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The OCC's recommendations for Score Validations

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Introducing:

- **Hua Kiefer**
  OCC
- **Jim Putman**
  US Bank
- **Mike Long**
  Experian

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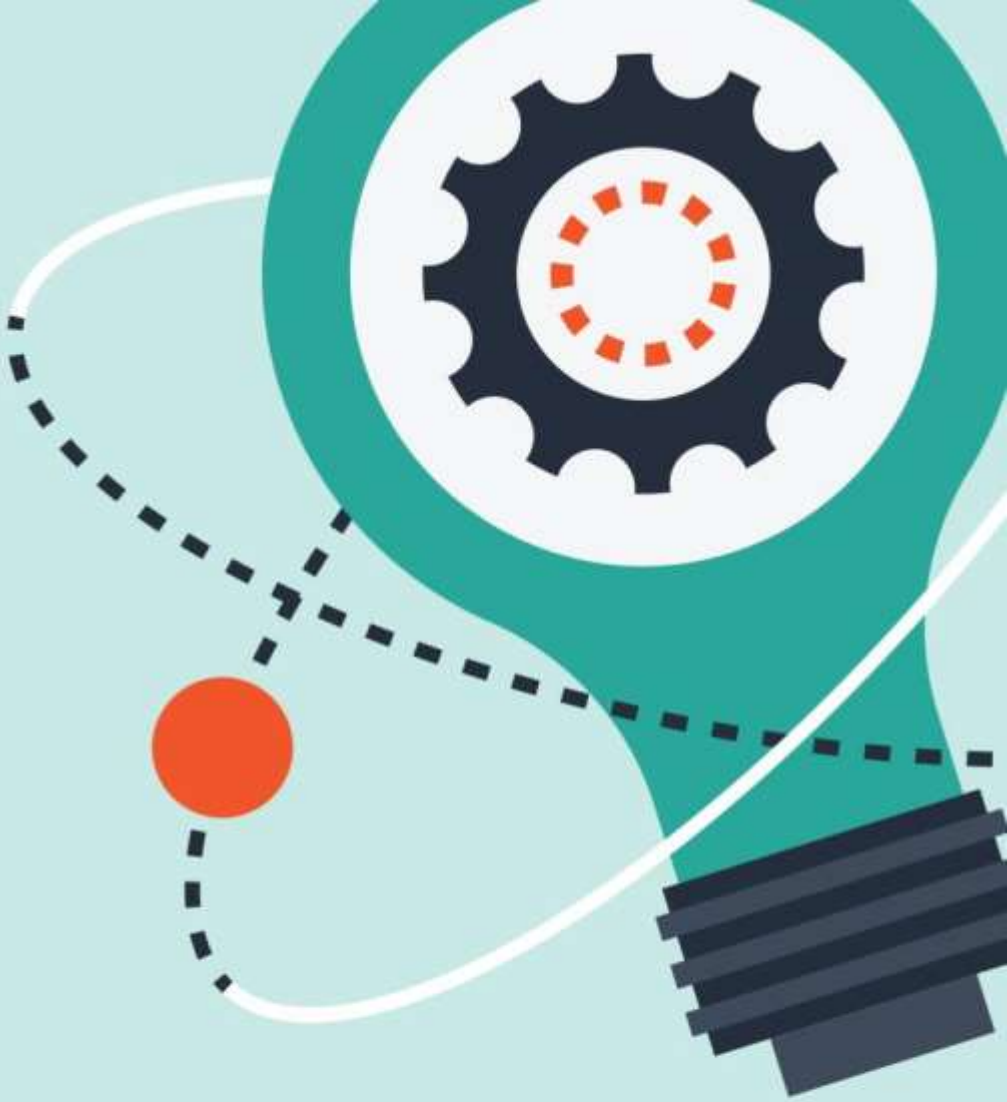
SCORE VALIDATIONS



> “I have never, ever sought validation from the arbiters of British poetic taste.”

