Understanding Roles of China and Japan in Southeast Asia Financial Multilateralization: A Game Theoretic Analysis

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Structure of Presentation

- Background of the CMIM

- Sino-Japanese Politics in the CMIM

- Model

- Conclusion

Background: The Region after Crisis

- Asian financial crisis 1997: Lessons from contagion effects

  - The change in exchange rate regime to a system of managed floats so-called the 'soft dollar pegs' (or 'Bretton Woods II')

  - The Asia countries needed to accumulate massive US dollar as a dominated reserve asset

  - Facing increased risk of dollar appreciation, volatility, or even potential 'currency war' with the US

  - Depreciation in the value of a local currency relative to US dollar would affect confidence of foreign investors and creditors and lead to the capital flights

Background: The Region after Crisis

- Asian financial crisis 1997
  - Many Asian countries realized its dependency on the IMF crisis resolution measures
  - Some debates toward the role of the IMF,
    - the disregard of social or political consequences from the recommended tight fiscal and monetary policies (which led to a change of political regime in Indonesia)
    - the 'one size fits all' conditionality for various countries with different contexts
    - An imposition of too rapid structural reform measures, such as stringent financial standards and corporate restructuring or the privatization of state-owned enterprises, etc.

Background: The Region after Crisis

- Asian financial crisis 1997

  - An increase in the so-called '**balance-of-payments insurance**' or the reserve accumulation in East Asian economy to insulate themselves from the shock in the crisis

  - Total reserves of emerging markets and developing countries have risen from less than $1 trillion to $5.5 trillion during the 2000s (Eichengreen, 2010)

Background: The Region after Crisis

- Driving forces to form a new kind of regional financial cooperation as an 'Asian bloc'
- Trend of international financial architecture, nowadays, goes 'more regional'
- The region's members could benefit in coping with the crisis of the global dollar standard, facilitating trade and investment, and also reducing cost of insurance in a form of risk-pooling

The Chiang Mai Initiatives (CMI)

- CMI, announced in May 2000

- A multilateral currency swap arrangement among the ten members of ASEAN including Japan, China (including Hong Kong), and South Korea, namely, the "ASEAN+3"

- Aimed to play roles like the Asian Monetary Fund (AMF), an alternative to the IMF

- Offering emergency liquidity to ASEAN+3 economies in currency crises to avoid financial contagion that could destabilize the region's economies

The Chiang Mai Initiatives (CMI)

- Short-term liquidity assistance: 90-day bilateral swap agreement (BSA) of US dollars with the domestic currencies of participating countries

- (except the Japan-China BSA, which would swap yen for renminbi)

- BSA can be renewed for periods of up to two years with total funds of over US$80 billion

- Allows a disbursement of up to ten per cent of the maximum amount of drawing without an agreement with the IMF

The Chiang Mai Initiatives (CMI)

- **Success?**

- Critics on the moral hazard letting to the countries' underaccumulation of their own reserves and its capability to stand on its own as a regional alternative to IMF

- The CMI was, thus, seen as more symbolic than truly effective and the US was still seen as the region's de facto regional lender of last resort (Lin and Rajan, 2001)

- There was no single draw on the CMI swap line during 2008 global financial crisis

- Bank of Korea (BOK), on that time, being concerned about the dollar liquidity in their banking system, decided to operate $30 billion swap agreement with

The Chiang Mai Initiatives (CMI)

- **Success?**

- "Size does matter" - Under the CMI, Korea could have exchanged a maximum of US$ 23.5 billion (17 billion with Japan and China, and at most US$6.5 billion with the other ASEAN countries) which was too small to effectively contain currency speculation (Nicolas, 2011)

- The linkage of the CMI with IMF conditionality: the CMI obligation that Korea has to negotiate with IMF which could disrupt the country's trade and investment

- Korea's lack of confidence toward ASEAN+3's economies compared to the US's, and the operational obstacle that was the intra-regional swap was dominated by their own currencies (yen or renminbi), not dollars

The Chiang Mai Initiatives Multilateralization (CMIM)

