Impact case study (REF3b)

Institution: The University of Edinburgh

Unit of Assessment: 19 Business and Management Studies

Title of case study: Increasing insights into Credit Risk of Small and Medium-Sized Enterprises (SMEs)

1. Summary of the impact

Research on risk assessment of SMEs conducted at the University of Edinburgh Business School (2005-current) in conjunction with the international credit industry has improved understanding of SME behaviour with a view to assisting lending bodies in their decision-making. It has led to refinements in the process of developing commercial credit risk models by providing valuable additional details to enhance existing models. It has developed methodologies now used by some of the leading lenders [text removed for publication] to cut the cost of providing credit, thereby making more credit available to SMEs. The reach of the work has extended across 349 credit practitioners from 38 countries.

2. Underpinning research

The research (which broadly falls under the Credit Research Centre (CRC) agenda) has been conducted since 2005 by:

- Dr Galina Andreeva (Lecturer in Management Science, CRC member, 2005-current)
- Prof Jake Ansell (Professor of Risk Management, CRC member, 1990-current).

The research has investigated SMEs' financial performance and the resulting implications for their credit risk assessments. An important feature making SMEs distinct from large corporates is their informational opaqueness: their financial accounts are less detailed and less reliable than those of larger businesses, and most SMEs are not listed on stock exchanges. This restricts considerably the information available to lenders for credit risk assessment. Various linked pieces of research have investigated ways to improve the effectiveness and accuracy of assessing and measuring SMEs' credit risk in order to better translate available information into a credit-granting decision.

First, building on the premise that SMEs share the risk patterns of consumer risk and corporate risk, this research has combined two traditional credit risk paradigms – corporate (Finance) and retail credit (Management Science) to demonstrate the superiority of a hybrid approach [3.1]. A further methodological contribution has been to improve understanding of defining credit default among SMEs. The most common, "hard", definition is insolvency, but this may not be suited to SMEs where insolvency is often not registered. The research has incorporated "soft" definitions of financial distress, e.g. cash-flow or stock-based indicators, and demonstrated their utility to the SME community [3.1].

Second, the widespread use of automated transactional lending has raised concerns that important qualitative information is left out of lending decisions. The credit crisis has intensified such concerns and led to appeals to bring back judgemental Relationship Lending. Relationship Lending is based on personal contacts between a Credit Manager and an Obligor and on the Credit Manager's subjective judgement of the Obligor's creditworthiness, in particular the Obligor's Management Capability, i.e. the ability to run the company successfully. In contrast, transactional lending (or "credit scoring") is automated and relies on quantitative information, such as financial transactions. However, Relationship Lending is expensive, restricting lending to SMEs. This research [3.2] demonstrated that Management Capability measures can be derived from standard transactional characteristics normally used in credit scoring, thereby circumventing the need for Relationship Lending.

Third, the research has explored the behaviour of SMEs throughout the "credit crunch" from

2007-2010 using a large UK dataset. The findings showed that, despite increases in the numbers of SMEs performing badly, there is still a significant degree of stability and accuracy of credit risk models. This means that models do not need to be redeveloped in times of drastic economic changes [3.3]. Nevertheless, the research also indicated that particular segments (defined by region, age and industrial sector) within the SME sector appeared to be more vulnerable to the crisis, and showed how credit risk models should be adapted for these segments.

Further work has investigated changes in the predictive value of different information types through the crisis [3.4] and panel modelling methodology has been applied to SMEs' credit risk assessment [3.5].

3. References to the research

3.1   Lin S-M, Ansell J and Andreeva G (2011). 'Predicting default of a small business using different definitions of financial distress'. Journal of the Operational Research Society, 63, 539-548 (10 August 2011) (DOI: 10.1057/jors.2011.65)

3.2   Ma Y, Ansell J and Andreeva G (2011). 'Management Capability: Is it Possible to Quantify for SME Credit Risk Assessment?' Credit Scoring & Credit Control XII conference, Edinburgh, UK. http://tinyurl.com/pycw7du

3.3   Orton P, Ansell J and Andreeva G (2011). 'Recent Developments in Commercial Scoring' Credit Scoring & Credit Control XII Conference, Edinburgh, UK. http://tinyurl.com/pr4mery

3.4   Andreeva G (2012) 'Modeling Credit Risk of Small and Medium-Sized Businesses: Evidence from the UK' Invited talk at INFORMS conference on Business Analytics and Operations Research http://meetings2.informs.org/Analytics2012/index.php or http://tinyurl.com/nvtdp83. This is a highly prestigious and competitive US practitioner conference (30 papers selected out of 82 submissions)

3.5   Andreeva, G, Ansell J and Ma, M, (2013) 'Credit performance of the UK SMEs through the Crisis' Impact Workshop, Edinburgh, UK. http://tinyurl.com/p62wh8u

4. Details of the impact

The research has enhanced lending bodies' understanding of SME behaviour and has refined existing credit scoring models by providing additional detail, thereby improving SMEs' access to credit. In the field of credit scoring, conference presentations have more immediate reach and impact as they avoid the significant time lag before results are published in journals. In the case of the research reported here, the findings have reached a wide range of leading lenders via INFORMS 2012, Credit Scoring & Credit Control (CS&CC) 2007, 2009, 2011 conferences. CS&CC2011 attracted 349 credit practitioners, with major lenders (Lloyds, RBS, Barclays) attending [5.1]. In addition, in June 2013 Dr Andreeva organised a workshop specifically focused on SMEs which brought together 30 practitioners and 40 academics [5.2, 5.3].