— Linton Kwesi Johnson

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The OCC's recommendations for Score Validations

- **Regulation** – OCC
- **Application**
  - US Bank
  - The score validation cycle
- **Key takeaways**
- **Q&A**

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Regulation – OCC

Bulletin 2011-12 - Model Validation

> “Is regulation per se bad? Better regulation is good for the business community.”
>
> **— Ed Rendell**

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Model validation purposes

To verify that models are performing as expected

- In line with their design objectives and business uses

To ensure that models are sound, in terms of:

- Modeling methods
- Variable selections
- Assumptions

To raise issues and deficiencies of models and address them in a timely manner

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Model validation benefits

Reduce model risk by:

- Identifying model errors
- Taking corrective actions
- Identifying potential limitations and ensuring appropriate use

Assess model reliability, in terms of:

- Source of model risk
- Extent of model risk

Helps to make decisions on model redevelopment schedule by:

- Analyzing model performance pattern over time

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Model validation requirements

Scope – all model related components including:

- Inputs, processing, and reporting
- In-house and third party models

Rigor and sophistication of validation effort depend on:

- Overall use of models
- Complexity and materiality of models
- Size and complexity of the bank's operations

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Model validation requirements

Independent validation process judged by actions and outcomes, e.g:

- Motivated and competent staff
- Critical review
- Issues identified and actions taken

Ongoing periodic review

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Vendor and third-party model validation

Same model risk management principles with modified process:

- **Appropriate processes in place** for selecting vendor models – banks should require the vendor to:
  - Provide developmental evidence
  - Conduct ongoing performance monitoring and outcomes analysis
  - Disclosure validation results
  - Make appropriate modifications and updates over time

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Vendor and third-party model validation

Same model risk management principles with modified process:

- **In-house validation** of vendor models by focusing on:
  - Whether the model is appropriate for the bank's products, exposures, and risks
  - Relevance of data input and model assumptions
  - Sensitivity analysis and benchmarking

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Example of leading validation practices

Frequent ongoing monitoring, including:

- **Validating** model against existing performance metrics and trigger events
- A well established **tracking** procedure of the corrective actions taken in response to issues identified in model validation exercise
- A detailed **implementation plan** of a new model in the event of model failure

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Example of leading validation practices

Early read analysis with appropriate benchmarks, particularly for:

- Models with a long **forecast time horizon** (e.g., 'bad' in 36 months)
- Models without sufficient initial **validation** (e.g., due to data limitation)
- Volatile **economic environment**

Back testing against valid alternative models (e.g., vendor models or in-house challenging models)

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Example of lagging validation practices

Ineffective ongoing monitoring, such as:

- No clearly defined validation plan (e.g., spontaneous validation)
- Subjective performance tracking
- No action plan in case of model breach

Unreliable validation outcome, such as:

- Adopting inconsistent ‘bad’ definition
- Using in-sample data (i.e., development data) for out-of-time validation

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Example of lagging validation practices

Inadequate documentation, such as:

- Missing details in support of adopted model development approach
- Inconsistent language regarding key elements of the model
- Uninformative validation report (e.g., due to lack of / invalid performance expectation, benchmark model, or action plan)

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Application – U.S. Bank

- **Model risk management**
- **Data governance**
- **Score validation approach**

> “Nothing is as empowering as real-world validation.”
>
> **— Steven Pressfield**

