Model Risk Management: How to be prepared in a data-driven world

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ABSTRACT

In our increasingly analytical world, models are high-value assets that drive important business decisions and critical regulatory activities. Models have allowed organizations to replace subjective opinion with objective and repeatable logic. However, models require attention and care; most professionals would agree that bad models are costly! Yet many companies struggle to answer basic questions about their models: How well are your models performing? What models require attention? Are you properly allocating your resources to address your material models? SAS is the largest and most successful model risk management software vendor in the world. Software like SAS® Model Risk Management enables organizations to use a data-driven approach to assess their model risks, identify gaps, review and update their policies and procedures, and reassess their risks. This iterative approach continually improves their model quality and efficiency. In this presentation, I focus on best practices in exploring model risk data, as well as fine tuning your governance policy and approach.

INTRODUCTION

In our increasingly analytical world, models are high-value assets that drive important business decisions and critical regulatory activities. Models have allowed organizations to replace subjective opinion with objective and repeatable logic. These benefits come with added risk; however, many companies struggle to answer basic questions about their models:

· How well are your models performing?

· What models require attention?

· Are you properly allocating your resources to address your high-materiality models?

Poor business decisions resulting from misinformed or incorrect model usage are common, but how best to mitigate this risk?

MODEL RISK ITERATION

Developing and maintaining proper models requires efficient Life Cycle management, smart governance, and automated tools. To establish effective model governance, executive management must first agree upon a well-articulated vision of the organization's model risk management framework. A successful framework consists of a risk appetite; testing and validation processes; a clear definition of roles, responsibilities, and resource needs; and documentation. Within this framework, organizations maintain an inventory of models, including their risk exposures, input data, and key underlying assumptions. They must dedicate adequate resources to understanding the models and quantifying their risk

exposures for present and future operations. Once an effective framework exists, organizations will be able to verify and manage their model inventories continuously in order to mitigate risk.

The best way to start model risk management….is to start. It might seem simple, yet many organizations that are beginning this journey toward an enterprise solution spend countless up-front hours devising a model risk policy. These discussions often pull in leaders from different areas of the organization, but many of them have been managing model risk with their own approach. Crafting a cohesive model risk program by combining business unit practices often leads to convoluted results. In my experience, the better option is to start with industry best practices and iterate from there. As shown in Figure 1, iterative model risk management enables organizations to use a data-driven approach to assess their model risks, identify gaps, review and update their policies, and fine-tune their processes. It's important to understand that each organization has its own structure, core-values, risk tolerance, business opportunities, and challenges. Proper iterative model risk management ensures that your model risk program is uniquely customized to address your organization by listening and carefully adjusting to your data.
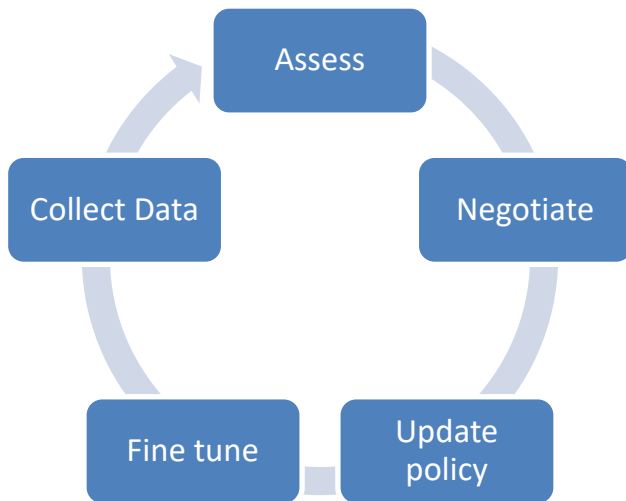
Figure 1. Iterative Model Risk Management

MODEL RISK DATA

If you plan to use data to drive your model risk practices, it better be good data! The first step to understanding your model risk story is enforcing standard assessment practices and methodologies. Today in many organizations there is no common language that allows results from one group to be compared to other groups. This presents many challenges to model risk management groups that are responsible for understanding and reporting model risk across an entire organization. Adopting consistent methodologies will facilitate the proper understanding and telling of your business's model risk story. It will also allow you to properly adjust to address targeted risk.

In addition to data consistency, it's imperative to use data, as frequently as available, to confirm how well your models are performing. Automated performance monitoring provides

an early warning sign when a model begins to deteriorate. This type of automation allows modeling and validation teams to focus on fewer tasks while "observing" many models.

