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Developing an Optimal Green Credit Guarantee Scheme

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Outline

1- Introduction

2- Challenges for green development

3- Green credit guarantee schemes (GCGS)

4- An optimal credit guarantee scheme

1- Introduction

The most disappointing aspect of the contemporary global green economy is the low rate of investment in sustainable projects (Sachs, Woo, Yoshino, and Taghizadeh-Hesary, 2019). The low investment in sustainable projects is mainly due to:
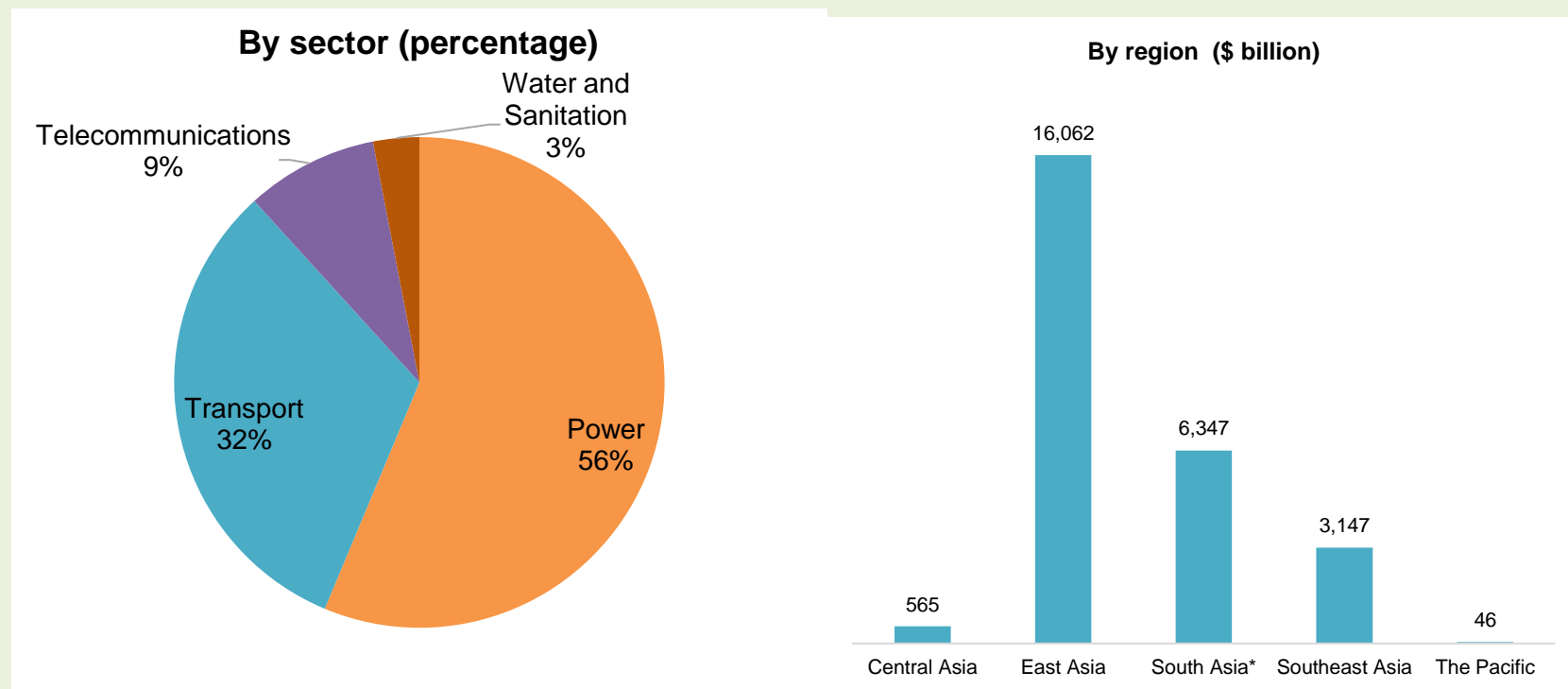
I. **Lack of long-term financing**

II. **Various risks associated with green projects**

III.**Lower rate of return in green projects**

IV.**Lack of capacity in market actors**

In the developing world the largest demand for infrastructure investment is for the developing Asia.
Of the estimated total climate-adjusted investment requirement for 2016–2030, $14.7 trillion is for power and $8.4 trillion for transport