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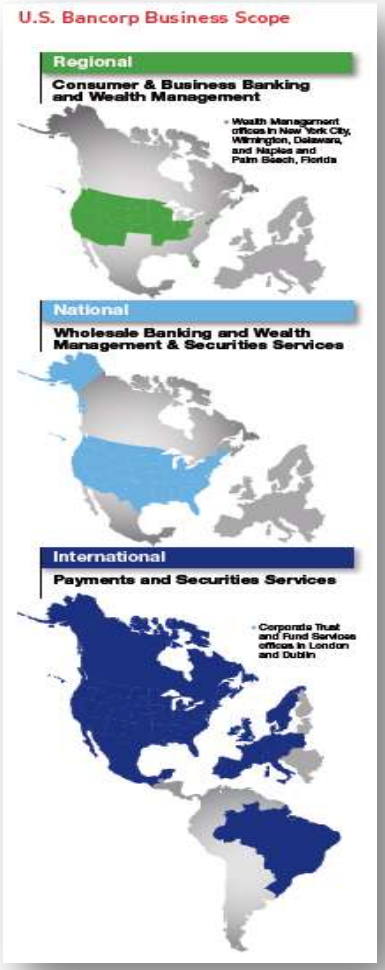
About U.S. Bank
2015



Fifth largest U.S. commercial bank

- Asset size – $422 billion
- Deposits – $300 billion
- Loans – $261 billion
- Customers – 18.5 million

Founded in 1863

- Industry leading profitability measures
  - ROCE – 14.0%
  - ROA – 1.44%
  - Efficiency ratio of 53.8%

The data above is effective 12/31/15

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Model risk management / data governance

Overview

Model risk governance

- Establish model risk framework for the Bank meeting regulatory requirements.
  - Corporate model definition, identification, and risk rating
  - Comprehensive model life-cycle starting before production
  - Development, implementation, validation and monitoring requirements
  - Maintain corporate model inventory with appropriate documentation
- Centralized monitoring / reporting on model risk

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Model risk management / data governance

Overview

Tool risk governance

- Establish framework for all high risk non-model items (spreadsheets)
  - Inventories, risk rating, controls, review cycle

Validation

- BASEL / Credit Validation
- CCAR Validation
- Financial Model Validations
- Trading Risk Validations
- Anti Money Laundering (AML) Validations

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Model risk management / data governance

Overview

Data governance

- Group responsible for meeting bank's requirements within policy for data governance in risk management and compliance
  - Data governance
  - Risk Data Aggregation and Reporting (RDAR)
  - BCBS 239 compliance

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Score validation approach

Validation / monitoring approach overview

- Risk-based approach assuming monitoring in place
  - High – 2-year validation schedule
  - Medium / Low – 3-year validation schedule
  - Monitor quarterly

Credit score approach

- Continuous Validation Approach (CVR)
  - Combines validation and monitoring
  - Includes all credit score models across enterprise
    - 78 model IDs including 125 model segments
    - Vendor and custom models
    - Acquisition and account management models

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The Score Validation cycle

> “The logic of validation allows us to move between the two limits of dogmatism and skepticism.”
>
> **— Paul Recoeur**

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The Score Validation cycle

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The Score Validation cycle

Decide what to validate

Which, why, who?	Example validation
Portfolio type	Bankcard
Process	Acquisition
Bureau	Experian
Models	VantageScore® 3.0 and Bankruptcy PLUS℠
Consumer group	Approved
Analysis owner	Experian
Performance measure	Bad = 90+ DPD, charge-off or bankruptcy
Performance window	Dec 2013 to Dec 2015

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The Score Validation cycle

Create input file and obtain score archives

PII

- Name, address, SSN, date of birth

Account ID

- Account number
- Opened date

Example:

- 145,000 random bankcard inquiries, Dec 2013
- Performance data from Dec 2015

Score archive time frame

- Date of application
- Middle / start of performance window

Example:

- Dec 2013

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The Score Validation cycle
Data cleanse

Exploratory data analysis

- Frequency distributions
- Good / bad rates
- PII quality

Remove outliers

- Excesses
  - Values
  - Number of occurrences
- VIP low-side overrides
- Test data

