JCIC's Services and Assistance for Banks in the Implementation of Basel II — Bank's Use of External Data and External Models - Supervisory Compliance Concerns

Lin Si-wei
JCIC Risk Research Team

1. Introduction

The New Basel Capital Accord (Basel II) allows banks to adopt Standardized Approach or Internal Ratings Based Approach (IRB) to estimate their credit risk capital charge. Banks that adopt the Standardized Approach can use the ratings of external credit assessment institution (ECAI) as the risk weighting of banking exposures. The application of external data is explicit and straightforward.

Banks that plan to adopt the IRB approach will estimate risks based on their own loss experience and accumulated data. With knowledge of their own business history and data characteristics, the IRB banks need to conduct data analysis and build up an internal rating system as a vital instrument for assessing risks associated with current portfolio exposure. The internal rating system also serves as a mechanism for computing capital charge, and a tool for risk management and business operations.

The current portfolio exposures of a bank are not necessarily fully covered and reflected in its accumulated historical loss experience (including size and extent of exposure, risk characteristics, and length of historical data). Any estimation on the basis of past data alone has inevitable defect and limitations. Moreover, the IRB approach involves highly complex data, model and risk quantification issues. In each stage of internal rating system construction, the segmentation, quantification, and the actual use of rating system[1] must be validated, tested, fedback, and calibrated

---

[1] With regard to the major processes and content for banks to develop the internal rating system under the IRB framework, refer to a JCIC publication entitled Application of JCIC Consumer Credit Scores: Risk Segmentation and Risk Quantification.

against actual data to meet the minimum operational requirements. Thus if due to the inherent data limitations[2] that the internally accumulated data and derived information of a bank are unable to complete the tasks in each stage of system construction, the bank, albeit willing and capable of implementing the IRB approach, will be forced to adopt the Standardized Approach for part (or all) of its assets[3] .Thus finding the support of external data or model that is viable and available is critical for a bank that plans to adopt the IRB approach.

If it becomes necessary for a bank that plans to implement the IRB approach to use external data or model to make up for the insufficiency of its risk estimation and management mechanisms, the supervisor's review and validation of IRB qualification will be focused on whether the bank has a clear grasp of the features and limitations of the external data or model used, and is able to apply the data or model effectively, reasonably and accurately to supplement the deficiencies and whether the bank can continue to demonstrate the usability of the external data or model.

In contrast, the vendor that outputs the data or model should provide full and transparent documentation and information for its data and model to the extent acceptable to the data user. On the one hand, such information can be used by the potential user to evaluate the usability of vendor data. On the other hand, it can be used by the bank to make necessary calibration based on the limitations of the external data or model and its differences with internal data so as to demonstrate to the supervisor the reasonableness of incorporating such external data or model into the bank's IRB processes.

2. Supervisor's Requirements and Important Issues Concerning Bank's Use of External Data or Models

The Basel II risk-based capital framework allows and encourages banks to use vendor products, including data and models when their own data are insufficient for evaluating the accuracy of the internal model outcome. However no exceptions are made from minimum requirements for IRB

---

[2] For a new line of business where loss data are not available, the business is defined as a low default portfolio for which the bank lacks benchmarking model for validation. With regard to potential data problems faced by banks in the construction of risk model, refer to a JCIC publication entitled Establishment and Application of JCIC Data Research Service Platform.

[3] Pursuant to our *Guidelines for Banks to Calculate Own Capital and Risk-Based Assets - Credit Risk Standardized Approach and Internal Ratings Based Approach - Temporary Version*, for banks that adopt the IRB approach, "asset charge estimated based on the standardized approach shall not exceed 15% of capital charge for credit risk." In other words, if the 15% cap is exceeded, the bank loses the qualification to practice IRB approach and must use standardized approach.

approach when vendor products are used[4] . Thus a bank should understand clearly the features of external data before using and continue to track and monitor the effectiveness of those data. The major principles regarding the use of vendor products published by the Basel Committee are as follows[5] :

(1) Banks must be able to document and explain the role of vendor products and the extent to which they are used within their internal rating system and processes, for example, use in portfolio segmentation, quantification of risk components, evaluation or benchmarking the reasonableness of model outcome.