- CMIM, announced in February 2009, as the agendas in reforming the CMI

- Offer a 'multilateral' swap arrangement - a formal reserve pooling arrangement (totaling $120 billion)- among ASEAN+3 countries governed by a single contractual agreement by pooling amount of potential reserves together

- Sources of funds are contributed as; 20% collectively from ASEAN countries and 80% from the '+3' countries

- Any disbursement of funds would be decided by a weighted voting system which varied to the member's financing contribution

The Chiang Mai Initiatives Multilateralization (CMIM)

- CMIM still differs in fundamental ways from the initial AMF concept

- The existing '**IMF link**' that requires the crisis countries to negotiate the IMF for a stand-by agreement in order to draw more than 20 percent of its quota or credit line with the CMIM to ensure that the major part of such swap arrangements was not leading to potential conflicts with IMF conditionality and the moral hazard problems

- Henning (2009) called that the CMIM is largely a "second" or "parallel line of defense" to IMF financing, not an alternative one

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Sino-Japanese Politics in the CMIM

- China and Japan are two major contributors and players dominating development of the CMIM

- Identical economic interests of creditors providing emergency liquidity loans, ensuring repayment, and avoiding moral hazards from certain and unconditional bailouts (funds should not be freely available when irresponsible policies have led to a crisis)

- There are still some deeply underlying political reasons, competition, and distrusts between Japan and China (Grimes, 2011)

Sino-Japanese Politics in the CMIM

- Two powers contest for regional leadership and is promoting the own currency as anchor currency and preventing the rival currency from establishing a dominant role

- **Japan** has substantially increased its bilateral swap agreements with South Korea, tying in the strategically important third player in regional currency cooperation
- **China** is aiming for the internationalization of the renminbi by also focusing firstly on expanding its regional role

Sino-Japanese Politics in the CMIM

- **China** also has a strong interest in seeking to prevent its ASEAN neighbors from economic collapse due to the increasing importance of trade ties between China's southwestern provinces and the bordering ASEAN countries.

- **Japan**, which her regional policy relying on the US-Japanese security alliance (Hassdorf, 2011), is interested in free trade and financial arrangements in East Asia for not purely economic reasons but, instead, willing to maintain its leadership role as the region's largest economy by checking and balancing China's expansion (Park and Wang, 2005).

Sino-Japanese Politics in the CMIM

- **ASEAN** countries have none of the material power and have seen themselves as 'rule takers' rather than as 'rule makers' (Dieter & Higgot, 2002)

- Both China and Japan decide to contribute almost equally on the CMIM for face saving compromise and to gain equal voting shares

- Since lending decisions will require a two-third majority of voting shares, it would be unlikely that conditionality can be agreed upon if opposed by either Japan or China

- No possible risk of 'near-veto power'

Sino-Japanese Politics in the CMIM

Countries		Financial Contribution (billion USD)		Share (%)		Purchasing Multiple	Maximum Swap Amount (billion USD)	Basic Votes	Votes Based on Contribution	Total Voting Power	
											%
Plus Three		**192.00**		**80.00**			**117.30**	**9.60**	**192.00**	**201.60**	**71.59**
Japan		76.80		32.00		0.5	38.40	3.20	76.80	80.00	28.41
China	China (Excluding Hong Kong	76.80	68.40	32.00	28.50	0.5	34.20	3.20	68.40	71.60	25.43
	Hong Kong China		8.40		3.50	2.5	6.30	0.00	8.40	8.40	2.98
Korea		38.40		16.00		1	38.40	3.20	38.40	41.60	14.77
ASEAN		**48.00**		**20.00**			**126.20**	**32.00**	**48.000**	**80.00**	**28.41**

# Sino-Japanese Politics in the CMIM

- Their interactions in the CMIM were still full of uncertainty about each other's intentions and likely behaviors

- Both countries could make a guarantee together to prevent moral hazards (by rejecting requests from countries in crisis or by delegating an independent body) but they tend not to do.

- To reject a request for loans from one borrowing country while another lender offers always means the political price.

- The asymmetric information among China and Japan results in high monitoring cost and creates the need for third-party enforcement through the IMF link.