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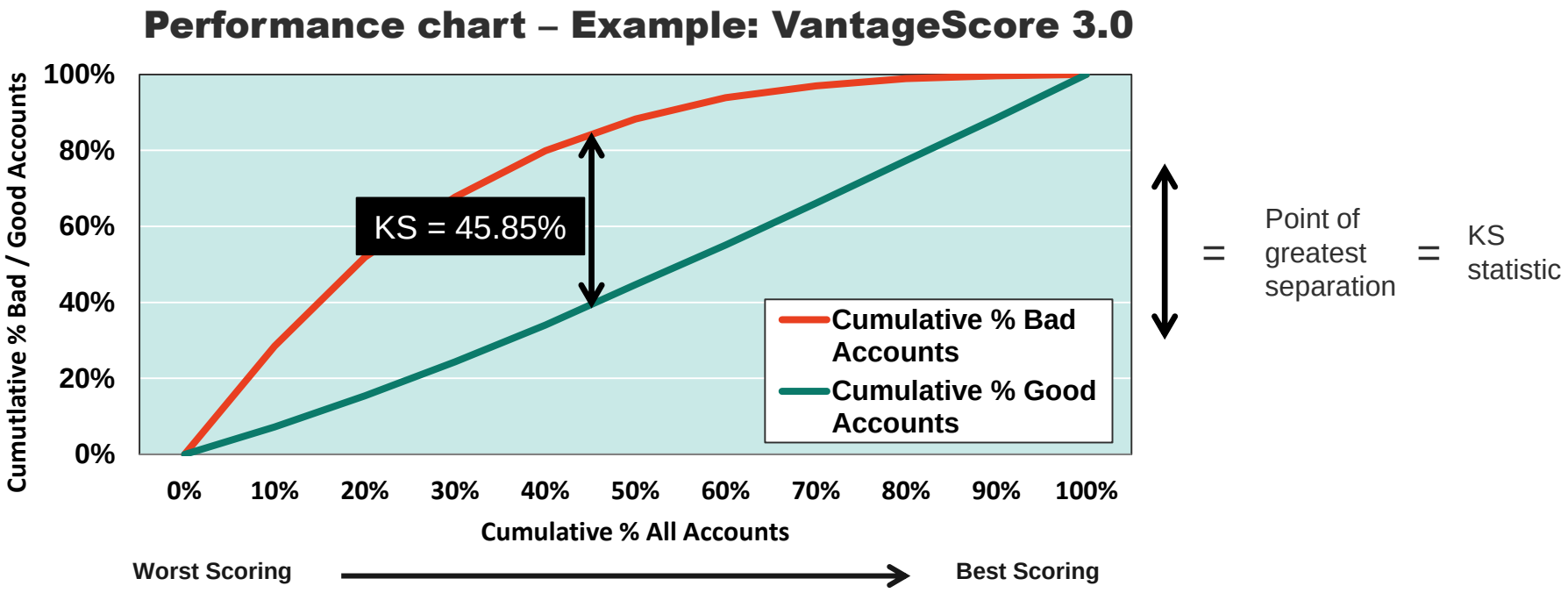
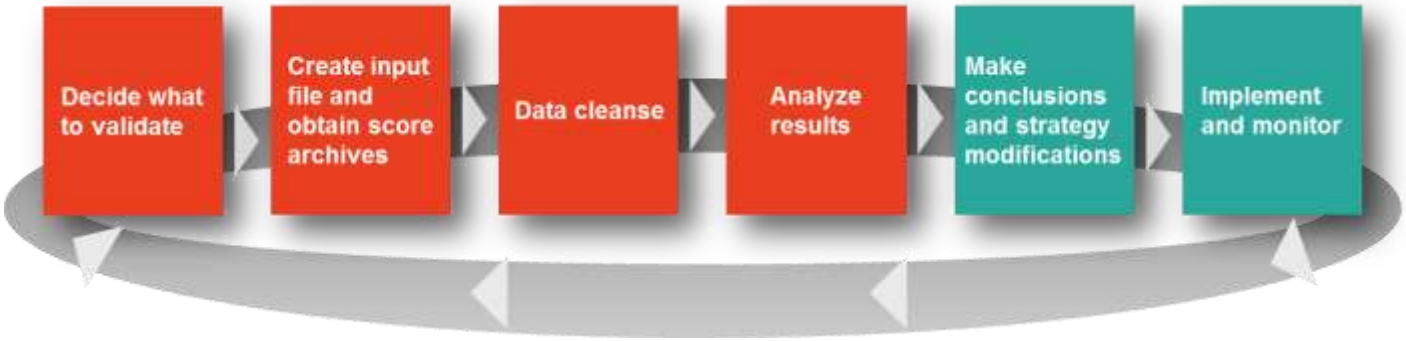
The Score Validation cycle

