Moody's Analytics

Better Faster Decisions

Debt Securities and Other Assets Considerations Under CECL

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Speakers

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Today's Discussion Points

- Changes to debt securities accounting as a result of ASC 326
- PCD accounting
- Transition Guidance, Disclosures and Reporting
- Modeling considerations – securities and other insurance assets in scope
- Q&A

CECL Focus

Different Exposure Profiles

Banks
- Retail loans
- C&I – CRE loans
- Securities
  - Munis
  - Bonds

Insurance
- Investments securities
  - Bonds
  - Structured
  - munis
- C&I loans
- CRE

Corporates
- Small business loans
- C&I loans
- Short dated exposures

Example Segmentation

Corporate Bonds
- Common Bonds
- Subordinated Bonds
- Common Covered Bonds
- Other Corporate Bonds
- Convertible Bonds
- Private Placement Loans

Private Loans
- Agriculture
- Private placements
- Airlines
- Utilities

CRE
- Apartment
- Retail
- Office Building
- Warehouse
- Industrial

Mortgage & Other Loans
- Residential
- Other Mortgages & Loans
- Private Loans

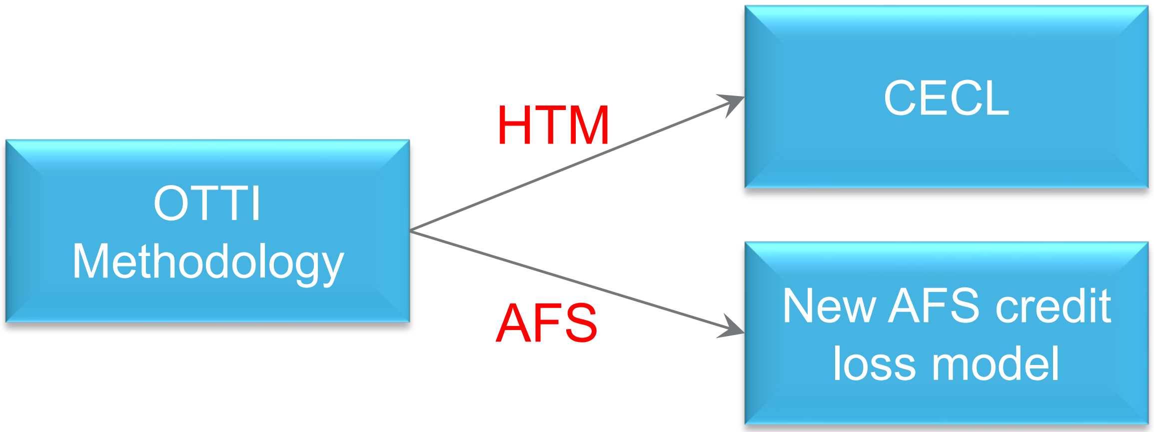
Government Bonds
- Central Government Bonds
- Municipal Government Bonds
- Regional Government Bonds
- Other Government Bonds
- Supra-national bonds

Reinsurance Receivables
- On Claims
- IBNR
- Future

Bonds - Structured Securities
- ABS – Equipment lease
- ABS – CBO/CLO
- ABS – Rate Reduction
- ABS – franchise loans
- Commercial MBS
- ABS – credit cards
- CMBS – CRE - CDOS
- ABS – Auto Loans
- CMO - other
- ABS – Structured Settlements
- Prime Jumbo
- ABS – Student Loans
- GSE Guaranteed
- ABS - Aircraft

Overall Changes to Security Accounting

- Treatment of AFS and HTM classified securities will be distinctly different
  - HTM will follow the CECL model
  - AFS securities have their own path
- In both instances, replaces the current other-than-temporary-impairment ("OTTI") logic



HTM Debt Securities

Future GAAP vs Current GAAP

OTTI Model

» Impairment is measured and recorded only when FV is less than Amortized Cost (AM Cost)

» Perform assessment at the individual security level

» Use DCF method

» Best estimate of the PV ECF basis

» Write off AM Cost when OTTI is recognized

» Considers length of time in unrealized loss position

CECL Model

» Measure ECL upon initial recognition

» Perform assessment on a collective pool basis when similar characteristics exist

