



中国工商银行

INDUSTRIAL AND COMMERCIAL BANK OF CHINA

Environmental Stress Testing

on Commercial Banks' Credit Risk

Yin Hong

Environmental Stress Testing Research Program, ICBC



Content

1. Background

2. Notion & Methodology

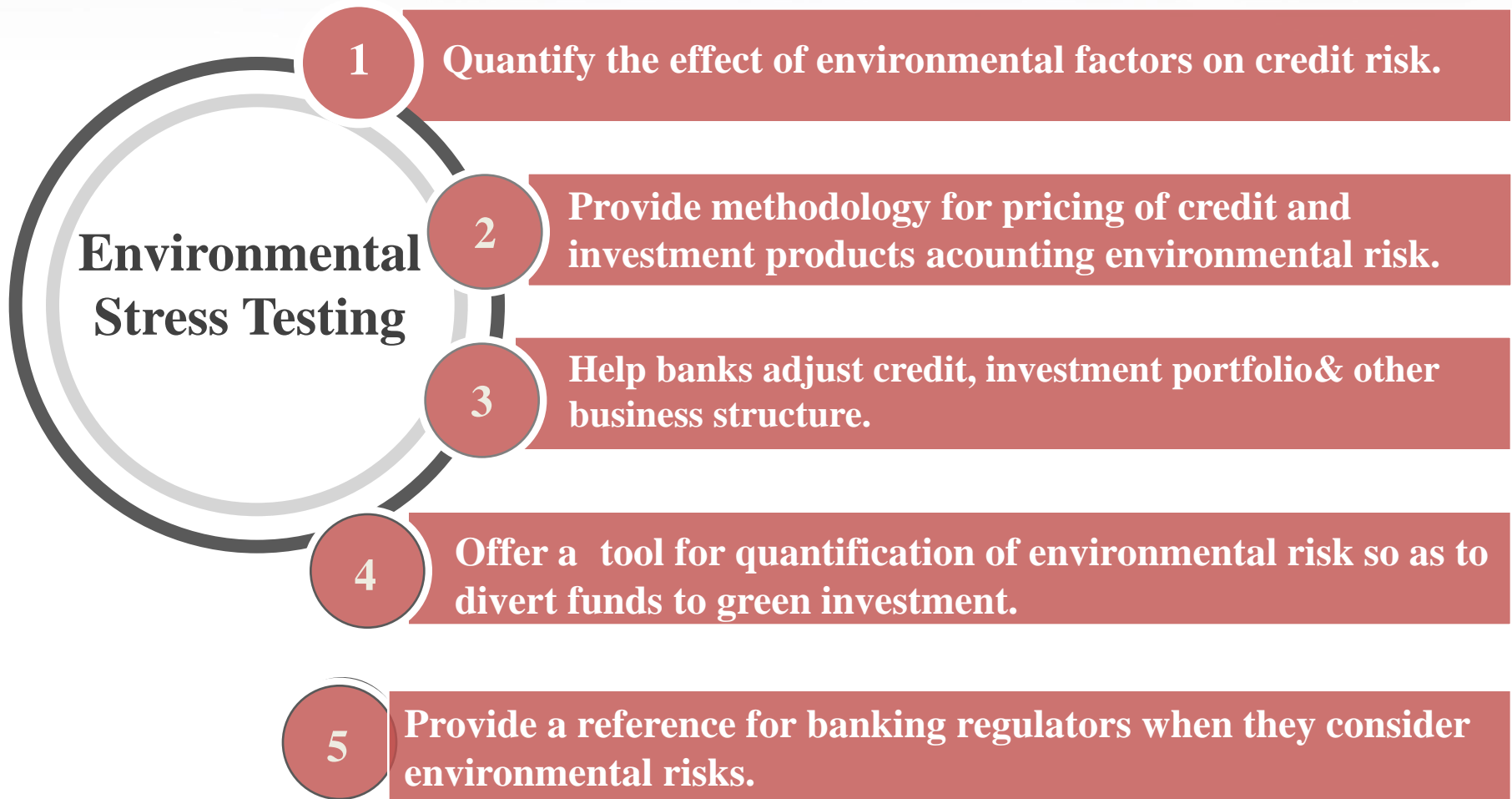
3. Work plans & Recommendations

1.1 Background

- ❑ Climate change, environmental and resource constraints have been becoming global issues.
- ❑ In China, after more than 30 years' high-speed development, the problems of environment pollution and high resource consumption are becoming increasingly prominent. The environmental risk confronting enterprises keeps growing and mass disturbances happen occasionally. These factors bring the commercial banks pay more attention to environmental and reputational risk than in the past.
- ❑ China has already included the “ecological civilization construction” as part of national strategy, it's expected that the environmental emission standards would be tightened constantly, and the credit risk of traditionally heavy polluting sectors would be becoming more significant in the future.
- ❑ This stress testing is one major task of the Green Finance Committee of China Society for Finance and Banking. At the request of the Committee, ICBC has launched the stress testing program since the beginning of 2015.