- Thus, while East Asia attempts to reduce dependence on (and vulnerability to) US or IMF macroeconomic/financial

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Game Theory

- Grimes (2011) had explained this complex relationship as 'two overlapping games' that China and Japan are playing dual hedging games against U.S. and against each other.

- This paper was inspired by this concept of competing two states but to explore further in the mathematic forms
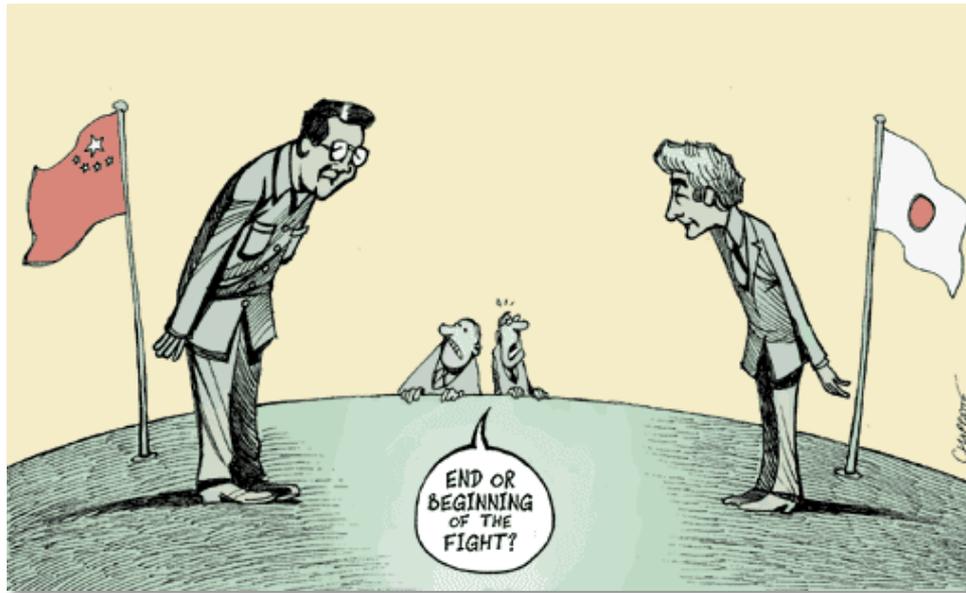
Game Theory

Decision games:

1) Japan and China decide to play a dominating or cooperative role in CMIM

2) Borrowers decide to request loans from either from CMIM or external sources (US or IMF)

- Two states of nature possible: 'peace time' and 'war time'

- Each player faces the value function containing both benefits and costs from a strategy

CMIM Lenders' Objective Function

Japan

$$V_{JP}(Z_{JP}, Z_{CN}) = PB_{JP}(Z_{JP}) - \gamma PB_{CN}(Z_{CN}) - \rho_{JP}E[C(Z_{JP}, Z_{CN})] - (1+i)(1-\theta)Z_{JP}$$

China

$$V_{CN}(Z_{JP}, Z_{CN}) = PB_{CN}(Z_{CN}) - \gamma PB_{JP}(Z_{JP}) - \rho_{CN}E[C(Z_{JP}, Z_{CN})] - (1+i)(1-\theta)Z_{CN}$$

Where;

Z_i = a country's level of lending agreement

$V_i (Z_i, Z_{-i})$ = a country's value function from lending

PB_i = a country's political benefits from lending; $PB_i{}'(Z_i) > 0$

C_i = a contagion effect to the lender's economy; $C'_{Z_{JP}}(Z_{JP}, Z_{CN})$ and $C'_{Z_{CN}}(Z_{JP}, Z_{CN}) < 0$

i = opportunity cost factor

γ = degree of rivalry between countries; $(0 < \gamma < 1)$

ρ_i = degree of economic interdependency; $(0 < \rho_i < 1)$

θ = probability that a borrower be a 'careful' type (its central bank conduct sound policy and be able to payback money in the future); $(0 < \theta < 1)$

CMIM Borrowers' Objective Function

ASEAN

$$\pi_i = LB_i(Z_i) - [\theta(1+i)^{-1}Z_i + (1-\theta)RP_i(Z_i)] - PE_i(Z) - DP_i(Z_i) \geq D_i$$

