

# FINsights

Technology Insights for the Financial Services Industry

Governance, Risk and Compliance »



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## From the Editors Desk

We are delighted to present the second issue of the Infosys Banking and Capital Markets journal FINsights. The spotlight in this issue is on Governance, Risk and Compliance and the compilation of articles reflect perspectives on risk and its measurement, governance, the compliance conundrum and our take on the priorities in risk and compliance and their technology implications in the coming years.

The increased incidence of failures in the financial services marketplace over the past decade has given visibility to the science (and art) of understanding and measuring risk in running a business, making strategic and tactical decisions and participating in markets and economies that are increasingly linked in a flattening world. A recent such event, covered in one of the articles, has been the sub-prime crisis and the unforeseen ripple effects in markets in distant parts of the world.

As always we have tried to reflect in these articles the unique value that Infosys brings to its clients through a combination of deep domain understanding, technology best practices and global sourcing expertise. The article on sub-prime crisis reflects the current challenges in credit risk measurement and brings a perspective that combines credit risk measurement approaches with a global knowledge process outsourcing (KPO) option.

Risk and compliance is a multi faceted animal and the focus in the past few years has been on giving it a holistic view through a unified Governance, Risk and Compliance (GRC) program. The articles featured on GRC explore integrated controls to implement GRC, use of SaaS in GRC and industry perspectives on GRC and the road ahead. In the area of compliance, the articles look at addressing compliance challenges, an aspect of internal compliance namely employee surveillance and the partial compliance challenge in the wealth management industry. Our articles on risk address credit risk management, the role of master data in risk measurement and risk reporting. Included in this issue is also a case study highlighting the importance of Information Risk Management (IRM).

We would like to thank all the authors from Infosys as well as external contributors - Adam D. Honoré from Aite Group, Tim Leech from Navigant Consulting and Bob Skea of Northstar Systems. As always, we look forward to your queries or comments on Governance, Risk and Compliance or any feedback and suggestions in making FINsights a more relevant and topical journal.

Happy reading and all the best for the new year 2008!

**Balaji Yellavalli and Sudhir Singh**  
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## Sub-prime crisis and credit risk measurement: lessons learnt

Although macroeconomic factors like plummeting interest rates, lack of government oversight and a lender friendly investor market for credit risk transfer are the major factors usually assigned to the sub-prime crisis, this article explores another factor – the current credit risk measurement process in retail mortgage lending. The article looks at some of the issues relating to credit risk measurement and ways to address the challenges going forward.

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Credit risk measurement in retail banking is essentially the underwriting process that a bank uses to determine a borrower's ability to repay. Before looking into the key issues with the current credit risk measurement approach, let us look at the major factors that contributed to the US meltdown with relation to the sub-prime mortgage lending.

**Plummeting interest rates:** The expansive monetary policy stance adopted by the Federal Reserve, since early 2000, to stimulate economic growth, saw the Federal Reserve Funds rate plunge to a low of 1 % in 2003 and correspondingly the prime rates hitting a low of around 4% at the beginning of 2004. The sub-prime market has always been lucrative to lenders because sub-prime borrowers will pay higher rates of interest and fees for a mortgage loan than a customer with a reliable track record. This is to compensate for the sub-prime borrower's poor or imperfect credit history. However, thanks to the federal government's monetary policy pre-2005, even the sub-prime "higher interest rates" which are normally 2% to 3% higher than prime rates did not seem that high.

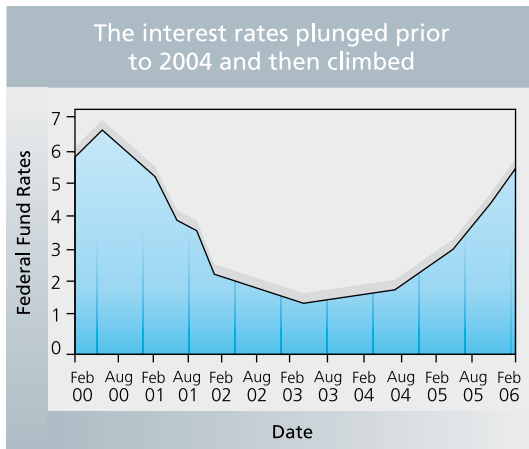


Fig 1: The interest rates plunged prior to 2004 and then climbed (Source: Federal Reserve)

However as shown in Fig 1, the macroeconomics changed from 2005 with interest rates gradually moving and changing the market dynamics contributing in a big way to the crisis.