1.2 Significances



1.3 ICBC Released the Stress Testing Study

- ❑ **On 23rd March 2016, ICBC released the achievements from the “Study on the Stress Testing for the Impact of Environmental Factor on Credit Risk of Commercial Banks” at the “The future of green finance international event” in London.**

[Andrew voysey](#) says ,this has powerful implications for firms of all types . As knowledge and methodologies develop to enable financial institutions to factor environmental risks into decisions about where they put their money, firms seeking to raise debt, maintain their equity value or buy insurance may increasingly find that their management of environmental factors is a decisive factor in their cost of ,or even access to ,capital.

[Sean Kidney](#), CEO and cofounder of the Climate Bond Initiative , said the ICBC research is helpful to accelerate global growth of the green-finance market.

[Mats Olausson](#) , senior adviser of climate and sustainable financial solutions at the SEB, said “what ICBC has done is applaudable, and highlights the fact that increasingly the financial industry needs to consider sustainability in their day to day activities.”

Content

1. Background

2. Notion & Methodology

3. Work plans & Recommendations

2.1 Notions

Climate and environment problems have distinct externalities. Both external economy and external diseconomy generated from environment changes can be converted into endogenous variables in the production and operation of enterprises. The internalized enterprise environment cost will impact the risks of commercial banks .

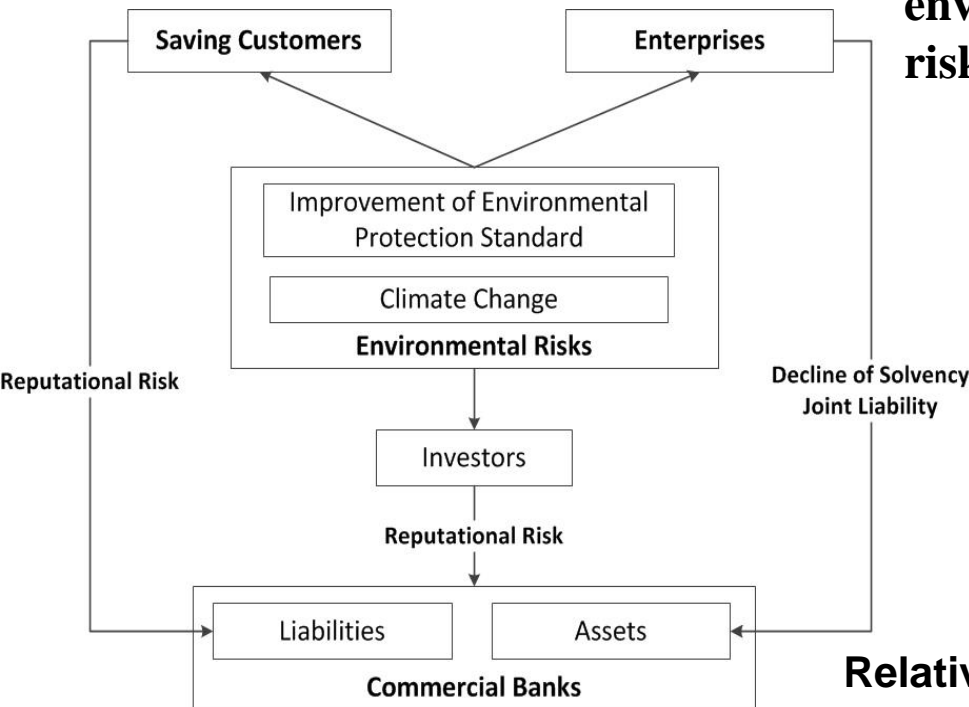
environmental factors will exaggerate business risk of commercial banks in at least three ways:

1、 credit risk

2、 the risk of taking a joint liability

3、 reputation risk

Relatively, the credit risk, as the main risk confronted by commercial banks, is considered as the focus of our research project.