Where;
LB_i	=	the country's liquidity benefits from borrowing
Z_i	=	total amount of lending to payback in the future
RP_i	=	reputation cost from defaulting
PE_i	=	the panic effects from borrowing
D_i	=	the damage cost from illiquidity when no borrowing
DP_i	=	cost of dependency to dollars

Model Equilibria

Case I: Two lender countries agree in lending

$$\text{Max } V_{JP}(Z_{JP}, Z_{CN}) = PB_{JP}(Z_{JP}) - \gamma PB_{CN}(Z_{CN}) - \rho_{JP}E[C(Z_{JP}, Z_{CN})] - (1+i)(1-\theta)Z_{JP}$$

$$\text{s.t. } \widetilde{V}_{CN} = PB_{CN}(Z_{CN}) - \gamma PB_{JP}(Z_{JP}) - \rho_{CN}E[C(Z_{JP}, Z_{CN})] - (1+i)(1-\theta)Z_{CN}$$

We can see that the optimum level of lending agreement ($Z_{JP}{}^{*}$) that Japan would be willing to offer

$$Z_{JP}^{*} = \left[\frac{(1+i)(1-\theta)}{(1+\gamma^2)} + \frac{\overline{C}}{(1-\gamma)} \right]^{\alpha}$$

Similarly, for China, we would also get;

$$Z_{CN}^{*} = Z_{JP}^{*} = \left[\frac{(1+i)(1-\theta)}{(1+\gamma^2)} + \frac{\overline{C}}{(1-\gamma)} \right]^{\alpha} \qquad V_{JP}^{*} = V_{CN}^{*} = A > 0$$

Model Equilibria

Case II: Only one lender country agree in lending

For example, the case that Japan agree to lend while China does not ($Z_{CN} = 0$). The Japan's objective function would become;

$$\text{Max } V_{JP}(Z_{JP}) = PB_{JP}(\widehat{Z}_{JP}) - \gamma PB_{CN}(0) - \rho_{JP}E[C(\widehat{Z}_{JP})] - (1+i)(1-\widehat{\theta})\widehat{Z}_{JP}$$

$$\widehat{Z}_{JP}{}^* = [(1+i)(1-\theta) + \widetilde{C}]^\alpha$$

$$\widehat{V}^*{}_{JP}(\widehat{Z}^*{}_{JP}) = PB_{JP}(\widehat{Z}^*{}_{JP}) - \rho_{JP}E[C(\widehat{Z}^*{}_{JP})] - (1+i)(1-\widehat{\theta})\widehat{Z}^*{}_{JP} = B$$

While, for China who does not lend, the value function would become;

$$\widehat{V}^*{}_{CN}(\widehat{Z}^*{}_{CN}) = -\gamma PB_{JP}(\widehat{Z}^*{}_{JP}) - \rho_{CN}E[C(\widehat{Z}^*{}_{JP})] = C$$

Model Equilibria

Case III: No lender country agree in lending

$$\widehat{\widehat{Z}}_{JP}^* = \widehat{\widehat{Z}}_{CN}^* = 0$$

$$\widehat{\widehat{V}}^*_{\ CN} = \widehat{\widehat{V}}^*_{\ JP} = - \rho E[C(0,0)] = D$$

