

**DEFAULT FILTER STATUS ON
MINIMUM BASEL CORPORATE RISK RATING REQUIREMENTS**

| BASEL REQUIREMENTS | DEFAULT FILTER STATUS |
|--|---|
| <p>1 <u>Statistical Default Model</u></p> <p>1.1 Banks may use average of individual default probability estimates for a given rating subject to adherence to other Basel requirements.</p> <p>1.2 Process must exist to assess accuracy, completeness and appropriateness of input data.</p> <p>1.3 Reference database must be representative of bank's own borrowers.</p> <p>1.4 One year default probability must be forward looking and allow for the simulation of changes in key default drivers.</p> <p>1.5 For purpose of capital adequacy assessment, process must exist to assess impact on default probabilities of future changes in economic conditions: economic or industry downturn, market-risk events, liquidity conditions.</p> | <p>✓ Default Filter maps individual default probability estimates for user defined rating scale.</p> <p>✓ Adherence to other Basel requirements - See other sections.</p> <p>✓ Diagnostic module allows users to judge accuracy, completeness and appropriateness of input data.</p> <p>✓ Diagnostic module quantifies representation of reference database to bank's own borrowers.</p> <p>✓ Default Filter is a predictive default model (as opposed to an actuarial model like a scoring system).</p> <p>✓ Default Filter's ScenarioCalculator module allows the simulation of changes in macro-economic default drivers.</p> <p>✓ Scenario Calculator module is in full compliance.</p> |

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| <p>1.6 Need robust system to validate the accuracy and consistency of default probabilities. Must include:</p> <ul style="list-style-type: none"> - Rigorous statistical testing of model stability - Rigorous statistical testing of model coefficient - Testing of model output against outcome - Comparison of estimated default probabilities with realised default rates for each rating | <p>✓ Validation module tests accuracy and consistency of default probabilities.</p> <p>✓ Requirement met by Validation Tests.</p> <p>✓ Requirement met by Validation Tests 2 and 3 and Analytic Module.</p> <p>✓ Requirement met by Validation Tests 1 and 5.</p> <p>✓ To be incorporated in Release 6.</p> |
| <p>2 <u>Rating Criteria</u></p> <p>2.1 All criteria must be grounded on historical experience with corporate borrowers.</p> <p>2.2 All criteria and data reference to be tested periodically for continued relevance.</p> <p>2.3 Quality of borrower's information to be taken into account.</p> <p>2.4 Other information than accounting to be used.</p> | <p>✓ Reference databases exclusively made up of comparable borrowers (country, industry, credit characteristics).</p> <p>✓ Comparability is quantified through distance measurement algorithms.</p> <p>✓ Diagnostic programs monitor on-going relevance of rating criteria and reference databases.</p> <p>✓ Analytic test-pattern program monitor on-going relevance of rating criteria.</p> <p>✓ Diagnostic programs screen reliability of borrowers' information based on comparability with peer group.</p> <p>✓ Any borrowers' information that can be quantified consistently may be used in Default Filter.</p> |

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| 2.5 Criteria for rating to be projected on year forward. | ✓ Risk Calculator and ScenarioCalculator modules allow the projection of criteria one year forward. |
| 2.6 Rating to take into account impact of normal business stresses. | ✓ Risk Calculator and ScenarioCalculator modules monitor the impact of normal (and other) business stresses. |
| 2.7 Rating criteria must demonstrate predictive and discriminatory power and be plausible. | ✓ Validation module quantifies on-going predictive and discriminatory power and plausibility. |
| 2.8 Rating to take into account unforeseen circumstances | ✓ Risk Calculator and ScenarioCalculator monitor the impact of unforeseen stresses. |
| 3 <u>Overall Rating Requirements</u> | |
| 3.1 Two dimensions: borrower specific and Loss Given Default (LGD) specific. | <ul style="list-style-type: none"> ✓ Borrower specific rating ✓ Allows for Loss Given Default (LGD) in CreditVAR computation ✓ Transaction specific rating incorporate in Release 6 (Collateral and loss experience) |
| 3.2 Minimum 8 to 11 grades | ✓ User driven - No restriction on number of grades. |
| 3.3 Clear relationship between rating and rating criteria, and rating and POD. | ✓ Clear relationship between rating criteria, POD and rating. |

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| <p>4 <u>Completeness and Integrity</u></p> <p>4.1 Risk reporting on portfolio to be available by grade, migration across grades, loss estimate per grade, comparison of default rates against expectations.</p> <p>4.2 Existence of comprehensive methodology document must include:</p> <ul style="list-style-type: none"> - Theory - Mathematical and empirical basis of assignment of POD estimates to individual borrowers - Statistical process for validating selection of explanatory variables - Circumstances where model cannot work | <p>✓ Extensive risk reporting module includes portfolio risk reporting by grade, loss estimate per grade, migration across grades.</p> <p>✓ Validation module includes comparison of default rates against expectations.</p> <p>✓ Comprehensive methodology document includes:</p> <ul style="list-style-type: none"> - Theory - Basis of POD computation by borrowers - Process for validating explanatory variables - User guidance to make model work |