**Climate-Adjusted Estimate of Infrastructure Investment Needs
by Sector and by Region for Development of Asia and the Pacific* (2016–2030)
(percentages and billions of $ in 2015 prices)**

By sector (percentage)

- Water and Sanitation 3%
- Telecommunications 9%
- Power 56%
- Transport 32%

By region ($ billion)

- Central Asia: 565
- East Asia: 16,062
- South Asia*: 6,347
- Southeast Asia: 3,147
- The Pacific: 46

Source: Authors, based on ADB data (2017).
Note: Asia and the Pacific includes the ADB's 45 developing member countries; Pakistan and Afghanistan are included in South Asia. ** Climate change adjusted figures include climate mitigation and climate-proofing costs, but do not include other adaptation costs, including those associated with rises in sea level.
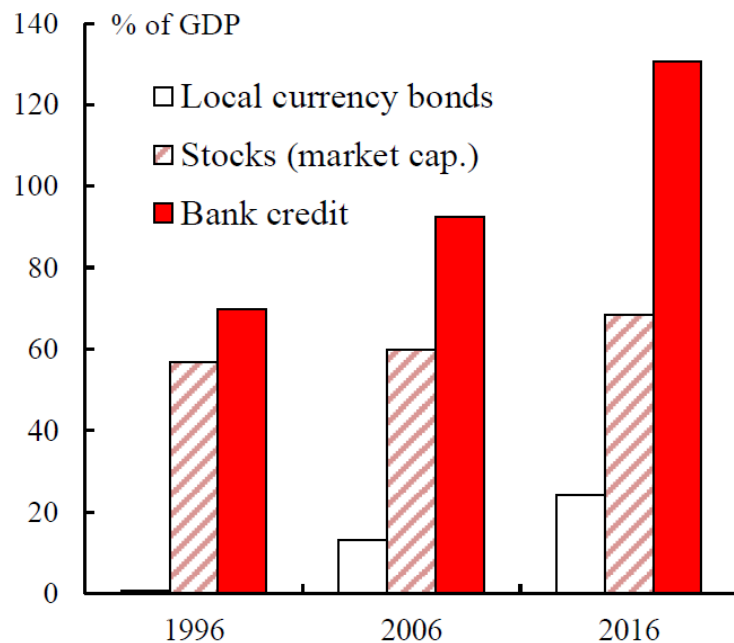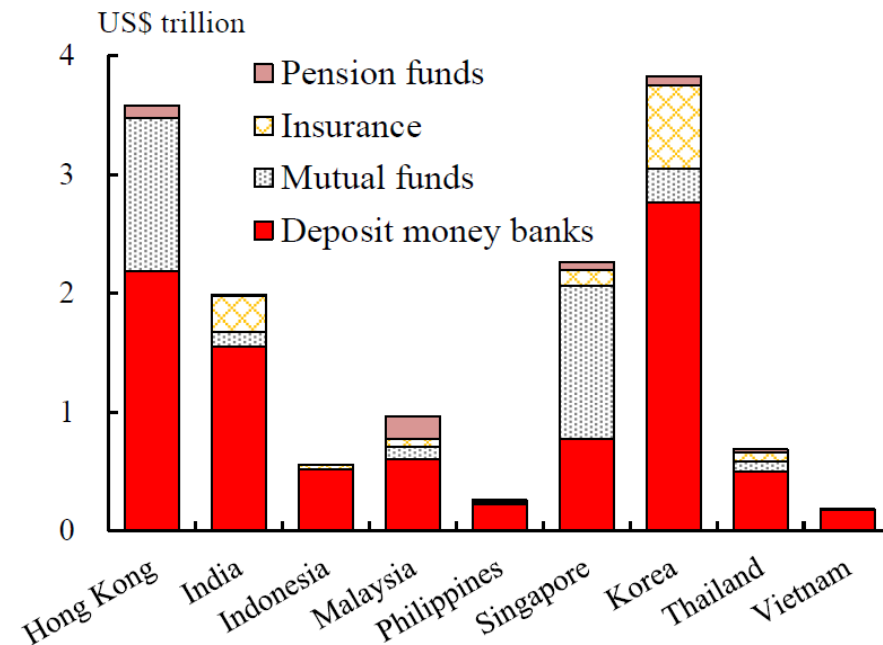
2-1- Lack of long-term financing

Shortage of long-term finance blunts green development Progress

Asian economies are still bank dominate and there are constrains in banking sector for long-term finance.