Model risk management is a dynamic discipline. When things do change, you need the appropriate data to be available to answer the pressing questions. Model risk data must be usable, not buried within thousands of pages of documents. Models are often developed, or tested, with certain assumptions and within a limited set of parameter ranges. When conditions move outside those tested ranges, or when they no longer meet those assumptions, the model results should not be trusted. These constraints are called *limitations.* For example, a model might be reliable with a standard yield curve. But, what if the curve inverts? Do you know what models within your organization might not perform with an inverted yield curve? When the yield curve inverts it's important to have the limitation data available to quickly identify models with this limitation.

Business, market, and regulatory requirements will always change--that's a certainty. The question is, how swiftly and efficiently will your business adapt to these changes? And do you have the tools and talent to translate the vast amounts of data that are now available to your business into valuable insights to improve your modeling?

FINE TUNING

Proper model risk management fine-tuning will require thorough study and understanding of your model risk data. Results should be analyzed and questioned. Are you seeing real information, or an artifact of misinterpretation or error? These are difficult questions that require an understanding of your organization and discussions with experts from multiple teams. This type of study will result in the identification of policy that is not working as expected or better ways to collect and represent data. It's important to systematically outline the recommendations for change, expected benefits, and potential risks. Proposed changes should be reviewed and signed off by all stakeholders. Driving these changes will require a strong model risk advocate who can negotiate across functions and business units to achieve a desired result. This is a tall order, and it rightfully involves the board of directors and executive management, who must establish and direct an enterprise-wide model risk management (MRM) program. The pace of change will be determined by your unique organization, results, and ability to implement. However, it is critical to collect enough data after each adjustment to properly assess next steps.

CONCLUSION

Overall, model complexity is on the increase, and banks are taking greater model risks because of their increasing reliance on and expanded use of models. This trend will likely continue, fueled by machine learning and artificial intelligence, more computing power, more sophisticated and powerful business solution software, the pace of change in business, and the ever-present pressure for better and faster decisions.

Technology is an important partner in regulatory compliance, and it connects model risk reduction to tangible business benefits. SAS solutions and tools provide transparency into the modeling process, options elected, assumptions made, and results obtained-all in an intuitive and thoroughly documented computing environment.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

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WRITING GUIDELINES

Trademarks and product names

To find correct SAS product names (including use of trademark symbols), if you are a SAS employee, see the Master Name List. Otherwise, see SAS Trademarks.

- Use superscripted trademark symbols in the first use in title, first use in abstract, and in graphics, charts, figures, and slides.

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Writing style

- Use active voice. (Use passive voice only if the recipient of the action needs to be emphasized.) For example:

    The product creates reports. (active)
    Reports are created by the product. (passive)

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- Run spellcheck, and fix errors in grammar and punctuation.

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If you include text or visuals that were written or developed by someone other than yourself, you must use the following guidelines to cite the sources:

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TIPS FOR USING WORD

These instructions are written for MS Word 2007 and MS Word 2010. The steps are similar for MS Word 2003.

To select a paragraph style

1. Click the HOME tab. The most common styles in your document are displayed in the top right area of the Microsoft ribbon. If you don't see a style that you want, click the slanted down arrow at the bottom right corner of the Styles area, and scroll through the list. The main styles for this template are headings 1 through 4, PaperBody, and Caption. Avoid using other styles.

2. To change a paragraph style, click the paragraph to which you want to apply a style, and then click the style that you want in the ribbon.

3. PaperBody (used for most text) is automatically applied when you press Enter at the end of any heading style or the Caption style.

To insert a caption

1. Click **REFERENCES** on the main Word menu.

2. Click **Insert Caption**.

3. Select the **Label** type that you want.

4. Click **OK**.

To insert a cross-reference

1. Click **REFERENCES** on the main Word menu.

2. Click **Cross-reference**.

3. In the **Reference type** list box, select Heading, Figure, Table, Display, or Output.

4. For a heading:

   a. In the **For which heading** list, select the heading that you want.

   b. From the **Insert reference to** list, select **Heading text.**

5. For a figure, table, display, or output:

   a. In the **For which caption** list, select the caption that you want.

   b. From the **Insert reference to** list, select **Only label and number**.

To insert a graphic from a file

1. Click **INSERT** on the main Word menu.

2. Click **Picture**.

3. In the Insert Picture dialog box, navigate to the file that you want to insert.

4. When the name of the file that you want to insert is displayed in the **File name** box, click **Insert**.