Dynamisms of risks and their risk management implications

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The purpose of classifying risks is to develop a process to assist risk managers to think about the characteristics of a risk in a systematic manner. Diebold[1] classified risks into three categories: the *known*, the *unknown* and the *unknowable*. The Diebold approach classifies risks according to the knowledge we have about their frequency and severity and is a quantitatively based system, while specifically recognising the lack of reliability of the modelling for some risks. However, there is an underlying assumption behind the Diebold system of stability and an ability to distinguish classifications. It is our view that such an assumption leads to a misunderstanding of the nature of risks (particularly in a financial institution) and it consequently leads to a risk of insufficient and inappropriate risk management processes.

In the Australian Journal of Management,[2] Ganegoda and Evans extended the Diebold risk classification system and used a classification of:

a) Knightian risk (which in this article we will rename Knightian certainty for consistency of naming) ("Kc");
b) Knightian uncertainty ("Ku");
c) Ambiguous ("A"); and
d) Ignorance ("I").

These are used to identify that while some risks can be quantified, they exist in multiple states and the state existing at any point of time is difficult to predict or model. A "Kc" risk is comparable to the Diebold known risk, ie, a risk where we are reasonably confident of the frequency and severity probability distribution for the event. A "Ku" risk is comparable to the Diebold unknown risk, ie, we know the event will occur, but we are not confident of its frequency and/or severity probability distribution. The "A" risk classification was introduced to reflect those situations where a risk has two or more states and in each state we are reasonably confident of the frequency and severity probability distributions, but we are not certain as to when a particular state will exist. A classic "A" risk is market risk for listed shares, where it is known that there is more than one state, but where the frequency and severity of the return profile is dependent on the state of the market. "A" type risks often result from situations where human reaction to the environment results in moves from one state to another, as occurs in listed equity markets. An "I" risk classification refers to the truly unknowable "black swan" risk events, those which we cannot characterise and which may or may not happen.

We have extended this classification system to recognise our view that risks are dynamic and can exist in all "Kc", "Ku", "A" and "I" states at once, with changing importance of each risk state over time. Further reflection then suggests that within the "A" risk state, there may be both "Kc" and "Ku" type risks.

If you consider operational risk for example, then it is possible to estimate reasonably the frequency and severity of the bulk of the events that might occur close to the mode of the distribution. As illustrated in the Ganegoda and Evans paper relating to the measurement of operational risks in banks,[3] there are risks that can be reasonably well modelled, ie, the "Kc" type risks arising from, for example, procedural errors and known legal risks. However, part of these operational risks will be "Ku" type risks arising from new procedures and legal decisions that were unexpected. Legal risk also exists in the "A" state continuously as there are legal outcomes of which we can be reasonably confident, those where we would be less confident and it is likely that there exist events about which we have no idea. Hence operational risks exist in all four simultaneously and the importance of each is also unpredictable at any point in time.

The simultaneous existence in all four states means that any risk assessment and management must take into account the different nature of the states. To treat the risk as existing in one state only will result in an error in its assessment and therefore in its management. It is also feasible that over time, both the absolute level of the total risk and the proportion of the total risk that exists in each state could change. An example is that when a major change in an administration process is introduced, the "Kc" operational risks would diminish and the "Ku"

risks would increase until there was sufficient experience and therefore knowledge to revert to the previous weights. This dynamism of risks indicates that an assumption of permanence or sustainability could result in an understating of the risks, as the knowledge of the risks will change as the weights across the "Kc", "Ku", "A" and "I" states change. Another example would be where a bank has issued a mortgage with a maximum LVR of, say, 80%, but decides to increase this to, say, 95%, then the "Kc" credit risk would diminish and the "Ku" credit risk would increase, which should send a message that there needs to be increased surveillance of the credit risks arising and increased management attention until the experience has stabilised.

Similarly, with the introduction of new financial products, there is an increase in the "Ku" risk and the exposure to "A" and "I" risks, as well as a decrease in the "Kc" risks, especially with respect to misunderstanding by both consumers and the distribution system. There are both regulatory and internal risk management issues that flow from this realisation.