(2) Banks must be able to demonstrate a thorough understanding of vendor products used in their IRB processes, including the basic construction and methodologies of the external model that enable them to grasp clearly the validity and limitation of the model and carry out and document reasonable adjustment and overrides.

(3) Banks must be able to demonstrate the vendor products used fit the bank's own portfolio characteristics, risk rating methodologies, and IRB framework. The supervisor does not require that the external model used by a bank and the data used for developing the model must be in full compliance with Basel rules. But if material differences exist, e.g. important variables for risk assessment were not incorporated in the external model, or inconsistent default definitions, or inconsistent data period and minimum requirements, the bank should undertake appropriate adjustment or transformation.

(4) Banks must have clearly articulated strategies for regularly reviewing the performance and accuracy of vendor model results in their application to the bank's internal system.

Rules set forth by the supervisory agency in different countries for use of external models and data are in principle similar to the principles stipulated by the Basel Committees. The EU in particular has developed more specific directives based on the aforementioned principle[6].Our *Guidelines for Banks to Calculate Own Capital and Risk-Based Assets -Credit Risk Standardized Approach and Internal Ratings Based Approach - Temporary*

---

[4] Paragraph 421 of The New Basel Capital Accord: "Use of a model obtained from a third-party vendor that claims proprietary technology is not a justification for exemption from documentation or any other of the requirements for internal rating systems. The burden is on the model's vendor and the bank to satisfy supervisors."

[5] Excerpt from Basel Committee Newsletter No. 8 (March 2006) "Use of Vendor Products in the Basel II IRB Framework"

[6] CP10: Guidelines on the implementation, validation and assessment of Advanced Measurement (AMA) and Internal Ratings Based (IRB) Approaches: EU draft Directive Annex VII part 4 published by The Committee of European Banking Supervisors, CEBS in January 2006.

Version were drafted in reference to the practice of supervisory agency of other countries, and has a substantial section on the use of external data and models as well. An excerpt of the Guidelines is depicted as follows:

"A bank should keep complete records and save the risk characteristics data of its default accounts········· If the accumulated default data are insufficient for developing a rating system or model, the bank can use external default data. Nevertheless, the bank should demonstrate the reasonable use of external default data."

"A bank can use external and internal data to calculate PD and LGD, and confirm the comparability of external and internal data."

"(Mapping of external data)···A bank should confirm the difference and reasonableness of external rating system and its internal rating system, whether the default definitions of the external rating agency are consistent with bank's internal rules, and whether the rating results cover only the characteristics of borrowers, but not the credit line; in addition, the procedures for deriving probability of default (PD) (e.g. use of

medium, averaging, etc.) should be applied in a consistent manner while taking into account the reasons for significantly different rating outcome and confirming the possible effect."

"When assigning retail exposures to portfolio, a bank must use internal data as major sources of data for the estimation of loss characteristics. A bank is allowed to use external data or statistical model as quantification basis, provided it can demonstrate: (a) the bank's process of assigning exposures to the portfolio is similar to that used by the external source; and (b) the bank's internal risk characteristics are similar to the composition of external data."

"Besides having a sound internal validation process, a bank should also conduct comparison and difference analysis with external data."

"The documentation requirement for external commercial model involving proprietary technology can be met jointly by the model vendor and the bank."

The supervisory rules for the use of external data and models in IRB risk quantification set forth by national supervisors can be summed up in a few important directives as presented below[7] :

---

[7] Excerpt of the General Prudential Sourcebook proposed by UK's FSA Expert Group of FSA to the FSA Credit Risk Standing Group in August 2005. Source: http://www.fsa.gov.uk/pubs/international/default.pdf

(1) **Onus remains on firms:** The minimum requirements for IRB data and models are the same for vendor products. The banks bear the burden to provide complete and transparent documentation.

(2) **Commercial confidentiality:** Even if commercial confidentiality may limit the willingness of vendors of external models to disclose all details, the vendor is still obliged to provide transparent and full information for banks to evaluate IRB compliance.

(3) **Support and maintenance:** Banks should be able to assess continuously and periodically the performance of vendor products, and make adjustment if necessary. Banks should also have a contingency plan in place when they discontinue the use of external products (or when vendor discontinues support).