**Lack of government oversight on new financial products:** It is interesting to note that the period from 1996 to 2004 was a period of innovation. In their enthusiasm to go after the lucrative sub-prime market, the lenders introduced into the marketplace a number of new products. With no proper government oversight, products were offered at low or discounted interest rates with other features that made it easy for borrowers in this risky segment to get loans. For example there were the Alt-A loans that required little or no documents, NINJA loans that were

loans granted even on 'no income, no job, no asset' and the piggyback loans that where the home-buyer could purchase a home with less than 20% down payment. Fig 2 shows the growth of one of these popular products - piggyback loan during this period.

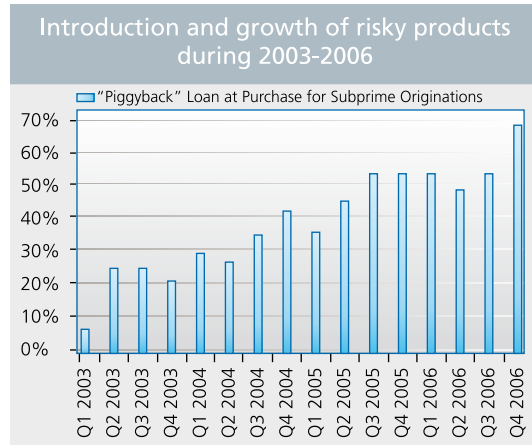


Fig 2: Introduction and growth of risky products during 2003-2006

(Source: Office of Federal Housing Enterprise)

All these products had deceptively low monthly payments in the beginning followed by higher payments in latter years resulting in higher delinquencies and foreclosures. The question that needs to be asked is what made the lenders feel that they could take on the extra risk introduced by these products and the answer is the booming credit derivative market that made risk transfer easy.

**A booming CDO market that made transfer of credit risk easy:** Banks often sell their loan portfolios to investors in order to reduce their risk exposure. While effective, this is difficult to implement as the loan portfolio of one bank seldom perfectly suits another investor's needs – ending in sales with large discounts for the banks. However, this issue was largely been eliminated in the past few years with the growth of the collateralized debt obligation (CDO) market. CDO are securities that are backed by a portfolio of bonds or loans. These can be better tailored to match an investors needs through "tranches" or classes of securities with different levels of risk, offering the investor a lot more choices. Although these tranches make the sale process easy, one criticism is that they also tend to obscure the inherent credit risk of underlying risky loans.

**The fourth factor – credit scoring:** No doubt the above factors contributed largely to the US meltdown. But some blame has to be taken by one more factor, the credit scoring approach. To fully understand the impact of this approach one has to look at it from the context of changing dynamics in the lending business.

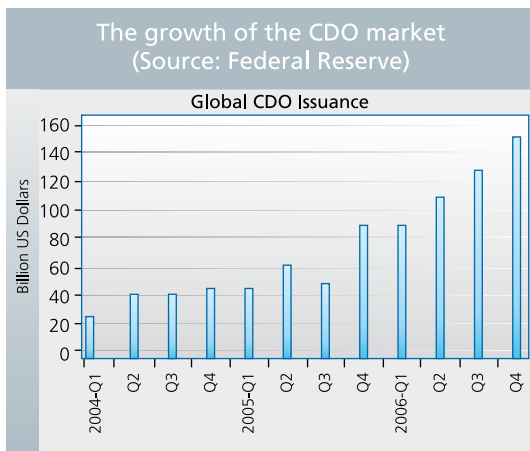


Fig 3: The growth of the CDO market (Source: Federal Reserve)

### The problems with credit scoring

As can be seen from Fig 4, in the traditional loan life cycle, the key entities were the lender and borrower. The key loan processes were loan origination, servicing and collections and the loan remained for the entire life cycle on the books of the lender. This life cycle is sometimes referred to as originate-and-hold approach. The credit risk measurement is applied during loan origination for measuring the credit-worthiness of borrower.