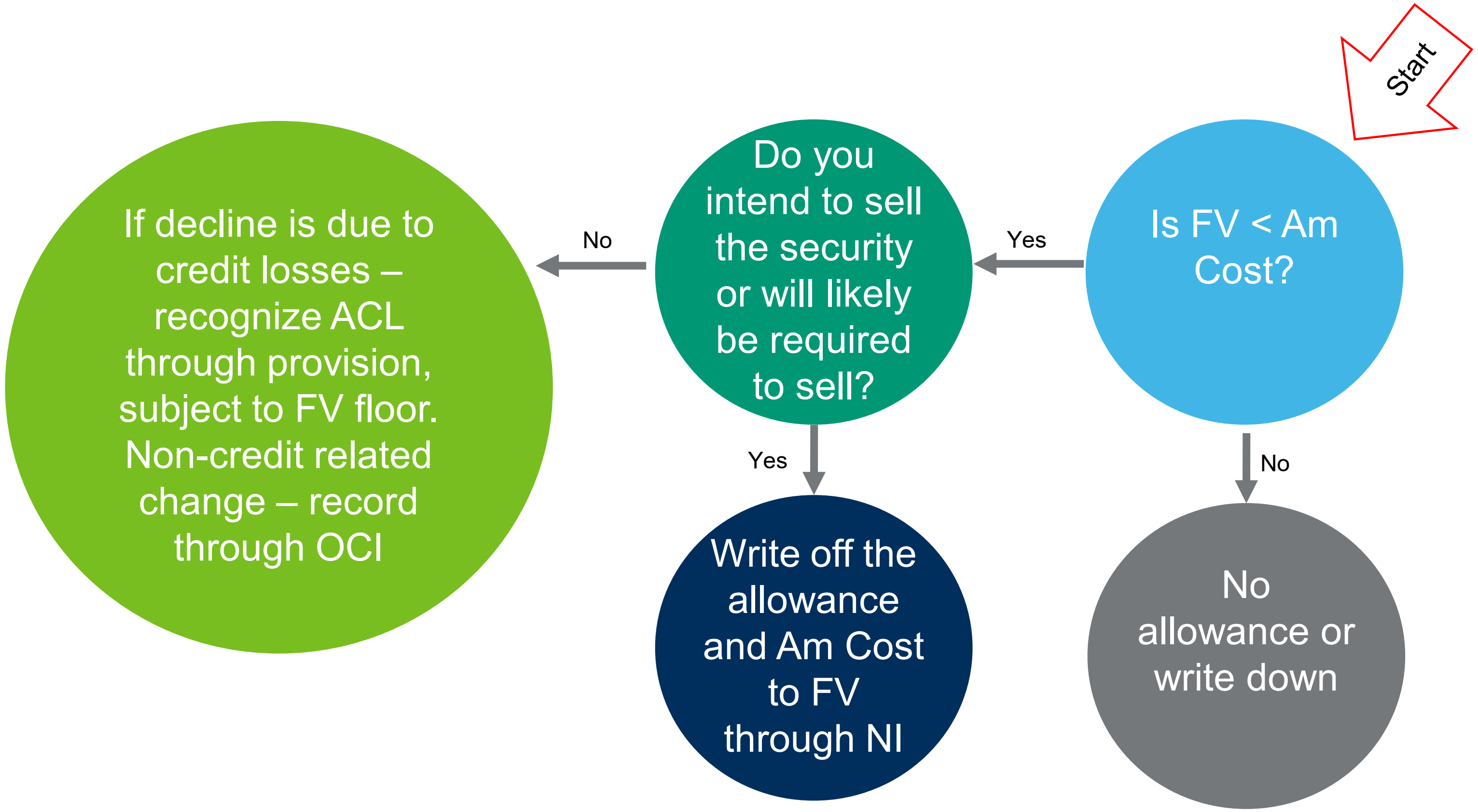
» Various measurement methods

» Risk of loss basis

» Write off AM Cost only when security is deemed uncollectible

» Length of time in unrealized loss position is irrelevant. Loss is recognized even if FV>AM Cost

AFS Credit Loss Model Decision Tree



AFS Securities will be treated differently

Future GAAP differences between HTM, HFI and AFS

New AFS Credit Loss Model

» ECL are measured and recorded through allowance only when FV is less then AM Cost

» Perform assessment at the individual security level

» Use DCF method

» Best estimate basis

CECL Model

» Measure ECL upon initial recognition (HFI loans and HTM securities)

» Perform assessment on a collective pool basis when similar characteristics exist

» Various measurement methods

» Risk of loss basis

What is PCD?