Analyze results





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The Score Validation cycle

Make conclusions and strategy modifications

How good is the model?

- Which one is best?
  - Example: VantageScore® KS = 45.85% vs. 44.46% for Bankruptcy PLUS℠
- Accuracy vs. % scored?
  - Example: VantageScore® percent scored = 98.5% vs. 94.6% for Bankruptcy PLUS℠

Modify strategy?

- Change cut-offs
- Change the score model?
  - ROI?

Further analysis?

- Combining models
- Custom models
- Data mining
- Bring rejects into the analysis
  - Reject Inference

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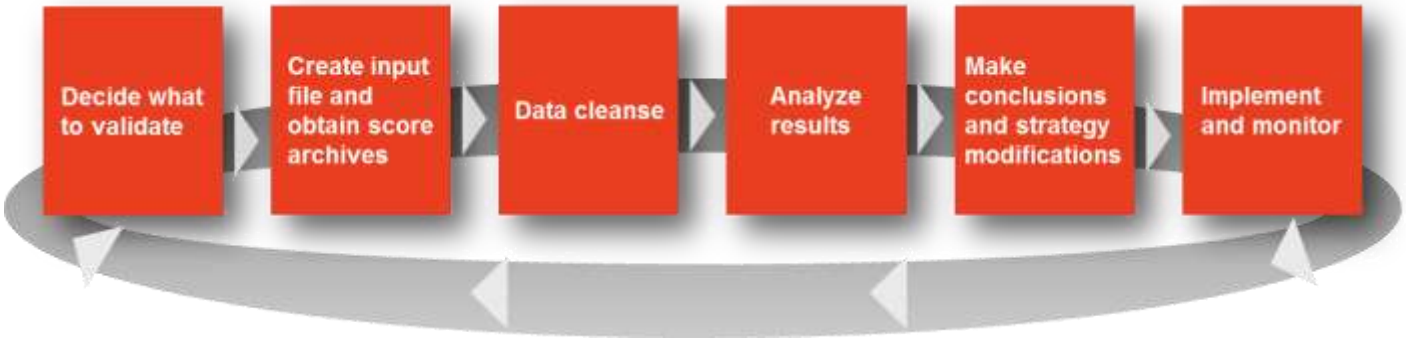
The Score Validation cycle

Implement and monitor

And let time pass …

- Governance / monitoring strategy evoked?
- Regulation change?
- Bad rates and / or approval rates change?
- Economic change?
- Marketing strategy change?
- New scoring products?
- New score versions?