2.2 Model

A model to illustrates the impact of environmental risk on enterprises and banks' lending risk.

$$Q^d = Q^d(r^l, \sigma_E)$$

Q^d :enterprise's loan demand

r^l :lending rate

σ^E :environmental risk

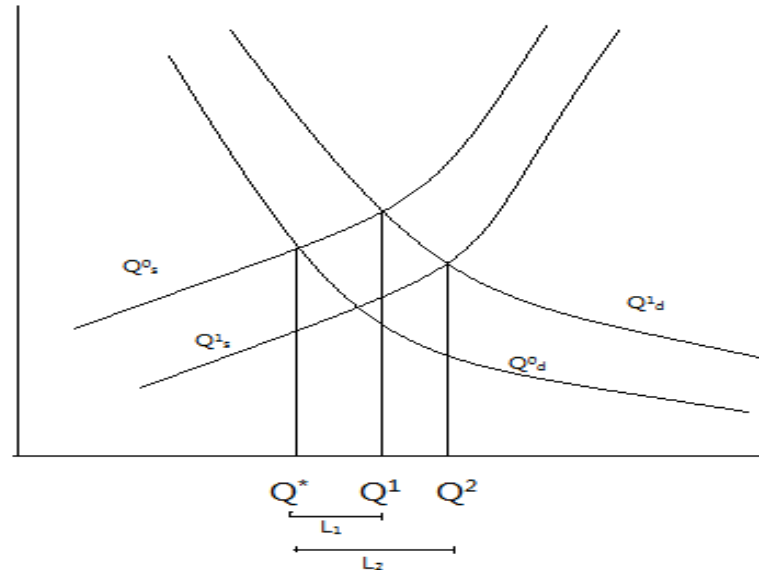
$$Q^s = Q^s(r^l, r^d(\sigma_E), \sigma_E)$$