Default Filter(TM) Proposed Validation Criteria

Working paper for
Bank Regulators

IQ Financial Systems

Introduction

- ◆ IQ Financial Systems is commenting in the attached paper on the Basles Committee's proposed capital adequacy framework on credit risk.
- ◆ The focus of IQ Financial's comments is on the availability of reliable quantitative techniques to assess the probability of default of companies in emerging markets.
- ◆ Proving that these techniques are accurate and reliable over time and over a large number of company data in various emerging countries and industries, addresses the issue of "validating results" to obtain approval from local Regulators on the internal rating approach.

Background

- ◆ This paper presents an **overview of the probability of default validation criteria** used by Default Filter, a probability of default calculator for un-rated companies, initially developed by Bankers Trust for risk advisory purposes in Asia
- ◆ IQ Financial Systems is the Bankers Trust company owned by Deutsche Bank that licenses risk software, including Default Filter. The Default Filter product team is staffed with Bankers Trust's three times Euromoney award winner "Risk Adviser of the Year" Risk Management Advisory group
- ◆ IQ Financial has been working over the past three years with local Asian financial institutions on developing default risk validation criteria applicable to fast growing markets.
- ◆ All validation criteria presented in the following pages have been shown and discussed with a number of Asian Central Banks as well as the Australian Supervisory Authority, the FSA in the UK, etc..

Basis for the validation criteria presented

The validation criteria presented were initially based on thousands of tests conducted over the last 6 years (1992-1998) of historical data available for un-rated Asian companies. These tests have now also been extended to Western European countries and Japan.

The significance of initially using Asian companies is that the historical information available on them is not as complete, timely or assumed reliable as that of most Western countries. Therefore any positive results on Asian data is a good sign for other markets.

All tests conducted show conclusively that strict validation criteria of the reliability of probability of default measures can be met, even for Asian un-rated companies with supposedly imperfect underlying credit information.

Starting Point to the definition of Validation Criteria

Some validation criteria have already been suggested in BIS' published papers and need to be built on:

- ◆ Are the mathematical foundations of the model sound and practical?
- ◆ Does the staff know how to use the model and deal with unusual situations?
- ◆ What is the model's track-record for picking ahead of time companies likely to default and not default (i.e back-tests)? (tests 1 and 2)
- ◆ Can the impact of future changes be stressed to reveal portfolios or models vulnerabilities?(test 6)
 - Individual factors on individual borrowers or portfolios
 - macro-economic factors on individual borrowers
- ◆ Are any unsustainable assumptions made in the model, or in the way the model is used? (across all tests)

Proposed validation issues to be addressed

Some of the other proposed validation criteria address issues specific to markets with large numbers of unrated companies.

All of them aim at addressing the extent to which the probabilities of default quantified are reliable. Three such criteria were defined after discussions with banks, central banks and rating agencies.

1. Can two banks using the same model find significantly different probabilities of default for the same company?(test 3)
2. Are the difference in probabilities of default between two companies consistently explainable? (test 5)
3. Do the aggregated probabilities of default for all companies match the following year's portfolio default rate?(test 4)

Six Resulting Validation Tests are automated in Default Filter

1. Historical Back-tests
2. Back-tests with alternative methodologies
3. Stability of the results across databases
4. Accuracy of projected Portfolio's default rate
5. Consistency of the most important warning signal to default
6. Stress-tests for borrower's specific changes or Macro-Economy changes

1. Back-Testing Methodology

◆ **Samples tested**

The samples are drawn from our Asian credit database. This comprises 11,000 large corporates and commercial borrowers from Malaysia, Singapore, Thailand, Indonesia, Hong Kong, Taiwan, Korea and the Philippines for whom 6 years of financial data is available. The credit information used was audited financial statement variables. The sectors tested are Banking, Construction, Services and Manufacturing. These are broad industry groups. Within each sample there is heterogeneity due to variations in sub-sectors.

◆ **Test methodology**

The general test methodology is to use a random sample of companies from which model parameters are calculated, and then test the actual predictive accuracy of the model on companies which have been withheld from any kind of analysis. The first sample is called the “estimation sample” and the second, the “validation sample”. These samples are drawn at random, so as not to bias the analysis in any way. As the default / non default status of each company is known in advance, the predicted status using the model can be compared with the actual status. The number of correct classifications in the validation sample is the quoted model accuracy.

1. (Cont.) Back Testing Accuracy

- ◆ DATABASE TEST: 500 ASIAN LISTED CORPORATIONS

| Sector | Software Accuracy |
|---------------|-------------------|
| Manufacturing | 86% |
| Construction | 84% |
| Banking | 82% |
| Services | 74% |

As can be seen, the predictive accuracy on the Services sector was the lowest. This was due to the heterogeneity of this sample relative to the other sectors, and confirms the axioms of statistical sampling theory.