1.   **Modelling risk of leasing to SMEs.**
[text removed for publication], the leading [text removed for publication] leasing company hiring out transport and equipment predominantly to SME customers, took into account the results presented at CS&CC2007, 2009 conferences and later published [in 3.1] when designing their first statistical scorecard (implemented in 2011). Their statistical scorecard is now based on the methodology outlined in the paper. Previously, [text removed for publication] used a subjective judgmental approach to credit risk assessment. The new statistical model allowed them to automate a significant part of this process. This led to faster decision-making whilst ensuring an acceptable risk level [5.4]. Communication with the company was conducted via e-mail, telephone and visits to [text removed for publication] by Dr Andreeva between 2008 and 2011.

2.   **Management Capability.**
[text removed for publication]   (a leading [text removed for publication] bank with more than 30

million customers) approached Dr Andreeva and Professor Ansell after the CS&CC2007 conference. Together, they devised a PhD project which used [text removed for publication] internal credit transactions data. Obtaining highly sensitive commercial data for research is extremely difficult; it will not be made available unless lenders see clear benefits. The release of this data is therefore in itself a testimony to the research's perceived practical value by [text removed for publication] [5.5]. The research and discussions with [text removed for publication] have led to an improved understanding of the underlying structure of transactional data. As a direct outcome of this PhD studentship collaboration, elements of Management Capability that underpin variables in [text removed for publication] scorecards can be shown in a more visible way than was previously the case [5.6]. The PhD student, [text removed for publication] now has a job with the Central Bank of China, and her expertise in the assessment of SMEs' risk was a decisive factor in her obtaining this position [5.7].

3. **SME behaviour during the credit crunch.**
Similarly to the case with [text removed for publication], [text removed for publication]**,** one of the [text removed for publication] largest credit bureaux, supplied its data for research following the CS&CC2009 presentation (data received in spring 2011). Again the very fact of data provision signifies the provider's confidence in the practical value of this research. The research value has been to disaggregate the effects of the credit crisis on the performance of different segments of SMEs. The in-depth knowledge generated has allowed [text removed for publication] to check assumptions around stability of variables in their scorecards. This has engendered improved understanding of SMEs' vulnerability and their risk drivers, which in turn has enhanced [text removed for publication] analysts' ability to make scorecard developments robust to economic downturns [5.8]. Because of the commercial sensitivity of a scorecard's predictive performance and the complex, iterative nature of scorecard development, no data exist to quantify the precise impact of this, or any other, discrete piece of research. However, we know that even a small improvement in predictive accuracy translates into less loss (Berger, Cowan and Frame, *Journal of Financial Services Research*, 2011), thus leading to savings which can be re-invested into new credits, and ultimately expanding the credit available to SMEs.

5. Sources to corroborate the impact

5.1. Delegate numbers from Credit Scoring & Credit Control 2011 conference: 390 delegates, including 349 practitioners and 214 non-UK delegates from 38 countries (see past events: http://www.business-school.ed.ac.uk/crc or http://tinyurl.com/n932ncs) (Illustrates the research reach to a wider international credit scoring community)

5.2. 'Modelling the Credit Risk of a Small Business: State of the Art and Future Directions', Workshop Programme, 17 June 2013, UEBS'; included delegates from Hymans, RBS, HBOS, Bank of Scotland, Bank of Ireland, Lloyds, Funding Circle, Chartered Banker, Central Bank of Ireland and Experian: http://tinyurl.com/p62wh8u or http://tinyurl.com/mqo94pm (Illustrates the research reach to SME lenders in the UK)

5.3. 'Meeting of minds' article in AUG/SEP issue of 'Chartered Banker' magazine http://www.charteredbanker.com/home/chartered_banker/ or http://tinyurl.com/m6uorad (Illustrates the research value to a wider banking community in the UK)

5.4. Letter from [text removed for publication] signed by Vice-President and Head of Risk (Illustrates the impact of research in [3.1], section 4i [text removed for publication])

5.5. Confidentiality Letter to [text removed for publication] (Illustrates the confidential nature of research that involves credit data[text removed for publication])

5.6. Manager, Specialised and Commercial Models, [text removed for publication] (Can corroborate the impact of research on Management Capability, section 4ii [text removed for publication]).

5.7. Email correspondence from former PhD student giving details on their current employment (Illustrates the value of the research on Management Capability and potential wider impact, i.e. in China [text removed for publication])

5.8. Senior Business Consultant, [text removed for publication] (Illustrates the impact of the research on SME behaviour during the crisis, section 4iii [text removed for publication])