» PCD → Purchase Credit Deteriorated (PCD) assets

- » At acquisition experienced a more-than-insignificant deterioration in credit quality since origination
- » Replaces the former Purchase Credit Impaired (PCI) accounting which required evidence of deterioration

» Applies to all assets within the CECL scope as well as AFS debt securities

» Accounting for PCD assets:

- – Allowance is determined in a similar manner as an originated or purchased performing asset
- – No provision on Day 1. Instead, AM Cost = FV (price) + Allowance
- – When non-DCF method is used, estimate loss on <u>the basis of UPB</u>

Day 1	Example	Day 2
Dr Asset 100 **Cr Discount 20** **Cr Allowance 10** **Cr Cash 70** **Am Cost: $80** **Carrying Value: $70**	**Par Amount:** $100 **Purchase Price:** $70 **Loss Rate:** .1 **ECL:** $10 (100 * .1)	**Apply relevant credit loss models dependent on the asset classification** **Accrete the non-credit discount to income using the Effective Interest Rate (EIR)**

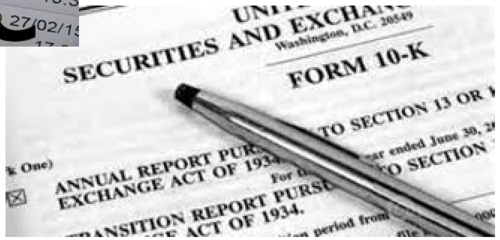
Transition Guidance for HTM and AFS

AFS and HTM Debt Securities

OTTI previously recognized

- Transition prospectively (no change to AmCost)
- The EIR is retained and locked in
- Amounts previously recognized in OCI – continue to accrete to income over the life using EIR
- Recoveries of the previous charge offs after adoption – recognize in income when received

New Disclosure Requirements…Qualitative Disclosures



…as CECL nears, look for new and changed disclosures from FASB, SEC, and Regulatory bodies…

326-20-50-11 An entity shall disclose all of the following by portfolio segment and major security type:

a) A description of how expected loss estimates are developed

b) A description of the entity's accounting policies and methodology to estimate the allowance for credit losses, as well as a discussion of the factors that influenced management's current estimate of expected losses, including:

1) Past Events
2) ***CURRENT CONDITIONS***
3) ***REASONABLE AND SUPPORTABLE FORECAST ABOUT THE FUTURE***

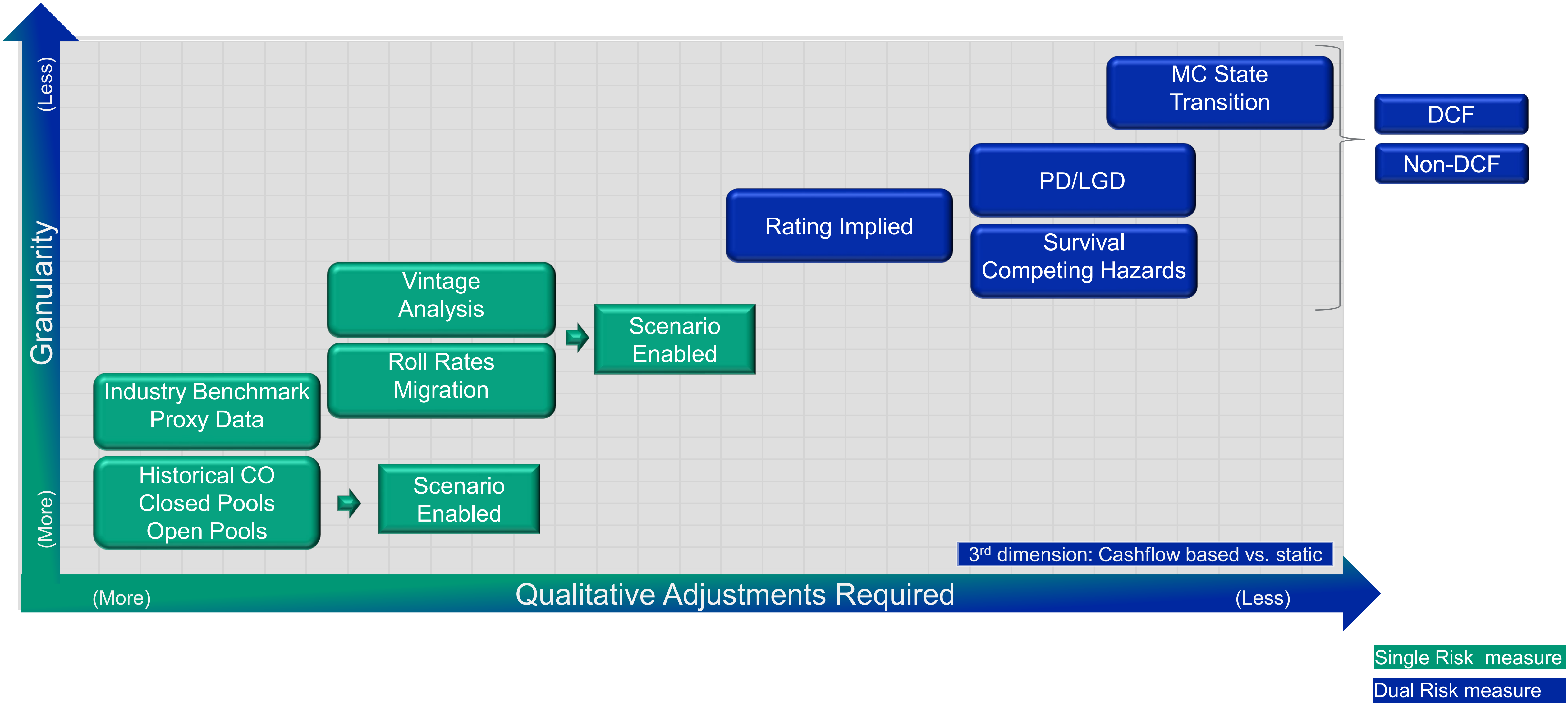
…A discussion of the changes in the factors that influence management's estimate (for example, changes in portfolio composition, current underwriting practices and significant events or conditions that were not relevant in previous periods…

New Disclosure Requirements…Roll Forwards!

	Total Loans and Leases	Total HTM Securities
Allowance for Credit Losses		
Beginning Balance		
Charge offs		
Recoveries		
Initial Allowance for PCD		
Provision		
Passage of time (optional)		
Ending Balance		

	AFS Securities
Allowance for Credit Losses rollforward	
Beginning Balance	
Charge offs	
Recoveries	
Additional ACL on AFS not reserved for previously	
Initial Allowance for PCD acquired this period	
Reduction for Sold AFS	
Reduction for securities that are moved to other categories	
Changes in ACL for AFS	
Ending Balance	

CECL Modelling Approaches…which one is right?



Methodologies

Example of Moody's models and methodologies offered

Adopt and Adapt

- **Historical Loss Analyzer**
  - Historical Analysis
  - Snapshot
  - Vintage
- **Retail**
  - Call Report Forecast
  - Loss rates
  - Loan Level
  - Customized
- **Commercial - CRE**
  - Call Report Forecast
  - Loss rates
  - Loan Level
  - Customized
- **Commercial – C&I**
  - Call Report Forecast
  - Loss rates
  - Loan Level
  - Rating/PD Converter
  - Customized
- **Securities**
  - Cashflows
  - Credit Models (Retail or Commercial)
  - Munis
  - Annual Default Study
- **Receivables**
  - Reinsurance receivables
  - Trade receivables
  - Other receivables
- **Custom**
  - SAS
  - R
  - Python
  - Excel

Overview of ECL Calculation Engines

Three Methodologies for ECL Calculations

Loss Rate	PD/LGD	Cash Flow
• Annualized • Lifetime • Curve	• Annualized • Lifetime	• DCF - Expected Cash Flow • DCF Loss Cash Flow • Loss Cash Flow

PD/LGD Method

Probability of Default
What is the probability of a borrower defaulting over the contractual life of the loan?

Exposure at Default
What is the outstanding loan balance at default?

PD x LGD x EAD = EL

Loss Given Default
When the loan defaults, what percentage of the exposure at default is charged off?

Expected Loss
The CECL allowance is the product of these three values!