(4) **Comparability and representativeness:** Vendor product applied to a bank's portfolio should possess certain degree of relevancy and comparability, e.g. default definitions, credit policy and practice, and risk characteristics, and the external model or the composition of reference data output by the vendor should be shown to be fully representative of the bank's exposures.

3. Disclosure and IRB qualification of Vendor Products

The majority of data vendors are not financial institutions, nor the targets of supervisory regulation. The products they provide, be it data or model outcome, are not required to meet the minimum requirements for IRB. However when the product user is a bank that is applying for supervisory approval for the use of IRB approach, the vendor needs to provide full and transparent documentation on its product to help the user achieve IRB qualification. If the vendor is unable to provide "full" information to help a bank comply with the minimum IRB requirements out of concern of commercial confidentiality, the vendor might lose an important market for its products.

The degree of transparency the supervisor requires of vendor products has been an issue of great concern for data vendors and banks. As described above, both the Basel Committee and national supervisors believe that the IRB requirements for data and models are the same for vendor products that data vendor should provide full and necessary information to help the bank meet the minimum IRB requirements[8]. But the Basel Committee also understands that vendor products may not achieve complete

---

[8] Same as Note 4.

transparency as the bank's internal outputs (e.g. variables and corresponding weights used by the model) due to the proprietary nature of certain aspects of their product. Thus the Basel Committee adopts a more macroscopic and holistic view towards the issue, reckoning that the lack of full transparency out of concern for commercial confidentiality is not necessarily a material defect for bank's IRB qualification, that banks can use other validation techniques and tools, e.g. benchmarking and outcome analysis to make up for the limitation or insufficiency of external model or data[9]. Thus national supervisors have not established prescriptive disclosure requirements for vendor products, but lean towards requiring the collaboration between the data user (banks) and data vendor to develop documentation sufficient to demonstrate IRB qualification, that is, the external data after adjustment can be incorporated into the bank's portfolio characteristics and are shown to be effective for risk management, and the bank has the capability to continuously maintain and adjust such data.

---

[9] Same as Note 5.

4. Comparison between Suggested Disclosure of Vendor Products and Current JCIC Practices

Vendor products can be classified into vendor data and vendor models. In practice, this distinction is often blurred. As long as the vendor has subjected their data to certain degree of value addition processing, regardless whether it is simple compilation, calculation, statistical results, or analysis, testing, segmentation, generation of predictor variables or model outcome, the vendor needs to explain clearly its data and value addition methods. Otherwise, data user will not be able to evaluate the usability of external data. Information on vendor products that should be disclosed generally includes:

(1) **Source of data:** Data source, update frequency, length of historical data, definitions, and code reference table.

(2) **Data processing method:** How data were acquired and cleaned, quality check and data selection logics, and handling of extreme values and missing values.

(3) **Content of product:** Data combination and compilation method for the product, including how and why data were segmented if applicable, segmented data compilation and calculation method or formula.

(4) **Product instructions:** Product query or acquisition method, product features and limitations, suggested use, pricing, and customer service information.

(5) **Technical document and user manual:** External model vendor should have documentation explaining the purpose of model construction, model attributes, and range of prediction, construction method, sources and duration of data used, sampling method, definitions of predictor and explanatory variables, how variables are generated, method and criteria for selecting explanatory variables, methods for validating and calibrating model outcome, continuous validation and monitoring reports.

With respect to IRB qualification, although national supervisors lean towards not establishing disclosure requirements for external data suppliers, some supervisors, such as the Financial Services Authority (FSA) of UK has made specific directives for the use of external data. The directives are for banks and model vendors to understand the non-compulsory expectations of supervisor and mean to serve as guidance for collaboration between the bank and model vendor.

Joint Credit Information Center (JCIC) is the only national credit databank in Taiwan. It has been collecting quality credit information across the finance industry and serving as the most important source of external data for domestic banks. As the implementation of Basel II brings attention to the issues of risk management and IRB qualification, the role of JCIC as an external data supplier becomes all the more essential.

