REPRINTED FROM

Risk

Risk.net August 2016

The new A to Z of risk modelling

Scott Aguais is helping banks go from point-in-time to through-the-cycle, and back again, writes Michael Hegarty

Things are changing in the world of credit risk. Since Basel II cemented the approach in regulation, banks have been relying on so-called through-the-cycle measures of credit risk, which average out the impact of fluctuations in the economic cycle. But requirements such as International Financial Reporting Standard 9 (IFRS 9) and the US Federal Reserve Board's Comprehensive Capital Analysis and Review (CCAR) are increasingly pushing banks towards the opposite: point-in-time measures, which incorporate these hidden cyclical effects. That leaves banks with the problem of having to switch between through-the-cycle measures for regulatory capital purposes and point-in-time measures for tasks such as accounting and supervisory stress testing.

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Scott Aguais, a London-based credit risk consultant and former credit modeller at Barclays and Royal Bank of Scotland, claims to have the answer. It lies in uncovering the cycles – denoted by the enigmatic letter Z – that cause credit risk to rise and fall over time. That is the goal of the Z-Risk Engine software, designed to work with banks' existing credit models, taking through-the-cycle numbers and using them to accurately assess credit risk at any point in the cycle.

The technology simulates the impact of the credit cycle in different regions and industries. By overlaying these effects on to various credit risk metrics – such as probability of default, loss given default, and exposure at default – it produces through-the-cycle and point-in-time numbers, which can be displayed alongside each other.

Aguais calls it the "dual ratings" approach, as it should allow banks to move easily between point-in-time and through-the-cycle measures without having to completely rebuild their credit risk architecture. The difference is more than just academic; the two measures of credit risk can differ by a factor of up to 10, he says.

"The cycle is not embedded fully in most credit assessments, because those models aren't running off current information that tracks that cycle, so you have to build these industry and region cycle measures and add them to the existing credit models," he explains. "One then gets much more accurate measures of credit risk at each point in time. And if one runs those same models with the cycle effects set to zero, one gets through-the-cycle assessments."

It is a simple idea, but one which has been more than a decade in the making. Aguais and long-term collaborator Larry Forest, who earned his PhD in economics under future Nobel laureate George Akerlof, have worked together since 1989. Aguais traces the origin of dual ratings to a 1998 research paper co-authored by Forest, in which Z was introduced as the variable for the "composite effect of economic factors influencing the rating-score migration" of borrowers, or a way of quantifying credit cycles.

Start of the cycle

The terminology of point-in-time and through-the-cycle first appeared in the literature of credit rating agencies during the 1990s, says Aguais. Basel II built on the fact rating agencies identified their ratings as being through-the-cycle, so this was reflected in the internal ratings-based (IRB) approach to credit risk.

After working as a consultant developing credit risk models in the US and Canada, Aguais – who also holds a PhD in economics – was hired by Barclays Capital in 2002. At the time, the UK investment bank was looking for somebody to spearhead its implementation of Basel II for credit risk as global head of credit risk methodology. Forest and Aguais duly packed up and moved from the Toronto offices of software vendor Algorithmics to Barclays Capital's London headquarters.

"We started experimenting with developing these credit risk cycles and we realised that if you look back over 30 years of data you see mean reversion – so if times are good and everything else the same, things tend to get worse, and if times are bad and everything else the same, they'll tend to get better," says Aguais. "But we also noticed that there's kind of momentum, so if you're going in one direction – getting better or getting worse – then you also tend to keep going in that direction in the short run."

The combination of these momentum and

mean reversion effects has an impact on all firms' likelihood of default, meaning that companies are more likely to founder during sustained economic downturns than they would otherwise. Aguais sums it up with the old adage that "a rising tide lifts all boats". But this truth is glossed over in the through-the-cycle view of the world.

In 2002, Barclays Capital, like other banks, made use of CreditEdge risk analysis software from New York-based rating agency Moody's Investors Service's subsidiary Moody's Analytics. But unlike other banks which used CreditEdge as an 'early warning' alongside more traditional credit analysis, Barclays was using the software to directly assign internal ratings. With the advent of Basel II and its through-the-cycle approach to credit risk, this became tricky because the CreditEdge ratings were point-in-time measures.

"It was really an extremely lucky step of fate that we were able to go to BarCap for Basel II ... and we were able to start working on the point-in-time/through-the-cycle framework," says Aguais. "Prior to that, we hadn't really focused on modelling credit cycles."

In order to obtain the through-the-cycle measures required by Basel II, Aguais and Forest had to find a way of deriving them from point-in-time numbers. This was the "Newton's apple" moment when the idea of dual ratings was born, says Aguais. He and Forest developed a technique to unpick the credit cycle from the CreditEdge model, so the resulting ratings could be deployed for the IRB. The technique was signed off by UK regulators and impressed Barclays' senior executives so much that it was ultimately rolled out globally.

The success Aguais and his team had at Barclays soon caught the eye of another UK bank that needed to work on its credit models.

"RBS then called and were in deep doo-doo in 2009," he recalls. The bank, which since the 2008 credit crisis had been majority owned by the UK government, was under fire because its IRB models were not up to scratch. RBS was "being threatened by the regulator" and had been ordered to "rebuild everything" in its credit risk model, says Aguais.

So he and his team found themselves overhauling a major bank's credit risk models using their views on credit cycles. In the case of Barclays, the model had to be adjusted to remove the cycles, but when building the new model at RBS, Aguais and his team were able to weave the credit cycle into the core econometrics. Once again, senior executives at the bank were impressed and regulators signed off on the new model.

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As the RBS project ended, Aguais sought a new challenge. In 2014, he and Forest began their own company, Aguais and Associates, where Aguais currently serves as managing director and Forest as global director of research. The idea was to help banks implement a dual ratings approach to credit risk modelling, which they believed was about to become indispensable with the arrival of IFRS 9 and the ascendency of CCAR. "Now, IFRS 9 and stress testing explicitly require point-in-time measures, on an unconditional and conditional basis," Aguais says. "But I don't think very many banks have started to move very far in that direction."

In January this year, Aguais and Associates became an associate firm of New York-based consultancy Deloitte. More recently, Aguais returned from a tour promoting the Z-Risk Engine in Australia and Singapore, where he says the product received an enthusiastic response from major banks and regulators. There has also been interest from banks in Europe and the US, he adds, ahead of a planned launch in September.

One driver for this interest may be IFRS 9, which is due to come into force in January 2018. The accounting standard demands that banks come up with an unbiased and probability-weighted estimate of expected losses for assets subject to impairment, such as loans. At the moment, some banks and regulators take this to mean a "limited multiple scenario framework", says Aguais. But he believes it means the use of an unconditional, point-in-time probability. "We think the better way to do that is with this unconditional [point-in-time] simulation covering all possible future scenarios," he says.

What started off as a way of making Barclays' credit risk models compliant with Basel II has suddenly become very relevant to global banks. ■