Corporate financing in Emerging Asia

% of GDP

- ☐ Local currency bonds
- ▨ Stocks (market cap.)
- ■ Bank credit

Investor base in Emerging Asia

US$ trillion

- ☐ Pension funds
- ☐ Insurance
- ☐ Mutual funds
- ■ Deposit money banks

Note: Emerging Asia is the aggregate of China, India, Indonesia, Korea, Malaysia, Philippines, Thailand, and Vietnam.

Sources: *Asian Bonds Online*; The World Bank, *World Development Indicators*.

Notes: 1. As of end-2013 except for India's deposit-money-banks figure which refers to end-March 2014.

2. Figures for Pension funds and Mutual funds for Indonesia and Vietnam and Insurance for Hong Kong are not available.

Sources: The IMF, *International Financial Statistics*; National central banks;

2-2- Various Risks Associated with low-carbon sector

1- Technology risk (new technologies)

2- Feasibility risk (lower rate of return)

3- Bankable projects or not ?

→ How much government support will be needed

4- Exchange rate risk

Too much reliance on overseas' money → future burden for the country

5- Other Risks (political risk, operational risk, demand risk, maintenance risk, earthquakes and natural disaster risk)

2-3- Lower rate of return in Green projects

1. Green technologies are often earlier in the development stage and not always commercially viable comparing to technologies in the fossil fuel field that many of them back to 100 years ago. This making green technologies more expensive and riskier ventures.

2. According to the OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015, the production or consumption of fossil fuels is supported by almost 800 individual policies (OECD, 2015).

3. Another form of subsidy, an indirect one, takes place when fossil fuel companies are not taxed efficiently (Coady et al. 2017).

2-4- Lack of capacity in market actors

1. Investments in low-carbon projects are also undermined by **lack of familiarity, limited information and knowledge, and limited expertise on green infrastructure** among investors.

2. For example, OECD research indicates that most institutional investors have limited experience with direct investment in green infrastructure projects, and it is expensive to build an internal team with the right skill set (**investors need a minimum of USD 50 billion in assets to build such a team**) (Kaminker et al. 2013).

3. Green infrastructure investment performance data is generally not collected systematically. (Kaminker et al. 2013).

4. In the absence of transparent information, data, financial research that can act as a signal to investors or means for performance comparison in any given sector, there are significant barriers to entry.

Green Credit Guarantee Scheme

Unlocking SME Finance in Asia

Roles of Credit Rating and Credit Guarantee Schemes

Edited by **Naoyuki Yoshino**, Asian Development Bank Institute, Japan and **Farhad Taghizadeh-Hesary**, Waseda University, Japan

Series: Routledge Studies in Development Economics

This book proposes new and sustainable models to help ease the access of SMEs to finance and boost economic growth and job creations in Asia. This book looks at the difficulties of SMEs in accessing to finance and suggests ways on how to mitigate these challenges. It suggests how we can develop credit information infrastructures for SMEs to remedy the asymmetric information problem and to utilize credit rating techniques for the development of a sustainable credit guarantee scheme.