- ◆ DATABASE TEST: 2000 SOUTH-EAST ASIAN SMALL COMPANIES

| Sector | Software Accuracy |
|---------------|-------------------|
| Manufacturing | 85% |
| Construction | 80% |
| Services | 74% |

1. Cont. Back-Testing Stability

These tests are conducted to demonstrate that the quoted accuracy of Default Filter above is not spurious and based on fortunate estimation and validation samples having been chosen by chance.

♦ **Random sampling error test**

The data in the reference database above is perturbed with random changes to simulate the effect of random sampling error on future possible estimation databases. These perturbations change each financial ratio randomly (and independently) between -5% to +5%. The database is perturbed a total of 200 times and each time the model is fitted to the database and the predictive accuracy of the model is measured. For the 200 random perturbations on the Reference database the accuracy ranged from **71% to 86%**. This indicates that Default Filter returns a high level of accuracy if the quality of the data in the database had been poorer than was actually the case.

2. Comparative Back-Testing

- ♦ **Stability over repeated sampling from base data**

This test uses the main credit database and randomly extracts numerous cross-sections of the data. This involves generating a large number of estimation and validation samples and keeping a record of the predictive accuracy as the samples change. From this, statistics e.g. the mean accuracy and fluctuations in accuracy can be calculated. To provide a measure of comparison, the 2 most common benchmark models were used:

- BENCHMARK MODEL 1

This model predicted “no-default” for all the companies in the validation sample generated by the repeated sampling process. For each company the model prediction was compared with the true known status of the company, and classification mistakes were counted across the validation sample. Another random sample was generated and the classification procedure repeated for a large number of random samples.

- BENCHMARK MODEL 2

This model classified each company in the validation sample using a Bernoulli trials procedure. For each estimation database generated the observed default rate for this database was calculated (say p). A random number in $(0,1)$ was generated and if the value was below p , the first company in the validation database was classified as defaulting, otherwise it was classified as not defaulting. The predicted status was then compared with the known status of the company and misclassification errors were counted. This Bernoulli procedure was repeated independently across each company in the validation database. The overall misclassification was calculated and the procedure repeated for numerous sets of estimation and validation databases. The number of databases generated tracks the size of the industry in Asia.

2. Comparative Back-Testing

- ♦ **Banking Database** - 350 independent sets of validation and estimation databases were generated

| | Default Filter | Model 1 | Model 2 |
|--------------------|----------------|---------|---------|
| Mean | 84% | 47% | 49% |
| Standard deviation | 10% | 11% | 12% |
| Minimum | 43% | 14% | 14% |
| Maximum | 100% | 71% | 79% |

- ♦ **Construction Database** - 500 independent sets of validation and estimation databases were generated

| | Default Filter | Model 1 | Model 2 |
|--------------------|----------------|---------|---------|
| Mean | 89% | 77% | 64% |
| Standard deviation | 5% | 7% | 8% |
| Minimum | 72% | 55% | 38% |
| Maximum | 100% | 90% | 83% |

- ♦ **Manufacturing Database** - 1000 independent sets of validation and estimation databases were generated

| | Default Filter | Model 1 | Model 2 |
|--------------------|----------------|---------|---------|
| Mean | 68% | 57% | 55% |
| Standard deviation | 7% | 6% | 7% |
| Minimum | 46% | 41% | 35% |
| Maximum | 86% | 76% | 78% |

In the above tests Default Filter is significantly more accurate and stable compared to the two benchmark models tested.

2. Comparative Back-Testing

- ◆ **Comparison tests against other methodologies**

In addition to the 2 benchmark models tested above, another popular methodology in computing default probabilities is linear regression due to its conceptual simplicity and negligible computational requirements. The following test was conducted on Thai data for the construction and manufacturing sectors:

| <u>Sector</u> | <u>Default Filter</u> | <u>Linear Regression</u> |
|---------------|-----------------------|--------------------------|
| Manufacturing | 83% | 50% |
| Construction | 73% | 43% |

Hence Default Filter compares very favorably against the comparison models tested.

2. Comparative Back-Testing

- ♦ **Comparison with Merton type models**

The approach used in Merton type models, namely an option pricing model based on share price information to calculate probabilities of default was tested on listed companies in major industry sectors for Korea, Thailand and Singapore. Default Filter was applied to the same data and the comparisons in accuracy are shown below.

The probabilities of default produced by the option pricing approach for a company that is not in acute financial distress is very low, on average almost zero for most companies. This means that a Merton type approach is not successful in differentiating the credit characteristics of companies which are not yet in financial distress.

It is due to these extremely low probabilities of default that the sample accuracies displayed below are default accuracies, I.e. how accurate were the models in predicting default one year ahead of time on companies which did eventually default by the end of the year.