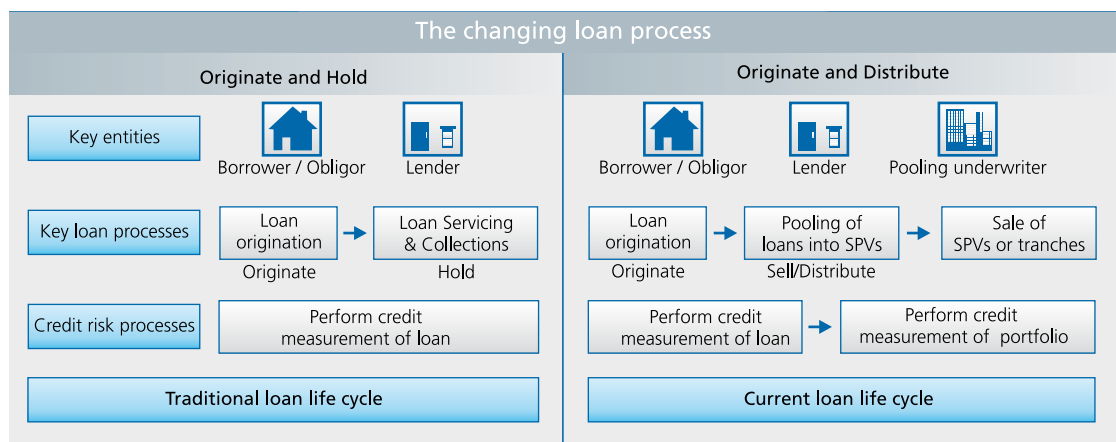


Fig 4: The changing loan process

With the growth in the securitization market or the market for a pool of loans or mortgage backed securities, this model changed introducing a third entity – the pooling underwriter. The pooling underwriter is normally a separate financial institution that builds special purpose vehicles (SPV) like CDOs that are securitized by loans. The pooling underwriter further breaks the instruments into various tranches – each tranches representing a pool of loan with similar risk exposure. These tranches are then sold to a third party, the investor, for immediate cash. This also benefits the lender in another critical way – helps lenders transfer its

credit risk. This life cycle is also known as the originate-and-distribute approach. In this approach, credit risk measurement is now applied at two levels: at origination during the underwriting process of loan and the pooling process when the risk measurement has to be applied to calculate the risk of each tranche.

Unfortunately for sub-prime loans, possibly because of lack of historical data for this segment, both loan and pool underwriters based their decision mostly on scores on consumer creditworthiness provided by Fair Isaac Corp. – scores which are popularly known as FICO scores.

**Excessive weightings on FICO cut-offs for credit risk measurement of loans:** FICO provides a cut off score which as shown in Fig 5, helps the lender distinguish the “good customers” from the “bad customers”. But like any statistical measure this cut off score is not 100% percent accurate as some good customers will turn out to be bad or “false goods” as shown in the figure. Since approximately 50% of the score is based on past payment and credit history, FICO score is even less reliable for a sub-prime customer since the credit history is unreliable or in some cases does not exist. But here is where the US banks made a serious mistake. Since FICO scores had

traditionally served well for the prime consumers, U.S. mortgage lenders got a little too confident with FICO and gave excessive weightings to it. And the net result was an increase in “false goods” as shown in the figure. Underwriters failed to look at other factors besides FICO scores for reducing the “false goods”, like how much the borrower is putting down or what is popularly called loan to value ratios and how well the borrower has documented his income. A recent study by a bond rating agency, Dominion Bond Rating Service (DBRS), showed that, for instance, that a borrower with a high credit score is just as likely to default on a no-money-down mortgage as a lower-scoring borrower who puts down 40%.

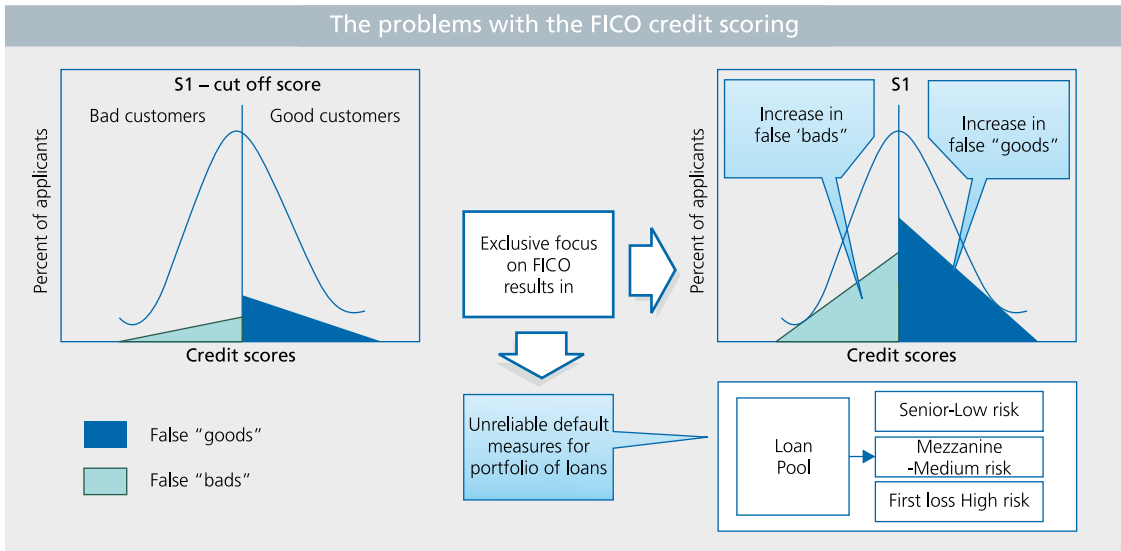


Fig 5: The problems with the FICO credit scoring

Excessive weightings on FICO cut-offs for credit risk measurement of CDO tranches - The pooling underwriters made the same mistake of excessive dependence on cutoff scoring approach for portfolios too.