Book cover: **UNLOCKING SME FINANCE IN ASIA** — ROLES OF CREDIT RATING AND CREDIT GUARANTEE SCHEMES. *Routledge Studies in Development Economics.* Edited by Naoyuki Yoshino and Farhad Taghizadeh-Hesary. ROUTLEDGE
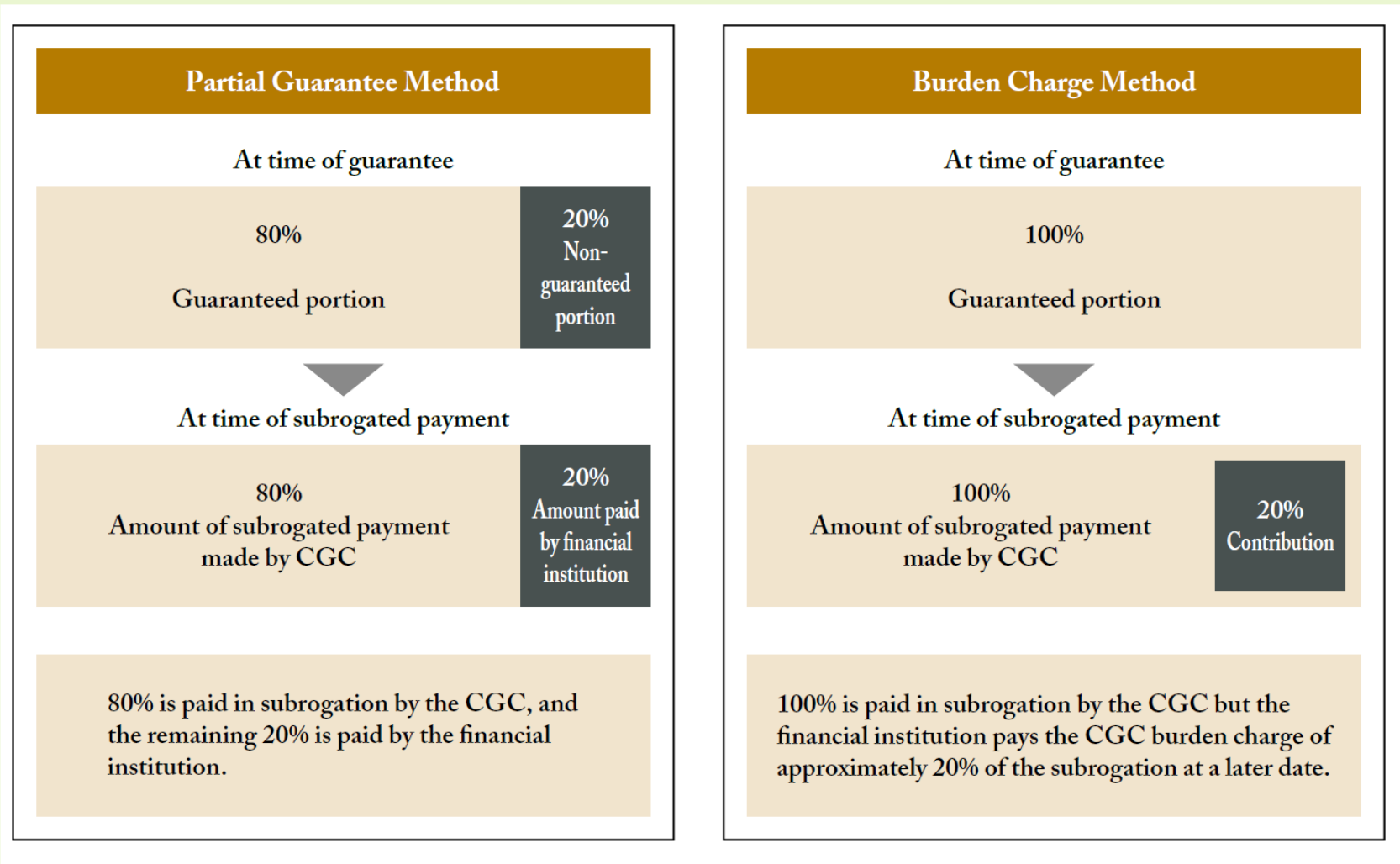
ADB Institute · OECD

Japan

1. Following the introduction of credit guarantee scheme (CGS) in Japan in 1937, their use spread first throughout Europe and the Americas in the 1950s, and then to Africa, Asia and Oceania in the 1960s and 1970s.

2. At present, there are 51 CGCs, one for each prefecture and one in each of the cities of Nagoya, Yokohama, Kawasaki, and Gifu.

3. At the end of 2013, their total liabilities stood at approximately 30 trillion yen.

	2009	2010	2011	2012	2013
Number of SMEs	4,197,719	4,197,719	4,190,719	4,201,264	3,852,934
Number of companies using guarantees	1,591,726	1,573,067	1,543,847	1,502,972	1,458,434
Guarantee use rate	37.9%	37.5%	36.8%	35.8%	37.9%

* Number of SMEs taken from the "White Paper on Small and Medium Enterprises in Japan" compliled by the Small and Medium Enterprise Agency.