The Lenders' Game

- The model of CMIM lenders' optimization in 3 cases above, we can see 4 multiple equilibria possible
- This could be illustrated in a similar form as the Cournot equilibrium where each lender makes a decision on a lending agreement separately and simultaneously but their outcomes are interdependent
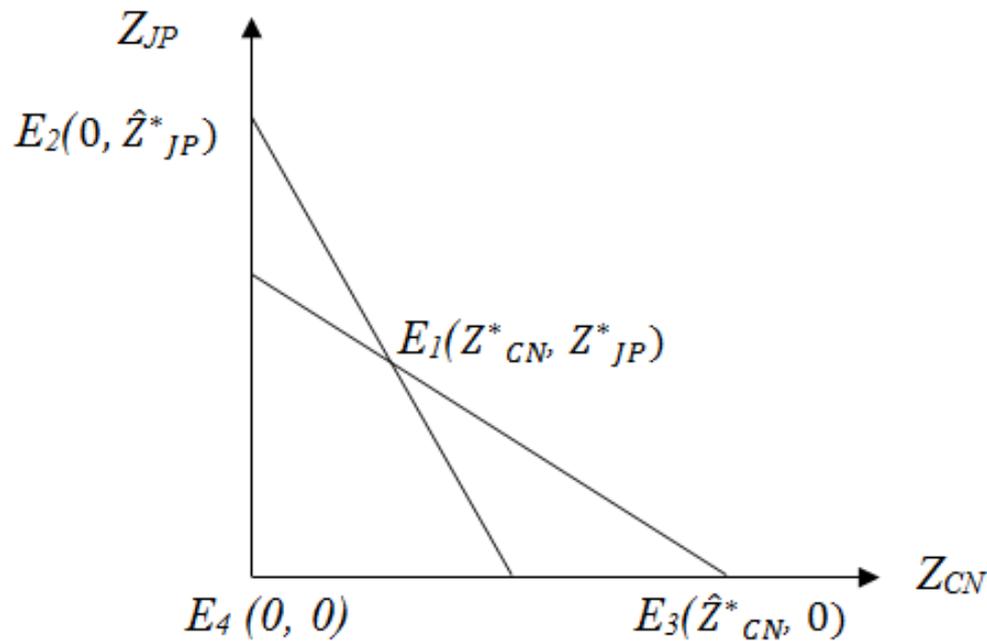
The Lenders' Game

Scenario 1: $A \geq B_1 > 0$ and $D_1 \leq C < 0$

	Japan		
		Agree	Do not agree
China	Agree	A, A	B_1, C
	Do not agree	C, B_1	D_1, D_1

Scenario 2: $B_2 \geq A > 0$ and $D_1 \leq C < 0$

	Japan		
		Agree	Do not agree
China	Agree	A, A	B_2, C
	Do not agree	C, B_2	D_1, D_1

Scenario 3: $A \geq B_1 > 0$ and $C \leq D_2 < 0$

	Japan		
		Agree	Do not agree
China	Agree	A, A	B_1, C
	Do not agree	C, B_1	D_2, D_2

Scenario 4: $B_2 \geq A > 0$ and $C \leq D_2 < 0$

	Japan		
		Agree	Do not agree
China	Agree	A, A	B_2, C
	Do not agree	C, B_2	D_2, D_2

In all possible scenarios, both China and Japan tend to agree upon lending via CMIM with correspond with the real situation that their cooperation in CMIM still exist or the equilibrium $E_1(Z^*_{CN}, Z^*_{JP})$ is 'stable'

The Lenders' Game

- However, some factors that could let $A \geq B$ possible are the low degree of rivalry between two countries (low γ), low inter-linkage with the crisis economy (low ρ), and low risk of moral hazard (high θ).

- We, thus, would call this case the '**good equilibrium**', which normally happens in the state of nature called '**peace-time**'.

- For another inversed case when B>A, we call it the '**bad equilibrium**' (high γ, high ρ, and low θ) which could be evidenced in the period of '**war-time**'.

The Borrowers' Game

Option 1: Borrowing the CMIM

$$\hat{\pi}_i(Z_i^*) = \widehat{LB}_i(Z_i^*) - [\hat{\theta}(1+i)^{-1}(Z_i^*) + (1-\hat{\theta})\widehat{RP}_i(Z_i^*)] - \widehat{PE}_i(Z_i^*) = F > 0$$

Option 2: Borrowing the US

$$\hat{\hat{\pi}}_i(Z_i^*) = \widehat{\widehat{LB}}_i(Z_i^*) - [\hat{\hat{\theta}}(1+i)^{-1}(Z_i^*) + (1-\hat{\hat{\theta}})\widehat{\widehat{RP}}_i(Z_i^*)] - \widehat{\widehat{PE}}_i(Z_i^*) - \widehat{\widehat{DP}}_i(Z_i) = G > 0$$