Taking the vendor information pack proposed by FSA as yardstick[10], the disclosure made by JCIC on its products provided for member institutions is depicted as follows to depict the role of JCIC as a external data supplier in helping domestic banks achieve IRB qualification:

---

[10] In reference to FSA CP189 Annex 3 .155 Proposed vendor grid and Use of External Models and External Data in the IRB Approach published by FSA Expert Group in August 2005. http://www.fsa.gov.uk/pubs/international/crsg_external.pdf

Table 1 Requirements for model-related data

	Item	Content	JCIC Disclosure[11]
Part A-- Model development			
A.1	The type of portfolio the model has been developed for	Model characteristics, including model time horizon. Show customer type, e.g. wholesale customer, medium corporate, small business, residential mortgages, accounts receivable purchased and sold.	The scoring range, data sources, data limitations, observation period and performance period of the model are fully described in the technical model.
A.2	What the model is designed to be used for	Describe the purpose of model, e.g. credit application, fraud detection, or prediction of recovery.	The purpose of model and development framework, variables, and predictor indexes are fully described in the technical manual.
A.3	Definition of model performance	The predictability of model in quantifiable terms.	
A.4	Definition of default	Describe definition of default used in model development.	The definition of default, source of data on confirmed default, and how data disclosure period confines the determination of default are fully described in the technical manual.
A.5	How the model is developed	Describe how the model was built, e.g. in-house or outsourced, custom made, or pooled, an expert system?	Model methodology, model development process, method for variable generation, variable selection standards, and model outcome are fully described in the technical manual.
A.6	Basic model assumptions	Detail the main assumptions used in model to cover market conditions or other known factors introducing uncertainty. (Question for banks - Are these assumptions fit for the design purpose?)	

[11] Detailed information on JCIC model is available in JCIC publications entitled Technical Manual for Corporate Credit Scoring Model (March 2006), Technical Manual for Consumer Credit Scoring Model (March 2006), User Manual for Consumer Credit Score Products (March 2006), and Consumer Credit Scoring Model Validation and Monitoring Report (July 2006). The underlined parts in **bolded form** are not yet disclosed or carried out.

	Item	Content	JCIC Disclosure
Part A-- Model development			
A.7	Use of data/other models	Describe the reference data used for model development, e.g. data or credit score from a credit reporting agency, and describe the completeness and accuracy of data.	Source of data, data handling and cleaning method, and data limitations are fully described in the technical manual or user manual.
A.8	How data were acquired	Describe internal and external sources	
A.9	Known data or other limitations	Detail any data or other issues arising, including how to mitigate any known limitations.	Data limitations and model limitations are fully described in the technical manual or user manual.
A.10	Additional considerations	Technical specifications and software for calculation of scores; model outsourced to third party vendor.	Related information is fully described in the technical manual.
Part B --Model validation			
B.1	Quantitative tests to demonstrate current and continuing appropriateness of model for individual bank	Evidence the key tests undertaken for confirm accuracy and power of model. Show monitoring/ tracking and archiving of performance data for model redevelopment as needed. List key reports used for management review.	The model validation results are fully described in the technical manual. ● **The corporate scoring model** is not officially online for query by member institutions. **Thus there are no periodic validation and monitoring reports available yet.** ● Latest validation and monitoring reports on **consumer credit scoring model** are published on a quarterly basis. However **no validation reports on individual member institution have been produced.**

	Item	Content	JCIC Disclosure
Part B --Model validation			
B.2	Validation steps	Including: number of years covered, and number of defaults for each time period.	The model validation method is fully described in the technical manual based on the established validation framework and dimensions. ● **The corporate scoring model** is not officially online for query by member institutions. **Thus there are no periodic validation and monitoring reports available yet.**
B.3	Qualitative review for firms regarding process in which models are used in practice (check and balance)	List operational checks and balances, adjustment and user intervention of model outcome.	The model limitations and suggested applications are fully described in the technical manual or user manual. JCIC has not fully grasped the member's purposes of using the model and the extent of qualitative validation and adjustment performed by them.
Part C - Bank and vendor responsibilities and accountabilities: Operational standards and responsibilities			
C.1	How the model should be used	Describe the suggested practice standards and provide examples of good practice. Ensure the use of model is for the purpose it was designed for.	The model limitations and suggested applications are fully described in the technical manual or user manual.
C.2	Operational standards (model and data support)	Detail continuing support for model related data and software.	JCIC's Credit Information Query Operation Manual details the query mechanisms and methods.