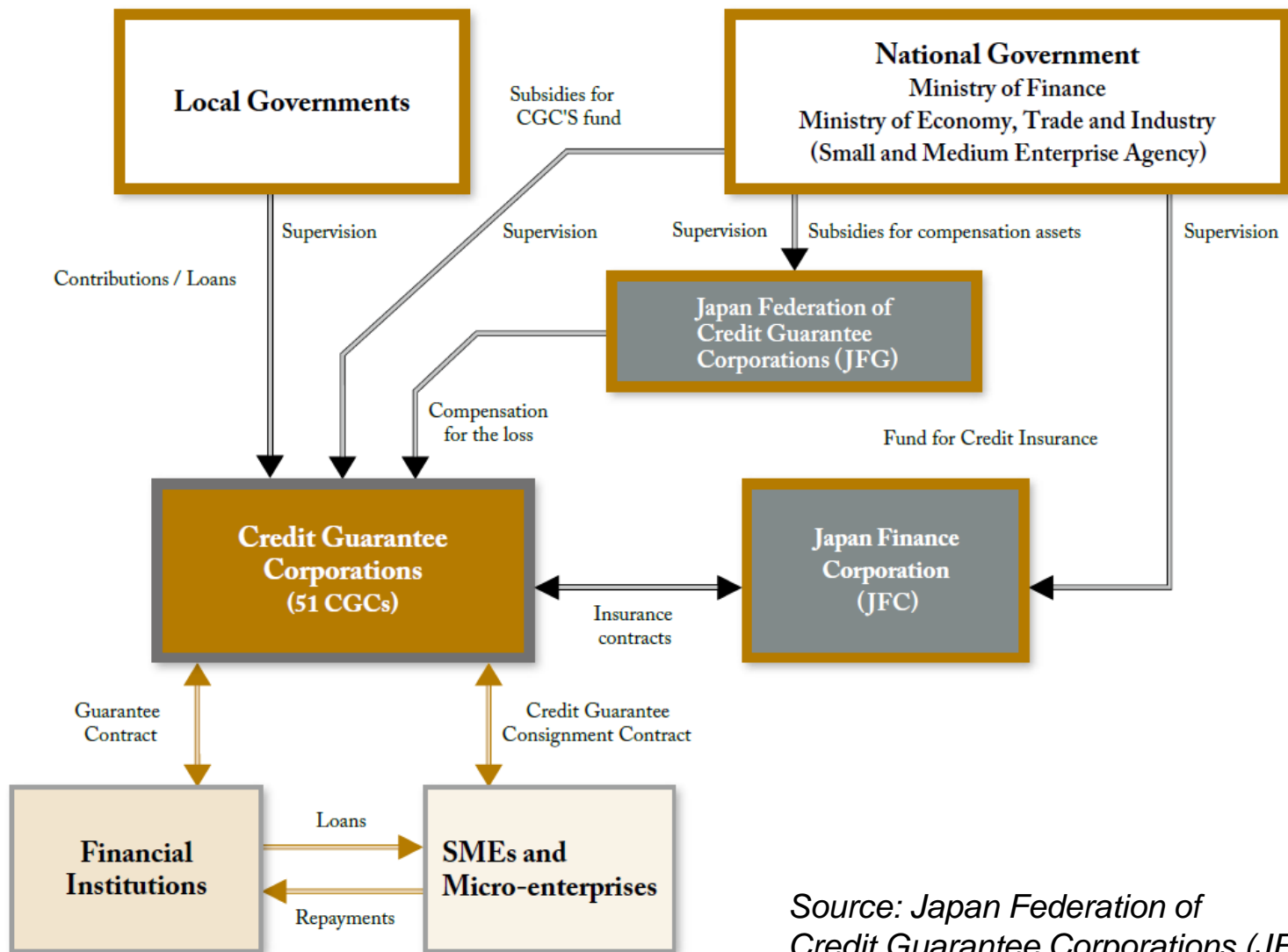*Source: Japan Federation of Credit Guarantee Corporations (JFG)*

Partial Guarantee

Partial Guarantee Method
At time of guarantee

80% Guaranteed portion	20% Non-guaranteed portion

At time of subrogated payment

80% Amount of subrogated payment made by CGC	20% Amount paid by financial institution

80% is paid in subrogation by the CGC, and the remaining 20% is paid by the financial institution.