2. Comparative Back-Testing

- ◆ Test 1 - Korea
Database size: 341 companies of which 72 defaulted.
This represented 70% of the companies on the Korean stock exchange involved in manufacturing.

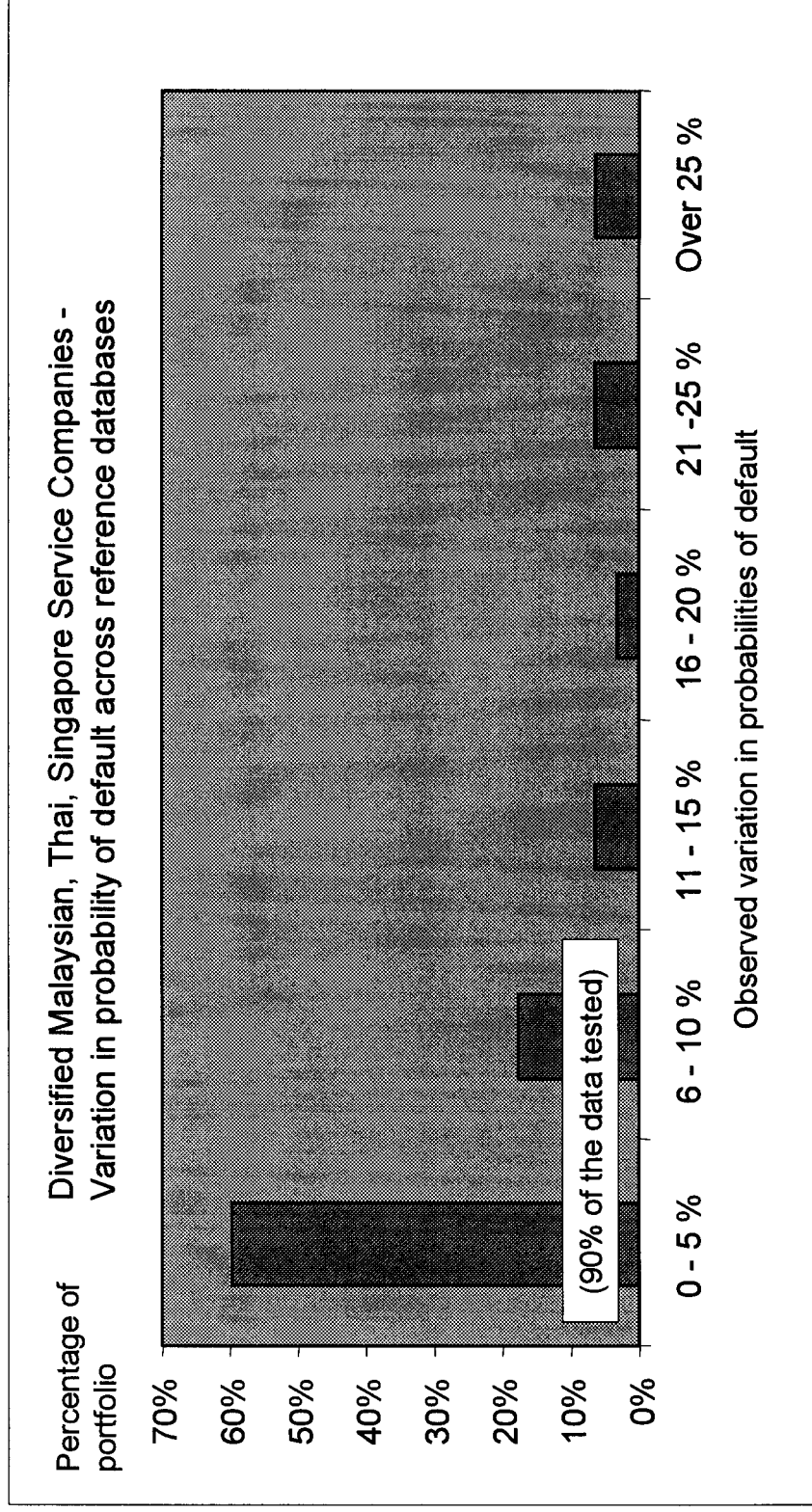
| | | |
|---------------|-----------------------|--------------------|
| <u>Sector</u> | <u>Default Filter</u> | <u>Merton type</u> |
| Manufacturing | 89% | 50% |
- ◆ Test 2 - Thailand
Database size: 90 companies of which 36 defaulted.
This represented all the construction companies on the Thailand stock exchange and 54% of the manufacturing companies.

| | | |
|---------------|-----------------------|--------------------|
| <u>Sector</u> | <u>Default Filter</u> | <u>Merton type</u> |
| Manufacturing | 83% | 56% |
| Construction | 73% | 50% |
- ◆ Test 3 - Singapore
Database size: 99 companies of which 6 defaulted.
This represented all the construction companies on the Singapore stock exchange and 83% of the manufacturing companies.