	Item	Content	JCIC Disclosure
Part C - Bank and vendor responsibilities and accountabilities: Operational standards and responsibilities			
C.3	Bank/vendor liability	Detail the extent of vendor liability, obligations and responsibilities.	JCIC's Member Rules detail the rights and obligations of members and JCIC.
Part D - Bank and vendor responsibilities and accountabilities: Future developments & other relevant information)			
D.1	Market influence	Provide any relevant comment on market standing and overall market development.	**No analysis performed.**
D.2	Latest development and initiatives	List developments in risk practice. Summarize plans to rebuild pooled models. Describe availability of new data sources.	The new format for reporting lending and credit card data has been completed. JCIC is undergoing the remodeling project.
D.3	Regulatory concerns, such as stress test and procyclicality	Describe processes and best practice.	JCIC has commissioned scholars to undertake related projects: ● The report on Empirical Study on the Effect of Basel II on Small and Medium Enterprises has been completed and published in JCIC journal. ● **The stress test project is ongoing.**

Table 2 Data related requirements

	Item	Content	JCIC Disclosure[12]
1	Accuracy	Ensure the degree of confidence in data input and that data are up-to-date.	JCIC has drawn up data quality check logic according to the data reporting guidelines and informed member institutions to comply.
2	Completeness	Data collected are sufficient to generate variables or indicators in line with the study purpose.	JCIC has revised the Lending and Credit Card Data Reporting Guidelines and informed member institutions to follow the new guidelines accordingly. The revised guidelines greatly improve data integrity for credit risk research.
3	Appropriateness	Data must be free of quantitative or qualitative biases that make it unfit to purpose.	JCIC describes the content of information products and how data were compiled in the Credit Information Query Operation Manual. Data users will determine on their own how to apply the data based on the JCIC disclosure.
4	Representativeness and comparability	Bank must ensure that the data is appropriate for the use to which it is being input. If the external data are not representative of or comparable to the bank's own portfolio, bank should describe the discrepancy in quantitative terms.	The Lending and Credit Card Data Reporting Guidelines have clearly defined the data field names, data format and definitions for users to make comparison and carry out necessary adjustment.

---

[12] With regard to the credit data collected and credit information products provided by JCIC, refer to JCIC publications entitled Guidelines for the Monthly Report on Outstanding Loans of Financial Institutions (January 2004), Consumer Credit Scoring Model Technical Manual (March 2006), Guidelines for Filing of Credit Cardholder and Merchant Credit Data (February 2006), and Credit Information Query Manual (update as needed).

	Item	Content	JCIC Disclosure
5	Consistency of definitions	Bank must clearly grasp the difference in the definitions used by the internal and external data, and make adjustment.	
6	Data storage and IT requirements	The bank's IT systems should be capable of storing and retrieving the relevant data with a contingency and disaster recovery plan in place.	JCIC has completed the construction of data warehouse and offsite redundancy, and informed the member institutions and the public on JCIC website and annual report.

5. Conclusion and JCIC's Goals for the Future

Established more than thirty years ago, JCIC is the only national credit databank in Taiwan. With member institutions from a complete spectrum of the finance sector, JCIC has accumulated comprehensive and quality inter-bank credit information for a long period of time and completed the construction of credit risk data warehouse. JCIC has also long been endeavoring in the research to improve the quality of credit risk data and model quantification techniques. For all member institutions regardless whether they adopt the IRB approach or not, JCIC is one of the most important external data suppliers.

Given the transparency of JCIC's products even by the rigorous standards of FSA, using JCIC products in its IRB processes will not create any obstacle for member institutions in their IRB qualification efforts. As the establishment of an IRB system relies on data accuracy and integrity, JCIC's assistance for banks that are faced with the challenge of insufficient internal data entails two critical jobs: one is to create a data provision mechanism that conforms to the principle of data privacy protection, and the other is to provide value-added data that carry more risk significance and better satisfy the needs of member institutions.