Burden Charge Method
At time of guarantee

100% Guaranteed portion

At time of subrogated payment

100% Amount of subrogated payment made by CGC	20% Contribution

100% is paid in subrogation by the CGC but the financial institution pays the CGC burden charge of approximately 20% of the subrogation at a later date.

Source: Japan Federation of Credit Guarantee Corporations (JFG)
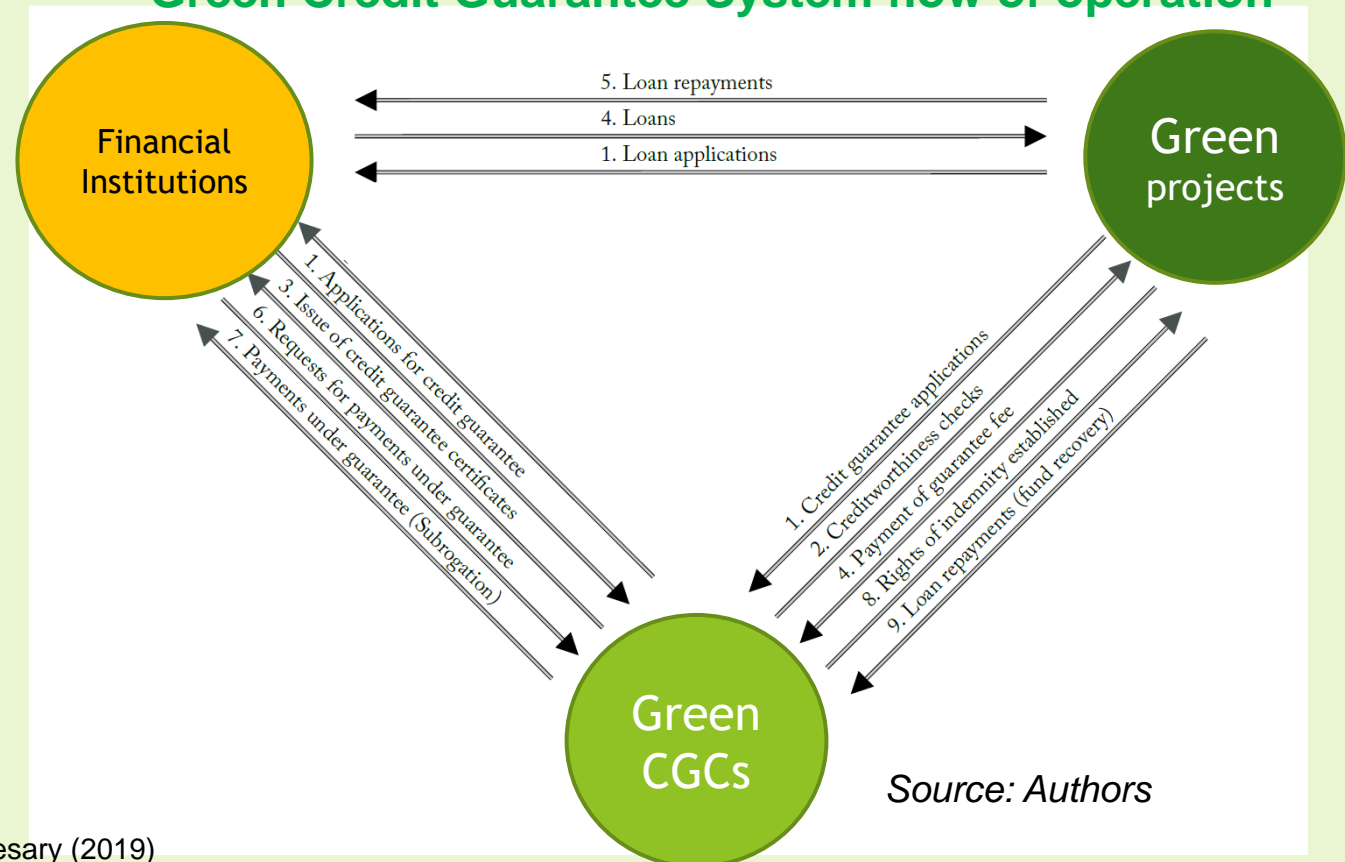
Example: Credit Guarantee Scheme of Japan

Source: Japan Federation of Credit Guarantee Corporations (JFG)

3-Development of green credit guarantee schemes (GCGS)

CGCs are public institutions that support those sectors that have lack of access to finance (SMEs, startups,…) by serving as guarantors to make it easier for them to borrow the funds necessary for their business operations from financial institutions.