| | | |
|---------------|-----------------------|--------------------|
| <u>Sector</u> | <u>Default Filter</u> | <u>Merton type</u> |
| Manufacturing | 94% | 33% |
| Construction | 67% | 0% |

3. Stability of Results across databases

Test #3: 30 randomly generated databases are produced and used to apply the default risk pattern identified by Default Filter and tested with test 1 And 2. Illustrative results:



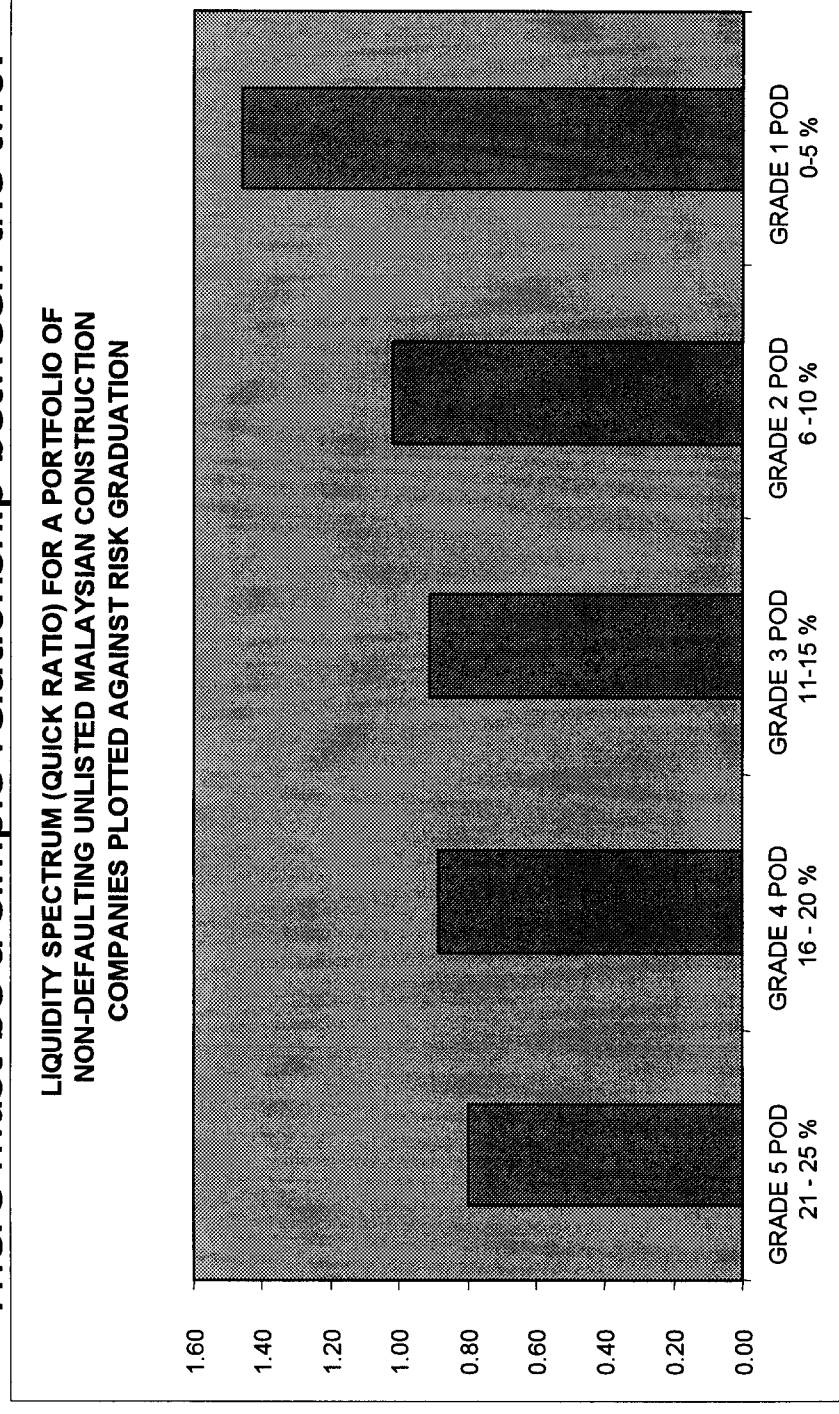
4. Accuracy of projected Portfolio Default Rate

Test #4: The aggregated portfolio probability of default and its future default rate must track each other. Illustration with Default Filter.

