

0820 - Model Risk -Learning From Others Mistakes

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My presentation addresses the risk embedded in heavy use of credit risk models by banks for improving decision-making. That risk is realized if there is a difference arising between the value received from the model and reality. Hence the more you lean on a model for decision-making, the higher the cost of error.

I start my presentation defining model risk and explaining what can go wrong. After understanding what we should look at, I will describe how to establish a framework of corporate governance of models in organizations, and how to mitigate that risk with SAS® tools.

Abstract

Lending is the core business of most banks. One of the key success factors in credit is to be able to differentiate between the good borrowers and the bad ones by using credit rating models (estimating probability of default, exposure at default and loss given default) you can trust. These models may be input to other models such as credit pricing models, concentration risk models, economic capital models, etc. As a result, a flawed model may have a severe impact on decision-making when it is based on models. Therefore development of corporate governance framework for models along with specific IT tools to monitor and mitigate that risk, is required.

Banks use credit models to screen credit recipients, for setting authorities for granting credit, for pricing loans sensitive to risk, type of collateral and expected RAROC, for managing the portfolio, for estimating concentration risk, for planning expected level of capital, for stress testing, for optimizing the annual work plan and group risk strategy, for identifying sensitive customers and for creating a watch list. The added value from these models is huge as long as the predictive power of these models stays high. It means that a lot of the risk is shifted from the credit officers to the models. The amount of reliance on models also defines how much risk is shifted to them.

As a result, developing strong corporate governance of models is crucial and should be led by a top manager, usually the CRO. **The Corporate Governance Committee** monitors credit models on the group level and approves significant models for use by business officers.

Monitoring the models means ensuring that the forecasting ability of the model is still good. If the quality deteriorates, steps will need to be taken such as; calibrating the model, refreshing its coefficients, updating data history,

rebuilding the model -- or alternatively, to stop using it. In addition the responsibilities of the corporate governance committee include:

- To periodically review group model quality.
- To approve and monitor the group work plan in models including setting handling priority and allocation of resources.
- To grant approval for transferring significant models for production
- To receive reporting for transferring non-significant models for production.
- To discuss and make decisions where there exists disagreement between the developer and the validator.
- To act accordingly regarding models that have deteriorated.
- To report to the BoD on significant models.
- To examine relevant changes in regulations.

I can't stress enough how fragile models can become and how many pitfalls exist until having/building/creating/selecting the winning model. In my presentation I go over the main reasons for actualization of model risk (see chart/slide/table 1)

Table1:

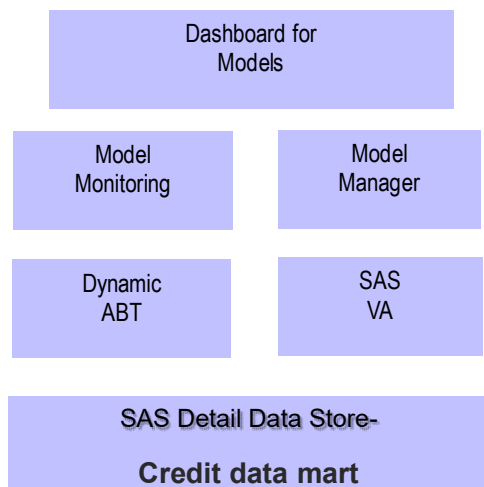
What can go wrong? What should we look at?			
Reasons for actualization of model risk			
Assumptions (statistical/ business) do not match reality	Compromising at development's stage due to no synchronization of systems and lack of access to data	Over conservative/lenient	Human resources: 1.Lack of specialist knowledge 2.High turnover 3. Overloaded
Incorrect parameters	Quality of data	Use of wrong model	Over-reliance on model
Non-utilization of significant variable	Changes: environmental, business, economic, regulatory, strategic	Model is not appropriate for business needs	Inability to see things from the developer's point of view.
Lack of data 1. No data 2. Data exists but not within bank systems 3. Little data	No validation performed	Model too complex 1. Operational challenge 2. Business intuition disappears	Legend: Residual risk after mitigation: Low medium high

However, there is a lot we can do in mitigating a great deal of these risks and I will introduce existing tools, such as Dynamic ABT, Model Monitoring & Manager, SAS VA and Dashboards for models, that you can use in order to reduce that risk (see chart/slide 2).

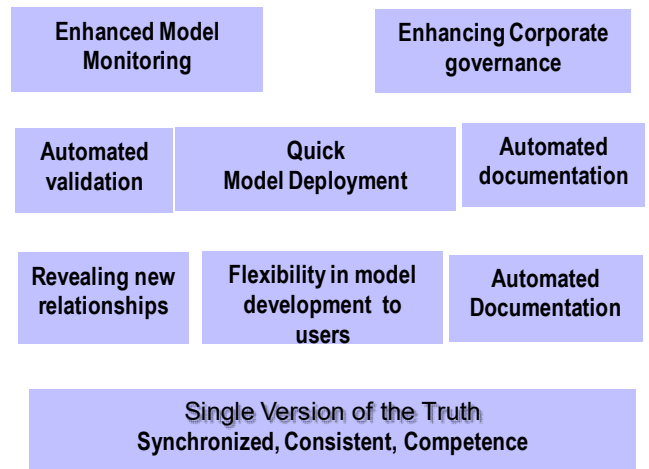
Slide 2:

Mitigating the model risk with SAS

Architecture



Benefits



CONCLUSION:

Since the global financial crisis of 2008, the requirements of model development, validation, calibration and documentation have been increasing dramatically. These requirements are crucial even if these models aren't used to determine the required amount of capital, but used for credit decision making (as described). Mitigating the model risk and establishing strong corporate governance of models are both crucial and can be achieved more easily with specific SAS tools designed for that aim.

The next step is to incorporate what is called "Big Data" in our risk models. Most of the use of Big Data so far has been focused on marketing and sales. It won't take long until financial institutions incorporate it in their credit risk models, starting with existing data that the organization may have, but doesn't capture (on the transaction level for example rather than on the borrower level) including unstructured data (relevant data from recorded conversations with the borrower for example) and then moving into data that is outside the organization (social media data on the borrower for example).

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Recommended Reading

1. M. Crouhy, D. Galai, R. Mark: The Essentials of Risk Management, Mc Graw Hill, 2014.
2. Analytics in a Big Data World: The Essential Guide to Data Science and its Applications (Wiley and SAS Business Series) 2014
3. GARP Webinar " Leveraging Risk Analytics to Drive Competitive Advantage", September 17, 2013 presented by Boaz Galinson (Head of Group Credit Risk Modeling and measurement) and Tom Kimner (Head of Americas Risk Practice & Global Risk).

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