Q^s :bank loans

r^l :deposit rate

r^d :lending rate

$r^d(\sigma_E)$:environmental risk

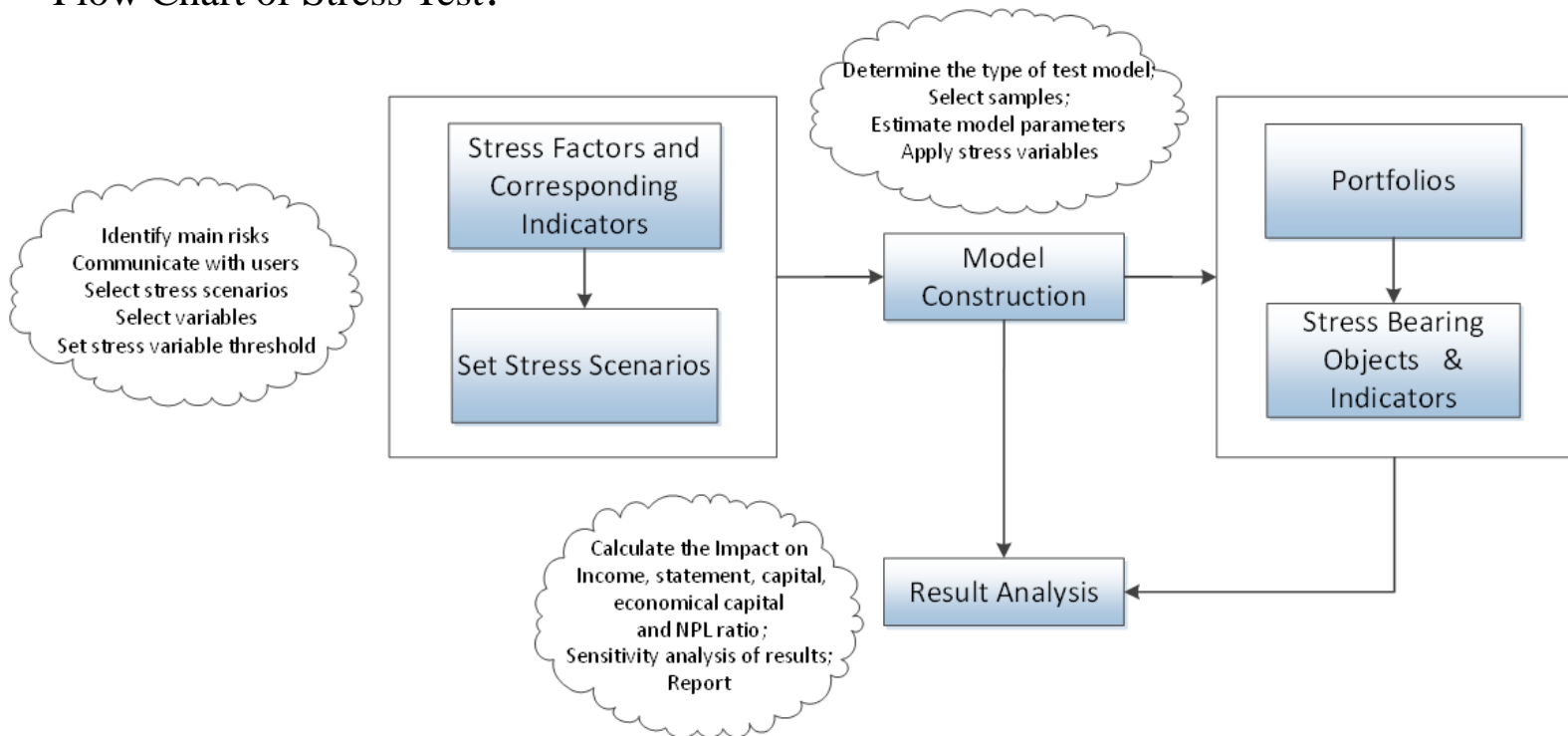


Relationship between Risk Exposure of Bank Loans and Environmental Risk

2.3 Basic process

Stress test`s 6 steps:1. selecting the portfolios to be tested; 2.selecting the stress factors and indicators to be applied;3. selecting stress-bearing objects and determining stress-bearing indicators;4. building scenarios;5. constructing the transmission model; 6.performing the stress test and analysing results

Flow Chart of Stress Test:



2.4 Methodology

☞ Firstly, We begin our stress testing in **cement industry** and **thermal power industry**, which are among the higher pollution and higher energy consumption industries in China.

☞ Secondly, we measure the impact of **stricter environmental standards** on enterprises' **unit cost**, under three different scenarios: mild, moderate, severe.

- In terms of cement industry, we take 3 aspects policies into account, including on emissions standards enhancement, sewage charges standard improvement, waste disposal **assistance**.
- In terms of thermal power industry, we take account 3 aspects policies, including on emissions standards enhancement, sewage charges standard improvement, the difference of regional standards.

☞ Thirdly, conduct stress test in ICBC' S financial transmission model. we measure the impact of enterprises' **unit cost** increase on **credit rating**, **probability of default** (PD) and **non-performing loan ratio** (NPLR) for those two industries

2.5 Results

- ✧ First, stricter environmental standards have significantly negative influence on operating costs and benefits of companies, especially of the small and medium-sized firms;
- ✧ Second, as most of our clients are high-quality ones in their respective industry, they feature comparatively strong risk tolerance and have their credit risk under control generally;
- ✧ Third, to mitigate the adverse impact of environmental factors, companies are willing to take such measures as technical upgrade and cut in operating costs.

Content

1. Background

2. Notion & Methodology

3. Work plans & Recommendations

3.1 Work Plan for the Next Stage

Plans

Range Expansion

- Work with relevant environmental protection institutions to promote environmental standard formulation and share cost-effectiveness data
- Enlarge the range of the stress testing study, and increase the efficiency and accuracy

Pricing Factors

- Take carbon trading and carbon tax into account, besides the single factor of environmental standard increase.
- Measure the change of relevant corporations cost, and effect on bank's credit risk, under multi-factor scenarios

ESG Rating

- Seek to bring companies under ESG (environment, social and governance) rating, study the possibility of including environmental factors into the credit rating system of bank customers

3.2 Recommendations

- ✧ In terms of **rules and systems**, emission standards should be raised, with strict supervision and implementation;
- ✧ With respect to **taxes and fees**, additional pollutant discharge tax could be collected from polluting enterprises, and meanwhile, enterprises should be encouraged and supported to make green investments and upgrade technologies by the introduction of tax reduction, discount, government procurement and so on;
- ✧ As for **carbon trade**, voluntary agreements and tradable permits can be introduced, to establish a well-running carbon trade market;
- ✧ In respect of **financial policy**, special re-lending policy for “environment protection fields” can be formulated, plus positive development of green bonds and green insurance, to reduce the operating cost of enterprises by the adoption of market-oriented approach
- ✧ With regard to **infrastructure**, the intermediary service system should be energetically cultivated, and the open and transparent environmental information disclosure policy should be enacted, to reduce the economic value of natural resources and carbon intensive investments by virtue of policy and market signals, and propel the transformation of enterprises and the adjustment of industrial structure.

Thank you!



中国工商银行

INDUSTRIAL AND COMMERCIAL BANK OF CHINA