should ideally be a Production system, rather than an Business EUC and should adhere to IT General Controls.

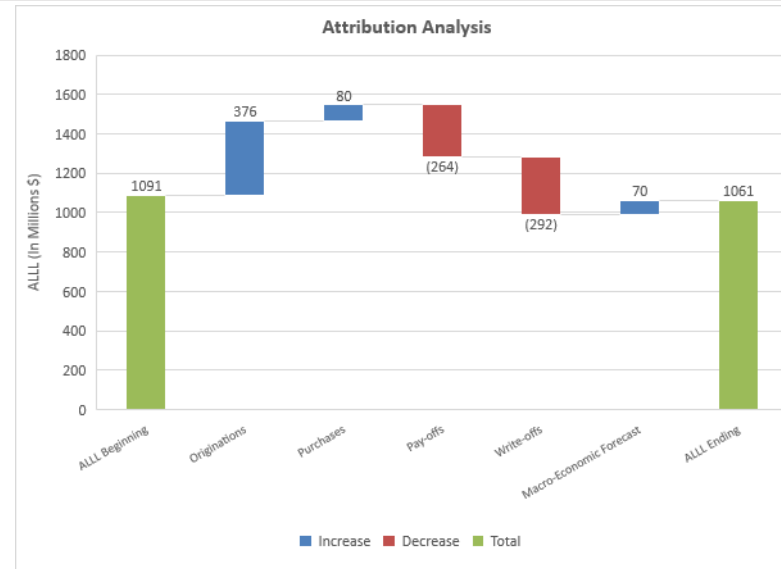
Model Production Readiness:

- In some instances, this may involve porting the models from an Econometric platform like SAS, R or MATLAB to code such as Python or Java.
- At the very least, there should be a step where the code is reviewed for production-readiness – remove code fragmentation, remove hard-coding, NII references and optimize for performance.

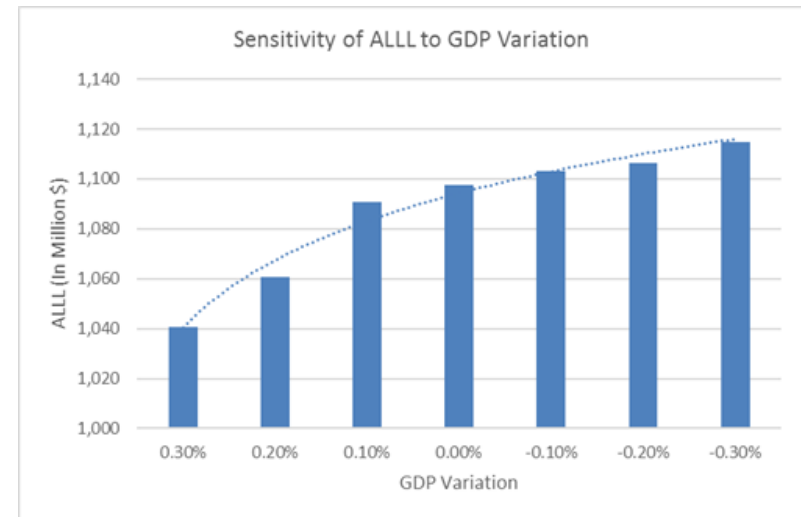
Analytics: Unlike current ALLL, provision results under CECL will not be intuitive to understand. Robust Attribution and Drill-down capabilities will be key in order to explain CECL results.



- Unlike current ALLL, the provision results under CECL will not be intuitive to understand. The provision will be impacted by several factors including the following – Forecast, Model Version, Loan Level transactions - Originations, Purchases, Payoffs, Write-offs.
- This will require a robust attribution analysis capability, including the ability to drill down into new originations, loan level activity, the capability to isolate the impact of forecasts and model changes.



Example - Attribution Analysis



Example - Sensitivity Analysis