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The Score Validation cycle

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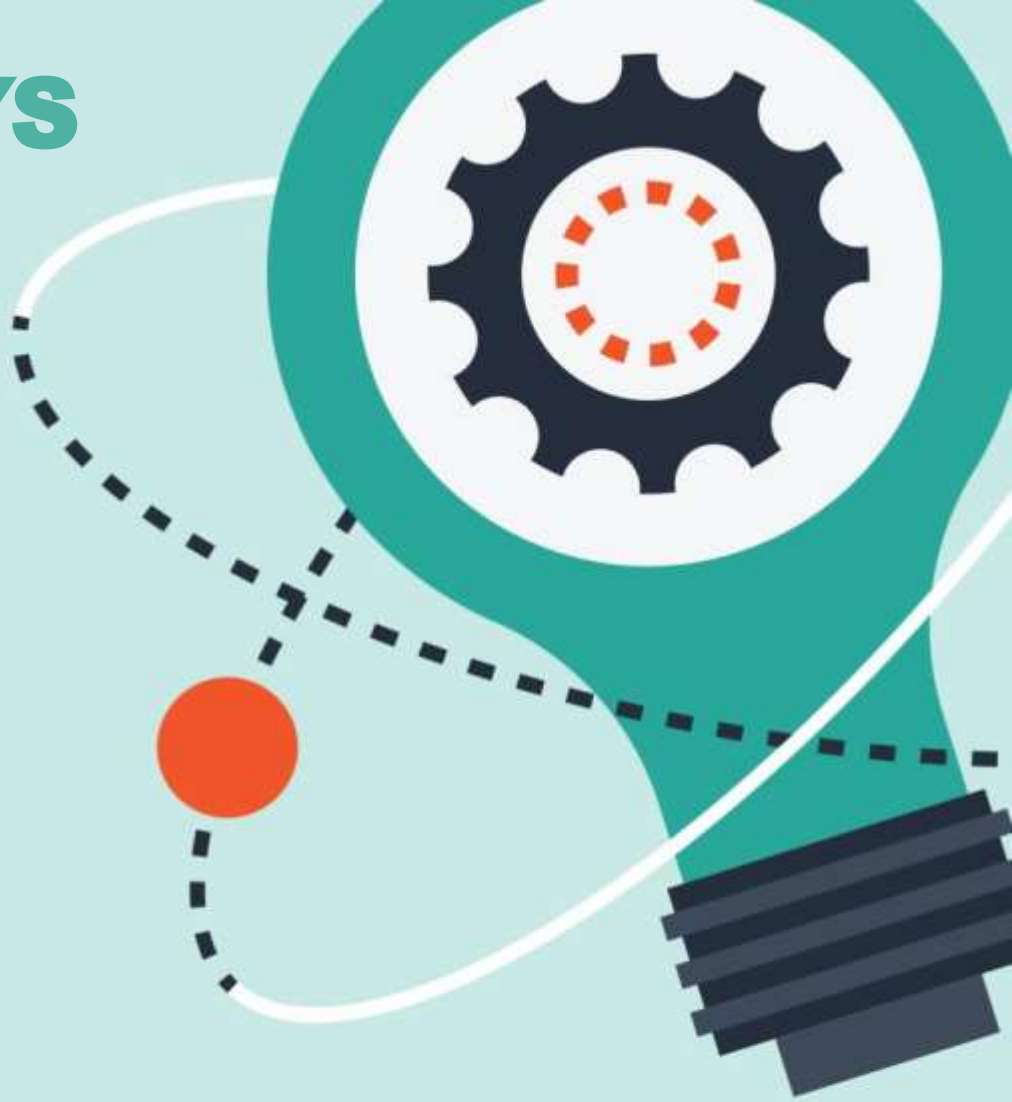
KEY TAKEAWAYS



> “Write your injuries in dust, your benefits in marble.”

— Benjamin Franklin

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Score Validations – Key takeaways

Regulation – OCC

- Multiple purposes
- Timely
- Minimize model risk
- Benchmarking
- Monitoring

Application – US Bank

- Strong laid out strategy
- Risk Based Approach assuming monitoring in place
- Continuous Validation Approach (CVA)
- Combines monitoring with validation

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Score Validations – Key takeaways

More customers and more accurate decisions

- E.G. New versions of existing scores
  - Example: 145,000 customers, scores Dec 2013, performance Dec 2015

Score	KS	% scored	Best 20% bad rate	Best 20% scores – net good consumers
VantageScore® 1.0	44.70	96.93%	0.92%	33,996
VantageScore® 2.0	44.71	97.76%	0.66%	34,500
VantageScore® 3.0	44.95	98.71%	0.65%	35,009

3% more good accounts...
with relatively little effort ???