| PORTFOLIO | COUNTRY | INDUSTRY SECTOR | SAMPLE SIZE | DIFFERENCE BETWEEN AVERAGE PORTFOLIO POD AND SAMPLE DEFAULT RATE |
|-----------|-------------|---------------------------|-------------|--|
| 1 | MALAYSIA | UNLISTED CONSTRUCTION | 141 | 6% |
| 2 | MALAYSIA | UNLISTED MANUFACTURING | 419 | 4% |
| 3 | MALAYSIA | UNLISTED SERVICES | 421 | 1% |
| 4 | MALAYSIA | LISTED CONSTRUCTION | 78 | 0% |
| 5 | MALAYSIA | LISTED MANUFACTURING | 103 | 0% |
| 6 | MALAYSIA | LISTED SERVICES | 93 | 3% |
| 7 | SINGAPORE | CONSTRUCTION | 46 | 2% |
| 8 | SINGAPORE | ELECTRONICS MANUFACTURING | 62 | 1% |
| 9 | SINGAPORE | ELECTRONICS DISTRIBUTION | 52 | 6% |
| 10 | THAILAND | CONSTRUCTION | 38 | 3% |
| 11 | KOREA | MANUFACTURING | 79 | 7% |
| 12 | SOUTH ASIAN | LISTED SERVICES | 124 | 1% |
| 13 | NORTH ASIAN | LISTED SERVICES | 108 | 2% |

5. Consistency of the most significant warning signal

Test #5: The probability of default quantified by Default Filter is compared to the value of the most significant factor identified. There must be a simple relationship between the two.



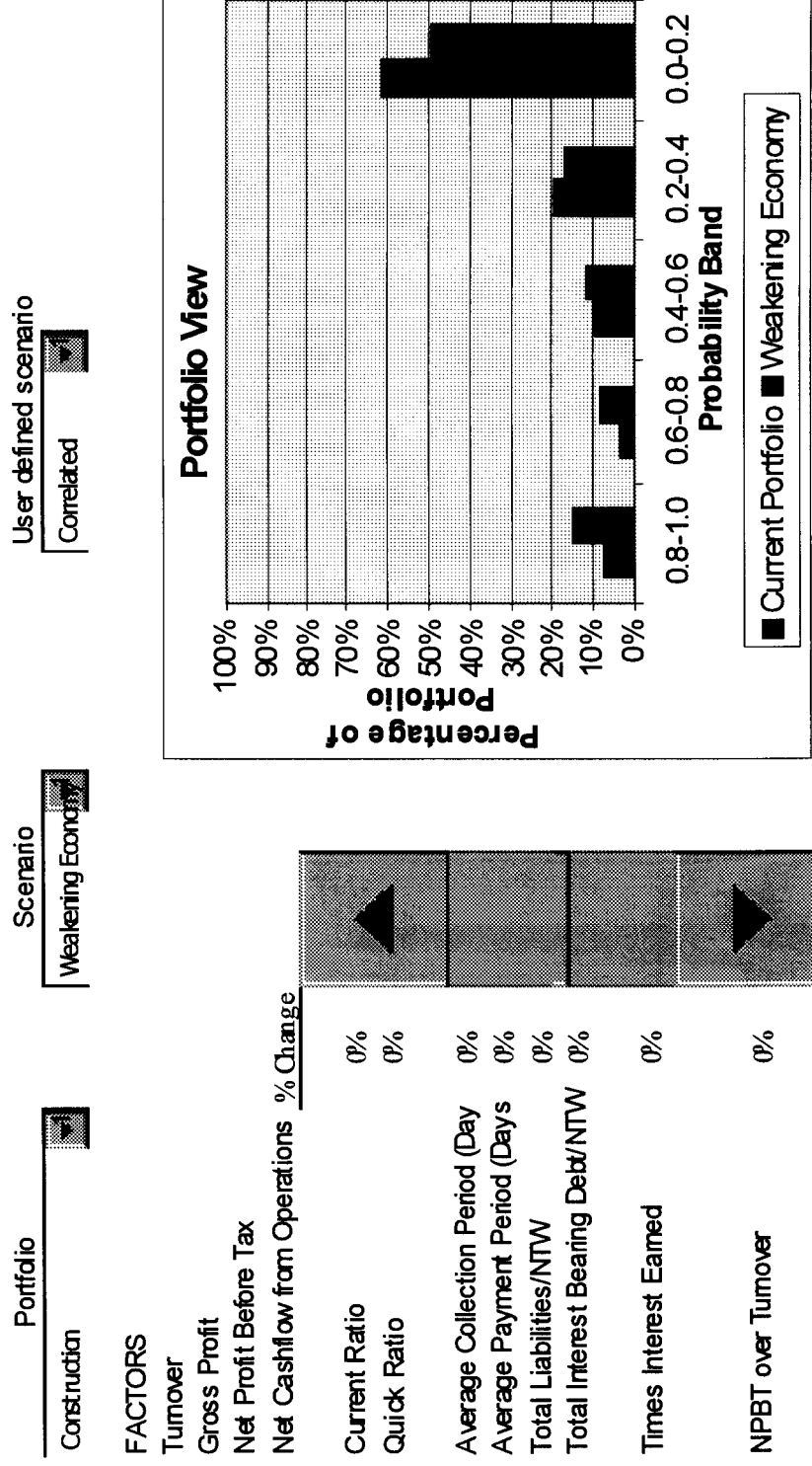
6. Sensitivity tests to specific or Macro-Economic factors