with 5% money-down and the other booked a 30-year fixed rate loans with 20% money-down. Despite having the same FICO scores, these loan pools would not be expected to perform the same. Other risk factors needed to be considered like kind of product, documentation and amount of money down.

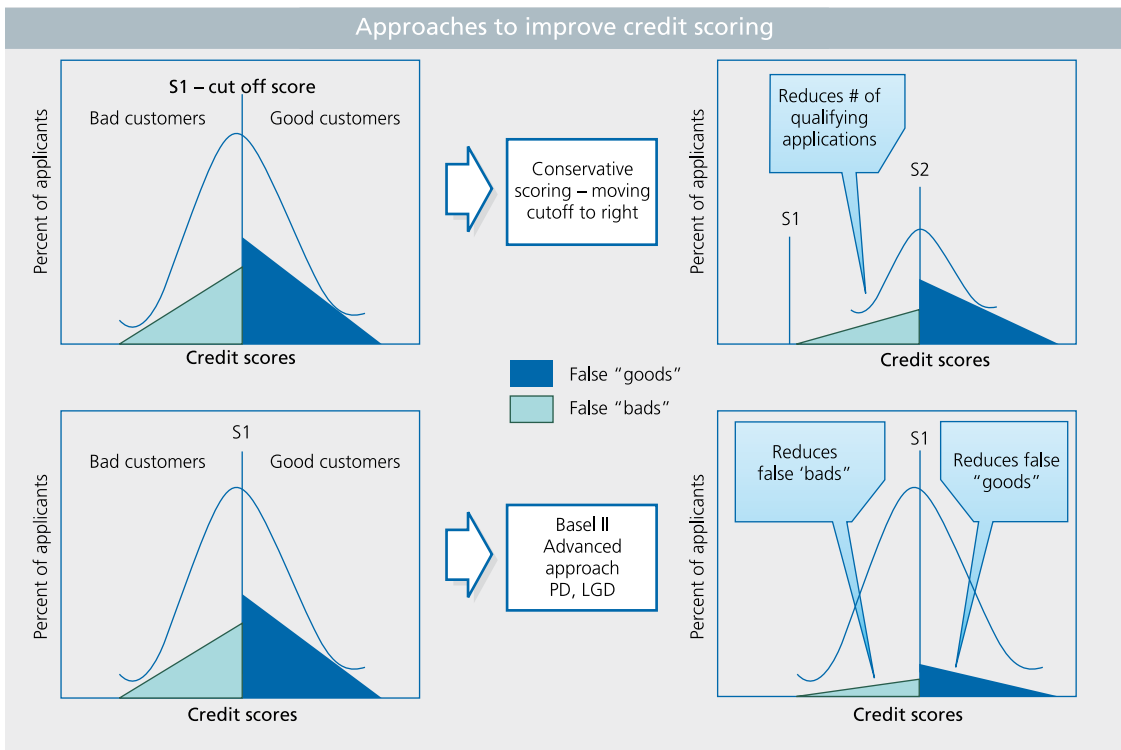


Fig 6: Approaches to improve credit scoring

Mortgage loans were clubbed together into tranches based on FICO scores even though they related to different loan products. For example, two mortgage applicants with identical FICO scores would be clubbed together even though had one booked a piggy-back loan

Obviously this did not happen sufficiently well with the sub-prime loans. In 2006, a large Wall Street firm sold a \$1.2 billion sub-prime loan portfolio in which the borrowers had an average FICO score of 631, within the upper range of sub-prime borrowers. Around the same time another portfolio sold was sold by another large mortgage company with borrowers scoring an average

of 600, putting them in the depths of sub-prime. The investors were told that based on the credit cut off scores, the portfolio sold by Wall Street firm was less risky. But 18 months into both pools lives, 15% of the borrowers defaulted in the first case while only 4% in the second case. The reason given was poor documentation for the former case – which obviously was not taken into consideration during the process of creating tranches.

or the loss that would actually accrue if the pool goes into default. This approach not only ensures that the risk estimates are far more accurate for portfolios, but they will also minimize the amount of regulatory capital required to cover default losses. A recent study by the Basel Committee showed that the regulatory capital reduction resulting from the adoption of this approach is close to 50% for retail portfolios.