From the regulatory perspective, it follows that prudential capital requirements need to recognise explicitly the unstable state of the "Kc" and "Ku" risks that exist in any financial institution. Since "I" risks are unknown, it is difficult to see how the prudential capital for this component of the risk could be determined other than in a very broad way by some arbitrary allowance, or recognising the implicit guarantee that the government appears to offer to the largest financial institutions on the grounds of their economic impact of failure.

The current practice of an institution determining a model of their risks based on their own experience to the extent it exists, supplemented by industry data, then recalibrating the model on a regular basis would seem to be flawed, as all this is doing is picking up the change in weight between the "Kc", "A" and "Ku" components and would always be in a state of perpetual adjustment. By specifically recognising the component of the total risk that is from the "Kc" classification, ie, nothing substantial has changed in the business process that produces a particular risk, as well as the component from the "Ku" risk, ie, the component of this risk that could never be modelled with any certainty, then the certainty, or lack of it with respect to the modelling of the risk, is identified and prudential capital is required to support the extent of the risk. This process would mean that the prudential capital would be dynamic as well and there would need to be increased supervision to reduce the risk of failure. It is however feasible if it is recognised that the increase in "Ku" risk is only temporary, then additional prudential capital may not be needed if it were offset with a heightened surveillance by the institution. There is also the possibility that, having recognised the risk and prudential consequences of changes to business practice, financial institutions might think twice before signing off on new ventures.

The dynamism of risks has serious implications for risk management in financial institutions, as failure to recognise some parts of the risks is difficult to determine. The risk identification process failure could prove fatal if there was a significant change in a major business process and if several of the now heightened "Ku" risks eventuated simultaneously. This failure to recognise a serious change in the business process was undoubtedly a major contributor to the problems of the banks leading up to the GFC, as they failed to appreciate the changes in the credit risks they were taking on and then failed to see the contagion risk that was rising rapidly. A heightened awareness of the coincidental multiple risk states would undoubtedly assist boards to better ensure that management brought to them a better understanding of the risks associated with new business processes. The acceptance of multiple risk states would then lead to a change in the way institutions carry out their risk review processes, as there would need to be an assessment of the change in risks with any significant proposal to change the business process or introduce a new product or acquire another business. As part of the implementation phase of any one of these changes, the risk management process would also need to be changed to be alerted to the heightened risk until it returns to a reduced level. Of course, it may also be the case that a new operational process could be introduced which reduces or transfers "Ku" risk, for which this risk framework should help highlight the inherent value of doing so. This suggests that the risk management review process needs to be much more dynamic than currently occurs, but the consequence should be a reduced risk of failure from multiple events that should have been recognised.

The suggestion that risks be considered as being in "Kc", "A", "Ku" and "I" at all times, as well as the fact that all that is happening over time is that the weight in each state changes to reflect business practice or external environment changes, requires continual analysis to identify the weights and to put in place effective monitoring processes. Techniques to predict the evolution of risks, or at least operational risks, have been discussed by Allan and Corrigan.[4] In their paper, they use phylogenetic approaches to understand the drivers of major operational risk events in the financial services sector and by mapping events using a common set of drivers, they were able to understand how major operational risks could evolve.

Their approach allows risk management to concentrate on monitoring these major drivers on the assumption that there is a high probability of similar patterns

emerging in the future with disastrous consequences if not controlled at early detection. This risk management approach is a methodology to predict the reduced weight to the "Kc" state and a heightened weight to the "Ku" state by detecting the existence of particular drivers of operational risk that evolves into more serious risks. The approach of Allan and Corrigan shows promise and needs to be extended and tested for other major risks to assist in the risk management process of financial institutions.

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Footnotes

1. FX Diebold, NA Doherty and RJ Herring, *The Known, the Unknown and the Unknowable* (2010) Princeton University Press.
2. A Ganegoda and J Evans "A framework to manage the measurable, immeasurable and the unidentifiable financial risk", *Australian Journal of Management*, December 2012.
3. A Ganegoda and J Evans "A scaling model for severity of operational losses using generalized additive models for location scale and shape (GAMLSS)", *Annals of Actuarial Science*, November 2012.
4. N Allan and J Corrigan, "Emerging risk assessment — latest innovation and practice", presented to *Actuaries Institute Summit*, May 2013.