GCGCs improve the creditworthiness of low carbon (green) projects, which lack physical collateral and have weak credit standings. It helps direct funds to them from private financial institutions and provides them with smoother access to financing.

Green Credit Guarantee System flow of operation

Financial Institutions

5. Loan repayments
4. Loans
1. Loan applications

Green projects

1. Applications for credit guarantee
3. Issue of credit guarantee certificates
6. Requests for payments under guarantee
7. Payments under guarantee (Subrogation)

1. Credit guarantee applications
2. Creditworthiness checks
4. Payment of guarantee fee
8. Rights of indemnity established
9. Loan repayments (fund recovery)

Green CGCs

Source: Authors

The way to induce private participation in green finance and investment

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A R T I C L E   I N F O

A B S T R A C T

Establishment of green credit guarantee schemes (GCGSs) and returning a portion of the tax revenue originally generated from spillover effect of green energy supply to investors. It can reduce the risk of green finance and increase the rate of return of green energy projects, respectively. In addition, technical developments in the sphere of distributed ledger technologies provide the opportunity to increase the transparency in green finance and investments. This paper contributes to literature by proposing two applied frameworks, backed by theoretical models on green finance and investment based on projects size. The objective is to induce the private participation in green finance and investment.

Green CGS will increase the loan supply to low-carbon projects

The *green credit guarantee* to low-carbon projects, will reduce the asymmetry of information and reduce the expected default losses because a portion of loan default is guaranteed by the credit guarantee corporation (government) therefore banks would like to lend money to those guaranteed low-carbon projects.

Green credit guarantee scheme and **loan supply to low-carbon projects**

r_{Green}

Backward bending loan supply curve

Normal loan supply curve to low-carbon projects with existence of GCGS
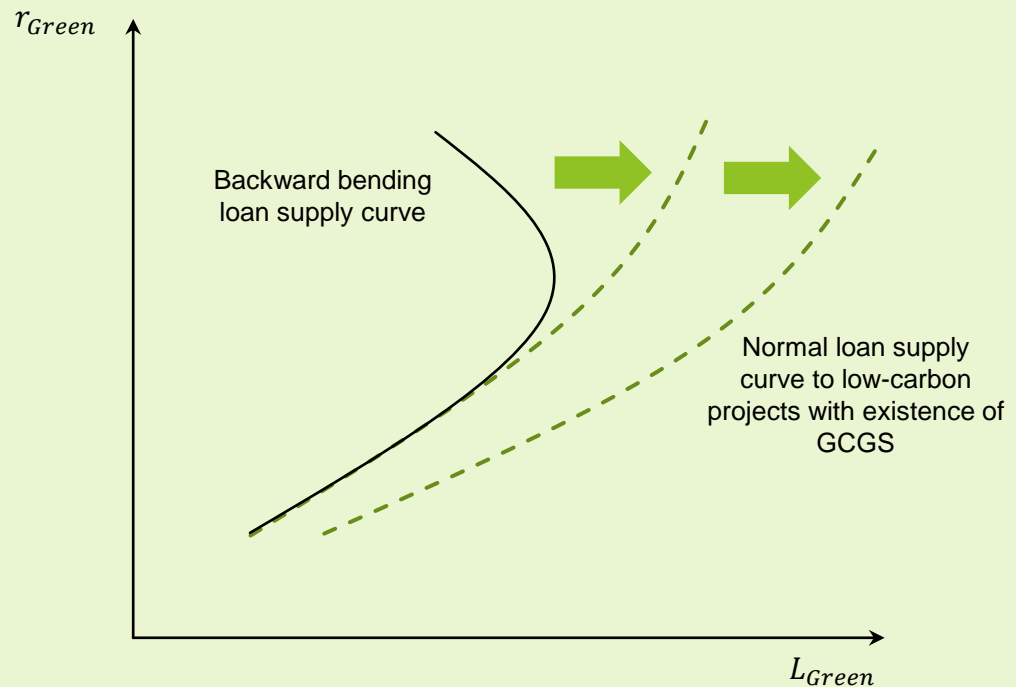
L_{Green}

Note: *rGreen* = lending interest rate to Green projects; *LGreen*= amount of loan to Green projects

Source: N. Yoshino, F. Taghizadeh-Hesary. (2019). Optimal Credit Guarantee Ratio for Small and Medium-sized Enterprises' Financing: Evidence from Asia. Economic Analysis and Policy.