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Q&A

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1. How would you rate the presenters' knowledge?
☐ Excellent ☐ Above average ☐ Average ☐ Below average ☐ Poor

2. How would you rate the presenters' delivery?
☐ Excellent ☐ Above average ☐ Average ☐ Below average ☐ Poor

3. How would you rate the presenters' time management?
☐ Excellent ☐ Above average ☐ Average ☐ Below average ☐ Poor

4. How useful was the session information?
☐ Very useful ☐ Somewhat useful ☐ Neutral
☐ Somewhat not useful ☐ Not useful

5. How would you rate the session on being current?
☐ Very current ☐ Somewhat current ☐ Neutral
☐ Somewhat not current ☐ Not current

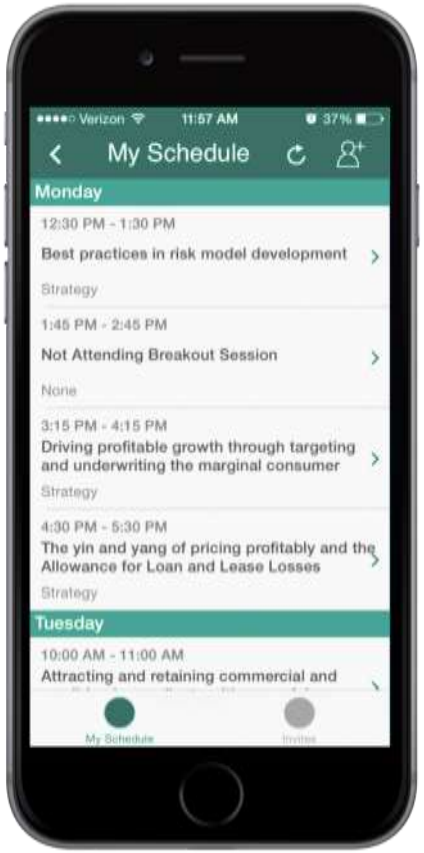
6. How relevant was the session content to the title and description?
☐ Very relevant ☐ Somewhat relevant ☐ Neutral
☐ Somewhat not relevant ☐ Not relevant

7. How would you rate the level of content?
☐ Too advanced ☐ Just right ☐ Too basic

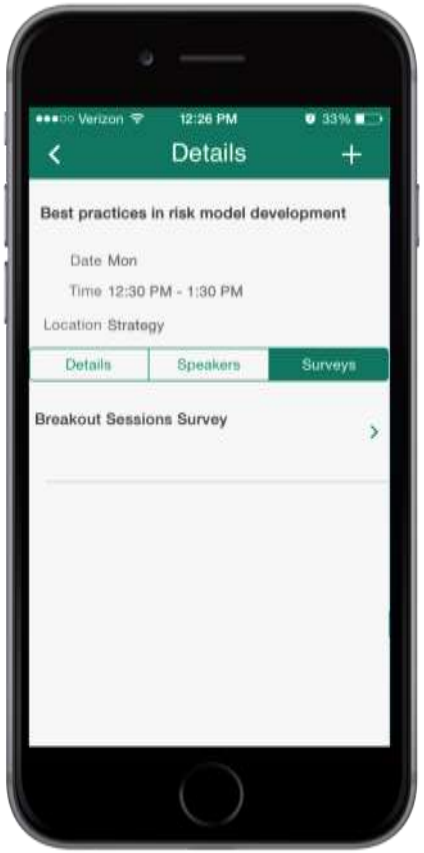
8. Why did you attend this session? (Check all that apply.)
☐ Relates to my business ☐ The presenter(s) ☐ Interest in new product
☐ Compelling session description ☐ Increase product knowledge

9. Do you have any additional comments?

1 Select the Survey button and complete



2 Select the breakout session you attended



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