CECL – Commercial Loan Models and Data

Source Data

- Secure cloud based data exchange
- CSV file upload
- Scenario Upload
- Automated data load through API

Model Development | **Model Development Data**

Commercial

Origination		Loan Level (calibration available)		Segment Level (calibration available)		Data and Benchmarks		
C&I (CRE OO*)	CRE	C&I (CRE OO*)	CRE	C&I (CRE OO)	CRE	Data Alliance (C&I, CRE, Proj Finance and Asset Finance)	Risk Bench	Loan viewer

* OO – CRE Owner Occupied

Commercial Mortgage Metrics ("CMM")

- **CMM is the leading analytical model and risk management tool for assessing credit risk in commercial real estate loans.**
- CMM offers:
  - PD and LGD (PIT and TTC) metrics built on extensive, proprietary dataset and calibrated to recent financial crisis
  - Robust scenario analysis/stress testing capabilities that support regulatory compliance (CECL, DFAST)
  - Reflects local CRE market variables
  - ECL projections – lifetime
  - Analyze a variety of loan types:
    - Permanent and Construction
    - Fixed or Floating Rate loans
    - Cross-Collateralized properties
    - Senior or Subordinated loans
  - Most property types (Hotel, Office, Retail, Multifamily, Industrial)

CECL – Securities Model Development and Data

Source Data

Secure cloud based data exchange

CSV file upload

Scenario Upload

Automated data load through API

Model Development

Model Development Data

Structured Credit

Cash

Synthetic

Market Value

CLO CBO

CRE

ABS CDO

Trups

TRS CDS

CLO ABS CDO

RMBS

Non-Agency

Whole Loan Pools

RMBS

REREMIC Reverse Mortgages

HELOC / HEL

Agency

Whole Loan Pools CMOs, TBAs

Multi Family / Multi Class Single Class / Mega MM

Consumer ABS

Autos

Loan

Lease

Floor Plan

Student Loan

Private

FELP

Credit Card

Bank

Retail

CMBS

Non-Agency

Agency

Conduit

Large-Loan

Esoteric

Lease

Loan

Aircraft

Equipment

Small Business

Franchise

Market Place Lending

Mortality Non Auto Floor Plan

SBAP SBIC

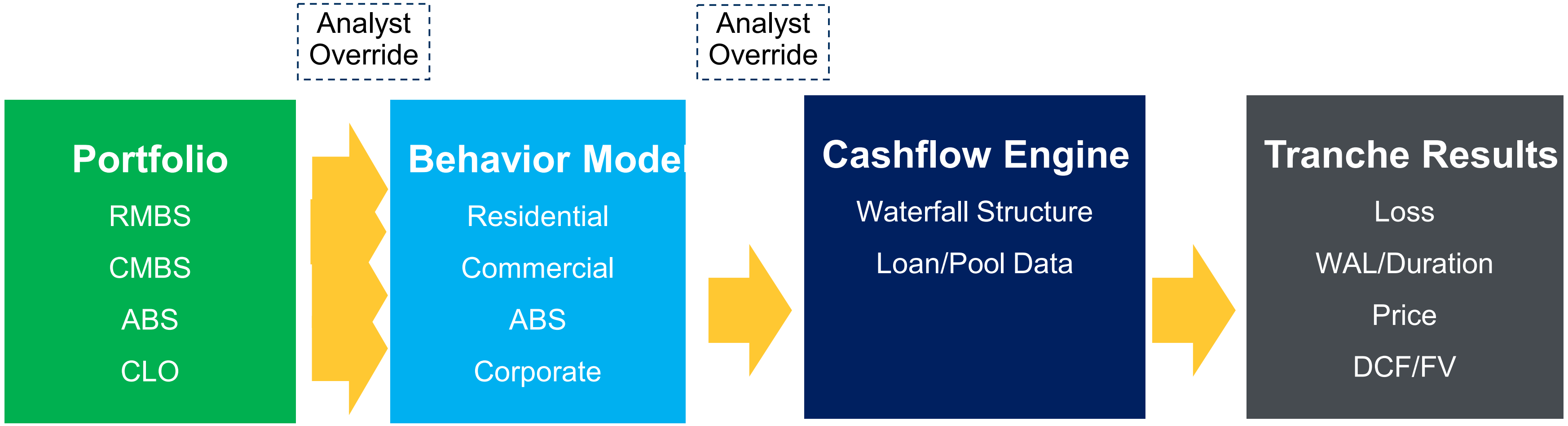
Credit Model

Cash flow model

Modeling Process

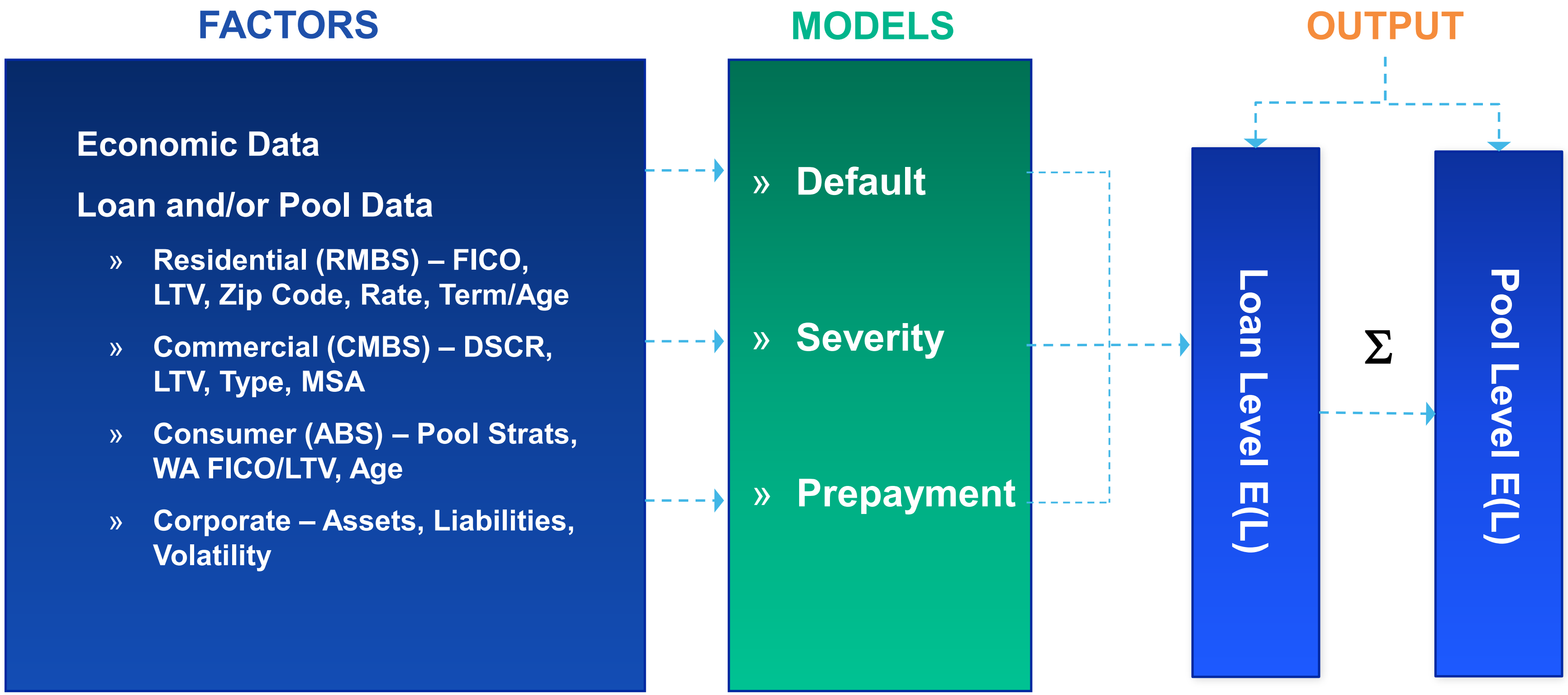
Quantitative Approach

- Complexity of underlying collateral and deal structure
- Model-driven collateral forecasting
- Analyst assumptions/overrides



Credit Modeling Overview

For each asset type, forecast default, prepayment, and severity for each loan or pool in the transaction.