In the aspect of data provision mechanism, except for normal inquiry with the consent of the principal and serving specific purpose, the JCIC has created a Data Research Service Platform supplemented with necessary security control measures to help

member institutions in their IRB qualification efforts by providing "deidentified" and value-added non-customer and out-of-term data and methodologies for credit risk research[13].

In the aspect of providing value-added credit information products and services, JCIC continues to improve in the following areas and endeavors to enhance its research capabilities to better serve the increasing number of domestic banks that are heading towards the IRB system and endeavor to enhance their risk management capabilities and know-how:

(1) **Diversifying products and services:** JCIC products currently available predominantly spread at the either end of the spectrum in terms of the degree of value addition, that is, " simple compilation" or "final value-added result." The standard JCIC products for query are representative of the former, where the main value addition process involves simply integration and summarization of borrowers. The latter is illustrated by scoring model outcome where the value addition process entails cross-period data compilation, generation of variables (including predictor, segmentation and explanatory variables), testing and selection of variables, weighting of selected variable to predictor variable, and adjustment and validation of model outcome. Information generated by the value addition activity between "simple compilation" and "final value-added result" that are currently not made available (including other variables generated by JCIC but not picked by the model14) will provide great reference value for member institutions preparing for IRB qualification. The availability of such information will also help member institutions save substantial manpower and operating costs in data compilation. The essence of IRB approach is the development of a fittest internal rating system based on individual bank's portfolio characteristis and operational strategies. Cross-sectionally,the availability of diverse external data can aid a bank to develop an internal rating systemwith unique features; longitudinally, it reveals a bank's understanding of the external data and its application techniques, hence accurately

---

[13] Refer to a JCIC article entitled Establishment and Application of JCIC Data Research Service Platform that discusses the use of JCIC deidentified credit risk research data to complement internal data and IRB implementation.

[14] Take the example of JCIC's consumer credit scoring model, the model selected only 40 variables out of more than 600 variables for calculation purpose.

reflecting the level of finesse in its risk management.

(2) **Proactive services and provision of custom-made products:** JCIC's four hundred some member institutions have varying size, nature of business, and risk management ability. Not all of them are capable of understanding, evaluating and selecting the most appropriate information products to suit their needs. Similarly, not all information products of JCIC are suitable for every member. Thus JCIC should work to help some members identify their needs and provide essential custom-made information15, and recommend to them information products that best fit their needs. JCIC will also work to provide custom-made products and services that meet the special needs of members.

(3) **Clear and transparent product documentation:** Value-added data should be provided with information on source of data, data dates, limitations, and cleaning method. In the user instruction document, it should clearly indicate the operational definitions of all data used in the value-addition process and calculation methods (if necessary, give examples of calculation and describe the reason for using the particular methods). The extent of documentation affects user's understanding and judgment, and constitutes an important IRB qualification issue.

(4) **Efficient provision of information:** Aside from the diversification of product, data suppliers should offer efficient support for provision of data, including standardization and documentation of data specifications and transmission method to allow data users fast access and direct input and integration into their information system to generate instant and accurate risk management data.

(5) **Feedback of member institutions:** The enhancement of data value is conditional upon the value-addition technique used, and more particularly, on matching the needs of user. As described, JCIC has four hundred some members of varying sizes and natures with disparate information needs. For its existing and future products and services, JCIC should carry out extensive data collection and understand

---

[15] For example, provide scoring model validation and monitoring reports for all customers of a member institution, and make further analysis of "good" and "bad" customer groups.

the needs and views of data users as an important reference for the revision and planning of services.

(6) **Continuing maintenance of products:** The online/offline management of JCIC products, and the continuing maintenance of the accuracy and validity of online products have a large bearing on the benefits to data users. Thus JCIC should examine regularly the update of its information products, and inform the users in writing of any extraordinary changes. The implementation of IRB approach has brought about bank's demands and attention to long-run data. But the usability of long-run data is predicated upon the consistency in product definitions. For any replacement of older version products (e.g. adjustment of industry classification and code, or method of classification, new scoring model replacing older model), data suppliers should establish the linkage between the old and new products and provide clear documentation and mapping table. It not only makes it easier for data users to make necessary adjustment, but also speaks to the reasonableness of data accumulation and continuity.