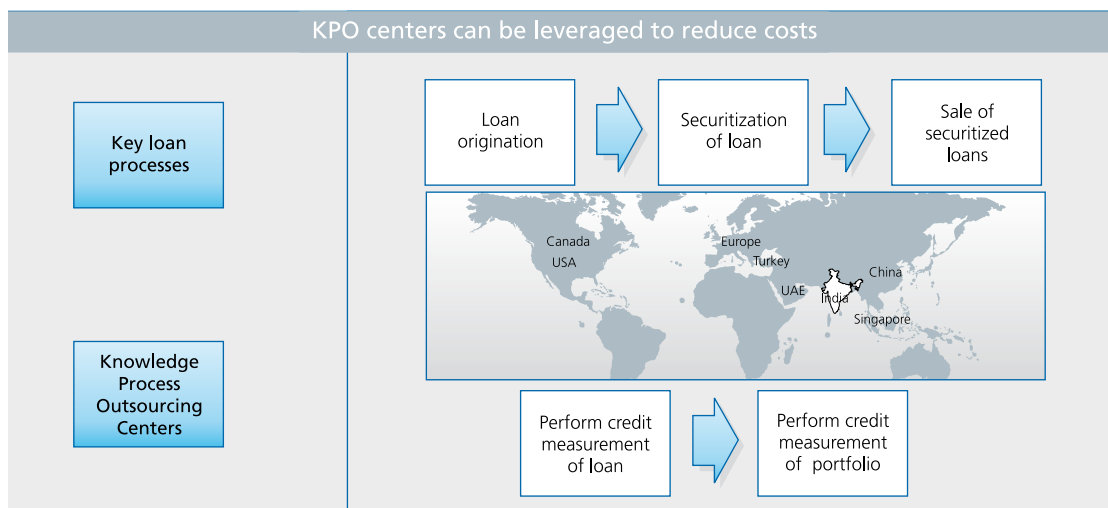


Fig 7: KPO centers can be leveraged to reduce costs

Clearly cut off scores are not sufficient. They rate an individual's risk over time but do not necessarily provide the best assessment of the credit risk of the loan, still less that of a portfolio.

**Ways to improve the credit risk measurement process in a cost effective manner**

As lenders look forward to improve their credit risk measurement approach they will look at several alternatives. An easy way out would be to increase the cut-off score. As shown in Fig 6 above, although this will reduce the number of "false goods" it will also result in fewer applicants qualifying and thus decrease the potential revenue.

**Include other risk factors for loans and move to Basel II recommended approach for portfolios:** Going forward, banks should collect more data and give more weight to other risk factors. Obviously this would add to the underwriting process and technology will help greatly in reducing the effort. Some processes like checking for quality of documentation, an important risk factor, are very manual and cannot be automated. For pool underwriting it would make sense for financial institutions to move to the Advanced Internal Ratings Based (IRB) approach recommended by Basel II. This requires banks to consider various other risk factors besides credit scoring and calculate the probability of default (PD) of the pool and loss given default (LGD)

**Reduce process cost through outsourcing:** Although it is quite clear that a more rigorous underwriting process is required at both the loan and portfolio levels, most banks are wary of the high capital investment in processes and technology. As shown in Fig 7, an effective way to avoid this high investment is to outsource the credit risk measurement process to knowledge process outsourcing (KPO) centers. India has become a preferred outsourcing destination for mortgage lenders with its deep labor markets and this process could be a natural extension to existing services.

**Reduce technology cost through on-demand services:** A similar approach could be applied for technology to move from a fixed cost to a variable cost structure. Several companies are offering on-demand services popularly known as Software-as-a-Service (SaaS) models that could be leveraged to host industry standard loan origination systems "off premise" and serve a number of lenders on a cost per transaction basis.

**Conclusion**

To sum up, it is clear that banks have to look at better approaches to credit risk measurement given the weaknesses of the existing approach. Although the alternative approaches of including other risk factors during underwriting for loan assessment or adopting the

Basel II Advanced IRB models for portfolio assessment seem expensive, there are a number of cost –effective options, which if leveraged, will help not only the individual banks but the entire financial industry.



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*The authors would like to thank Nikhil Bhingarde and Harpreet Khasseria for their research and insights on this topic. Nikhil is a Principal and Harpreet is a Senior Associate with the Banking and Capital Markets practice of Infosys Consulting.*

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