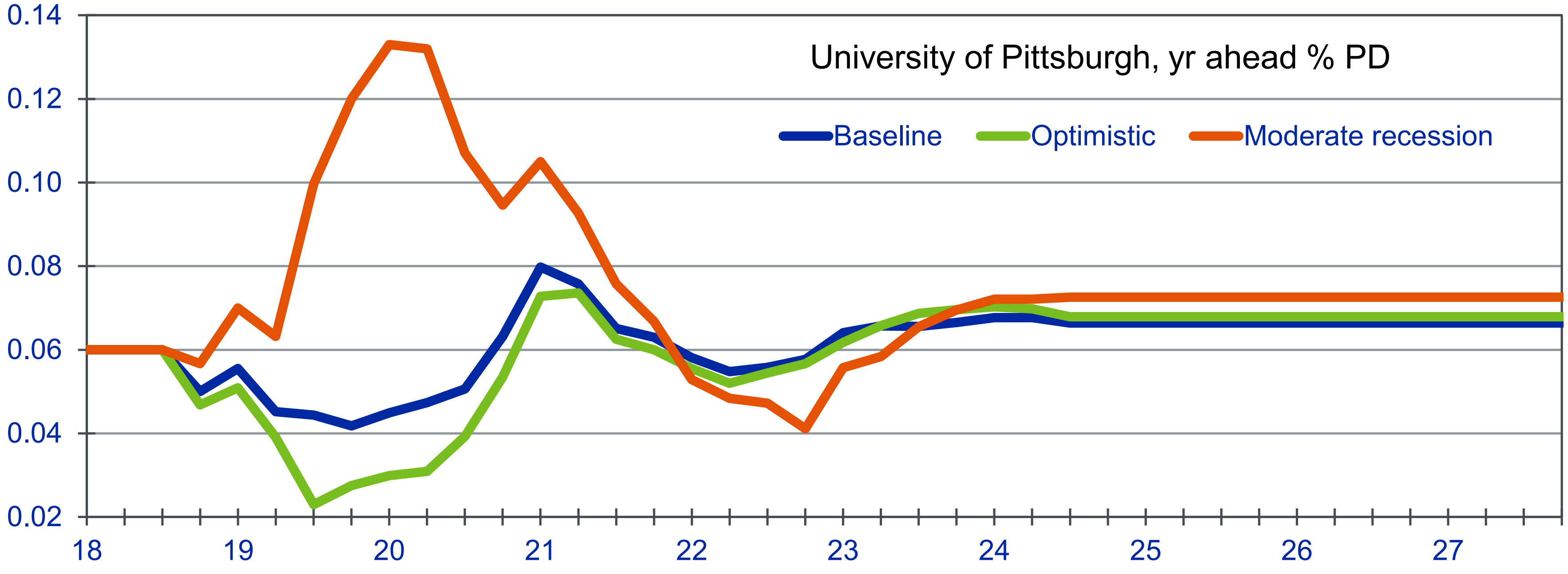
Stress Potential Muni Credit Losses

Muni Loss Forecasts: Scenario Conditioned PD and LR Forecasts

- » Allows users to stress individual muni issuers, or entire portfolios for CECL and other stress testing applications
- » Historical data spanning 5 decades and over 32,000 muni issuers
- » 2 step forecasting process links PDs to macroeconomic variables (national and sub-national) using structural models
- » Extensive off-the-shelf scenario coverage (S0-S9, Regulatory, etc.)

Muni Loss Forecast Models

Scenario-Conditioned and Issuer Specific



Source: Moody's Analytics

Starting PD: TTC to PIT PD Converter

Using Moody's internal models and data to produce a dynamic PD to rating map.

(1) Credit cycle estimation

Point-in-time PD term structure is adjusted to reflect the current credit cycle.

(2) Forward looking adjustments

Additionally, for the calculation of lifetime ECL the tool extrapolates point-in-time PD term structure through the loan's maturity.

Scenario Conditioning: GCORR Macro Model

- **Industry Leading Model:** Moody's correlation framework is the industry standard to estimate clustered defaults and ratings downgrades in poor macro-economic conditions.
- **Model ready to use "off the shelf":** General segment, industry and country (including sector, region, industry, etc.) and asset correlation model that is calibrated on Moody's proprietary data set.
  - Parameterize credit factors to match risk of each individual exposure
  - Easily backtest/validate impairment estimates based on available loan loss history of individual institution (if available)
  - Annual updates of macro factors, relationships and credit factors
- **Flexible Approach**: Model pre-calibrated to a full set of sector, industry, regional and asset class factors. For each run, user decides which variables will define the scenario and the tool creates a conditional model to reflect the scenarios impact on systemic credit risk.

Questions & Answers

MOODY'S ANALYTICS

Better
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