Test #6: The user stresses any parameter used in the computation of individual probabilities of default and judge of the intuitiveness of the test results. Illustration for one borrower:

| Construction | Scenario | | Scenario | | User defined scenario | |
|----------------------------------|-------------------|-------------------|------------|--------|-----------------------|--|
| | Weakening Economy | Liquidity Squeeze | Correlated | | | |
| Probability of Default | 0.15 | 0.25 | 0.24 | 0.05 | | |
| Credit Margin | 3.00% | 5.00% | 4.80% | 1.00% | | |
| FACTORS | | | | | | |
| Turnover | 984,750 | | | | | |
| Gross Profit | 427,822 | | | | | |
| Net Profit Before Tax | 43,492 | | | | | |
| Net Cashflow from Operations | 20,000 | | | | | |
| Current Ratio | 0.80 | 0.64 | 0.40 | 1.34 | | |
| Quick Ratio | 0.78 | 0.62 | 0.39 | 1.07 | | |
| Average Collection Period (Days) | 90.00 | 117.00 | 90.00 | 102.87 | | |
| Average Payment Period (Days) | 30.00 | 39.00 | 30.00 | 17.77 | | |
| Total Liabilities/NTW | 0.93 | 0.93 | 0.93 | 0.49 | | |
| Total Interest Bearing Debt/NTW | 0.51 | 0.51 | 0.51 | 1.43 | | |
| Times Interest Eamed | 1.00 | 0.60 | 1.00 | 2.11 | | |
| NPBT over Turnover | 0.04 | 0.03 | 0.04 | 0.24 | | |

6. Sensitivity tests to specific or Macro-Economic factors

Test #6: Sensitivity tests must also be applied to entire portfolios to judge of the intuitiveness of results.



Other Criteria used to address mathematical foundations

- ◆ Existence of a methodology document
- ◆ Background and expertise of the staff who wrote and validated the methodology document
- ◆ Mathematical soundness of the methodology document
- ◆ Validation process both internal and external
- ◆ Applicability of the methodology without adjustments to the proposed environment

Other Criteria used to address the risk staff's expertise

- ◆ Training programs designed for staff operating the default risk model
- ◆ Background of staff operating the model, in particular in Credit and in Risk Management
- ◆ External assistance available to staff operating the model

Conclusions

- ◆ All previously defined default risk validation criteria can be satisfactorily produced by Default Filter on heterogeneous Asian credit databases across major industry sectors.
- ◆ These tests have also been applied satisfactorily to Western European and Japanese companies.
- ◆ These tests are encouraging to banks in markets with a majority of un-rated borrowers who wish to use the Basles Committee's internal rating approach and demonstrate its accuracy on their own data to their regulators.
- ◆ This paper demonstrates that banks in emerging markets will be in a position to apply for internal credit rating approach approval.

IQ Financial Contacts

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Background and Credentials

Best Risk Advisor 1995/1996

EUROMONEY AWARDS
FOR
EXCELLENCE
1996

Risk adviser

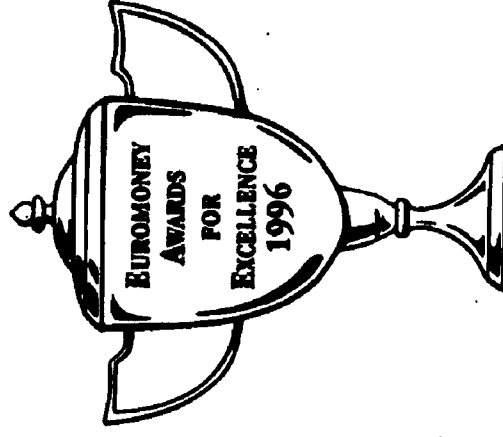
Bankers Trust

The Procter & Gamble scandal weighs hard on Bankers Trust's reputation in derivatives. But the lessons from that episode have given the bank an eye for risk management that is second to none. Its experience with its internal risk measurement and management system has helped it build up an impressive risk management advisory group over the past five years. Where Bankers comes out on top is that risk advisory is far from a product sell, and has become more akin to a corporate finance or mergers and acquisitions function. And while other areas of the firm may have sold derivative products incorrectly in the past, the risk

advisory group's reputation is endorsed by the fact that throughout the whole P&G debacle clients have still been coming in.

The firm's internal system was used as the basis for developing the industry-standard measure of risk-adjusted return on capital (Raroc). Last year BT launched its risk management system for clients, called Raroc 2020, which measures risk at both an aggregate and individual level on a tailored basis.