- Since the CMIM has the requirement that the borrowing countries have to be co-agreed by the IMF, the monitoring process in a peace-time is stricter and probability of 'careful' type would be higher ($\hat{\theta} > \hat{\hat{\theta}}$), and this lowers the risk of moral hazards and reduces the cost of possible default from careless policies.
- However, the investors' panic effects from dealing with the IMF when borrowing the CMIM is much greater than those occurred when borrowing the US ($\widehat{PE}_i(Z_i^*) > \widehat{\widehat{PE}}_i(Z_i^*)$)
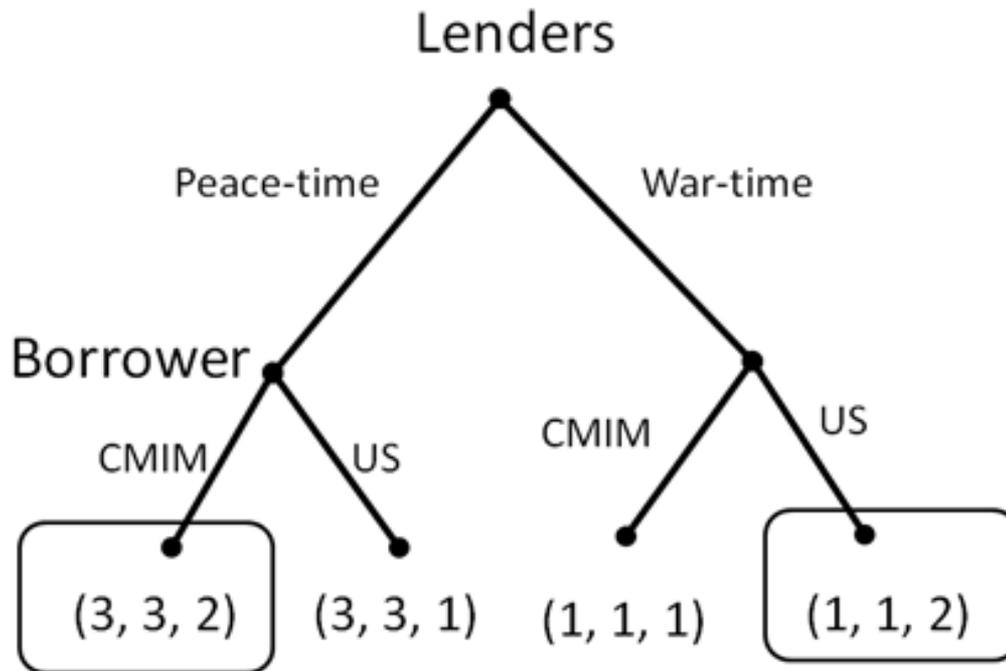
The Borrowers' Game

- There is no stable source of loans. The state of nature could be the determinant for the borrowing source.

- In a 'war-time' when there is higher probability of default and the panic effect is much higher than usual, G tends to exceed F and the crisis country borrows US.

- During a 'peace-time' is in contrary that, F tends to exceed G and the country in needs will bear lower cost by borrowing the CMIM.

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A Sequential Game of Lenders and Borrowers

- the sub-game Nash equilibrium would depend on the state of nature
- If the state of nature is in the peace-time period, the country that needs loans would prefer to borrow the CMIM
- In the war-time period, the borrowers would prefer to borrow the US

Conclusion

- However, we still cannot guarantee that, practically, the equilibrium of borrowing the CMIM would be preferable even in the peace-time
- We have not yet considered the domestic resolution to pre-mitigate the crisis, i.e. the accumulation of foreign reserves, etc. which also prevent the country from the illiquidity generating more sovereign debts

Policy Recommendation

- The IMF link of the CMIM cost the borrowers a lot in terms of panic effect
- US granted Korea in 2008, but there is no guarantee that the US will indeed grant the swap, such as in the case of Indonesia (Susangkarn, 2010)
- The creation of some sorts of institutional guarantees regarding how each will act in preventing or managing regional crises and preventing moral hazard would be very important
- The ASEAN+3 Macroeconomic Research Office (AMRO), an independent regional surveillance unit, has been established to monitor and analyze regional economies and contribute to the early detection of risks, swift implementation of remedial actions, and effective decision-making of the CMIM
- The CMIM borrowing quota should be expanded to be

Thank You