Two critical questions for developing an optimal Green credit guarantee scheme:

1. What is the optimal credit guarantee fee to be paid by the green projects?

2. Should GCGC provide same guarantee ratio for all lending institutions? Or should it be different based on the healthiness of the lending institutions?

Optimal credit guarantee ratio based on creditworthiness of borrowers and lenders

Source: N. Yoshino, F. Taghizadeh-Hesary. (2019). Optimal Credit Guarantee Ratio for Small and Medium-sized Enterprises' Financing: Evidence from Asia. Economic Analysis and Policy
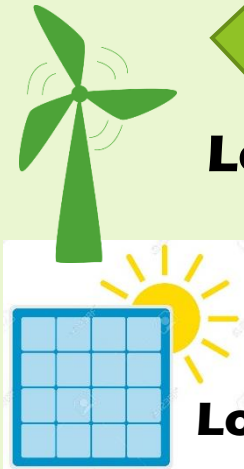
A model for calculating optimal credit guarantee fee for small and medium-sized enterprises

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ABSTRACT

A credit guarantee scheme is a method for promoting lending to small and medium-sized enterprises (SMEs) by formal financial institutions. It reduces information asymmetry and SMEs' collateral burden, but at a cost of a credit guarantee fee. The paper provides a theoretical model for calculating the optimal credit guarantee fee. In the empirical part, this study examines whether selected macroeconomic variables and financial health of SMEs have a statistically significant impact on default risk ratio of loans to SMEs – the main determinant of the fee. Principle component analysis (PCA) and two vector error correction model (VECM) models are applied on a sample of 1363 SMEs. Empirical results support our hypothesis that the credit guarantee fee should be different for sound and risky SMEs in order to avoid moral hazard, but also according to the macroeconomic state.

3. A Model for the Optimal Credit Guarantee Ratio

Policy Objective Function

$$U = w_1 \left(L - L^* \right)^2 + w_2 \left(\rho - \rho^* \right)^2$$

Loan Demand Function

$$L = l_o - l_1 r_L + l_2 Y^e$$

Banks Profit Maximization

Max. $\Pi = r_L(L)L - \rho(g,Y,P_L,P_S,M,Z)L - r_D D - C(L,D)$

Subject to: Banks's Balance sheet $(1 - \rho)L + \rho L = D + A$

Amount of loan in equilibrium

$$L = \frac{l_1}{2}\left[\frac{l_0}{l_1} + \frac{l_2}{l_1} Y^e - \rho(g,Y,P_L,P_S,M,Z) - r_D - \rho'_L \right]$$

Optimal Credit Guarantee ratio: g

$$g = -\frac{1}{\alpha_1\left(\dfrac{w_1 l_1^2}{4} + w_2\right)} . w_1 \frac{l_1^2}{4}\left(\frac{l_0}{l_1} + \frac{l_2}{l_1} y^e - r_D - \rho_L'\right) + \frac{l_1}{2\alpha_1} L^* - \frac{w_2}{\alpha_1} \rho^* - \frac{\alpha_2}{\alpha_1} Y - \frac{\alpha_3}{\alpha_1} P_L - \frac{\alpha_4}{\alpha_1} P_S + \frac{\alpha_5}{\alpha_1} M + \frac{\alpha_6}{\alpha_1} Z$$

Depends on:

- Actual Green loans
- The desired Green loans
- The desired default risk ratio of loans
- Fixed demand for loan
- Deposit interest rate
- Expected GDP
- The weight for stabilizing the Green loans
- The weight for reducing the non-performing loan ratio
- Marginal increase of non-performing loans by increase of additional loans
- Price of Land, Price of stock, GDP, money supply,
- Financial profile of banks

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