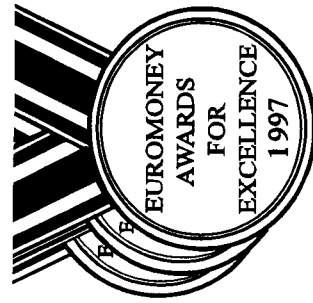
The risk management advisory group provides a tailored service that goes beyond just quantifying risk. A full-scale risk management advisory assignment, such as that for



Coral Energy Resources, a new joint venture between Shell Oil and Tejas Gas, in July 1995, often leads to the company changing the whole way it runs its business. In another case, Bankers Trust was brought in by Abbey National Treasury Services back office on a contract basis in order to apply its dynamic knowledge of risk management to the allocation of capital on the basis of operational risk.

One odd outcome is that frequently after looking at all policies and procedures across a company, the actual derivatives activity falls or is at least simplified.

And again for 1996/1997...



Risk Advisor

Bankers Trust

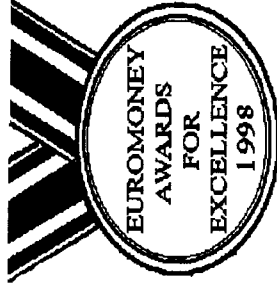
Risk advising has gone global at Bankers Trust in the last 12 months, with expansion into new industries and regions, especially Latin America, Asia and Australia. As the bank's reputation grows, so do the staff dedicated to risk advisory work. Bankers Trust now has an unrivaled network of dedicated risk advisory offices in Houston, Kuala

Lumpur, London, New York, Singapore, Sydney and Tokyo.

Bankers Trust has put a lot of effort into developing new markets and devising original initiatives to assist client companies manage risk and enhance shareholder value. The bank has also worked hard to develop industry standards that have been recognized by

the global banking community and its regulators. Being the first and only institution to be approved under the BIS market risk guidelines regulating the use of internal risk models to measure capital adequacy is good for business – there has been a marked increase in the number of banks worldwide seeking advice from Bankers following this achievement.

And again for 1997/1998



BEST RISK ADVISER **Bankers Trust**

"Risk advisory is a fairly young market. As banks and corporates started to become aware of the different kinds of risks they faced, they began to call in specialists to tell them how their credit, operational or foreign-exchange risks correlated and how their future earnings could be affected. "Our business started as risk identification," says Martin Nance, head of Bankers Trust's risk-management advisory group in New York. "Then it became risk measurement. Now we're providing solutions to manage those risks."

Bankers Trust places great importance on innovation. Often, the best way to measure complex risk is with a computer model. Sometimes that requires tailor-made software. But the traditional side of risk advisory remains important. In the past six months, for example, Bankers Trust has begun to market Default Filter, specifically designed to predict which of an emerging-market bank's customers will default."

Bankers Trust Legacy



May 2, 1997

"Bankers Trust is first to adopt own risk model"

By George Graham in London 05/02/1997

Bankers Trust, the New York-based wholesale bank, has become the first institution to take advantage of new international rules which can lower the amount of capital banks need to hold.

The Bank for International Settlements agreed last year to allow banks to use their own internal models to measure how much capital they need as a cushion against swings in financial markets. The BIS, based in Basle, has become the centre for setting global banking supervision standards.

The new rules should come into effect at the beginning of next year, but the Federal Reserve is allowing some US banks to introduce the system before then if they can satisfy supervisors that their models work properly.

Bankers Trust won approval to use the new technique for calculating its capital adequacy ratios at the end of the first quarter.

The bank's tier 1 capital at March 31 stood at 8.1 per cent of its risk-weighted assets. This is above the official BIS minimum of 4 per cent, although most international banks achieve at least 6.5 per cent.

Bankers Trust's ratio is estimated to be more than half a percentage point higher than it would have been without the use of the new modelling rules. Without that half point bonus, Bankers Trust's tier 1 ratio would have shown a sharp drop because it was required for the first time to include the activities of BT Securities, its securities trading affiliate, in its overall capital calculations.

European banks are likely to have to wait until 1999 at the earliest because the European Commission has only recently released proposals for amending its capital adequacy directive to allow internal modelling.

Bankers Trust Legacy

Extracts from Publicly available information

Bankers Trust is THE Industry Reference on credit risk...

“Following the lead of Bankers Trust New York Corp., virtually all of the top 50 U.S. banks now rely on some internally developed grading system to calibrate the riskiness of their loans. Indeed, the acronym for BT’s computer-based risk-adjusted return-on-capital system – Raroc – which dates to the 1970s (Institutional Investor August 1992), has become almost a generic term for credit risk management.”
Institutional Investor, December 1994

“In fact, the first credit derivatives to be labelled as such were default swaps on a basket of corporate names created by Bankers Trust in 1992”
Risk Magazine, July 1997

“Not surprisingly, then, the credit derivatives market has largely been the preserve of a handful of top Wall Street firms, including Bankers Trust, the new Chase Manhattan and JP Morgan. — Bankers Trust led the charge in 1993 by offering swaps” — credit derivatives — “with a new twist.”
Risk Magazine, July 1996