

KEIO UNIVERSITY
MARKET QUALITY RESEARCH PROJECT
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KUMQRP DISCUSSION PAPER SERIES

DP2007-001

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-Feasibility of Asian Infrastructure Bond Fund-**

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Naoyuki Yoshino*
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1. Introduction

Since the financial crisis of 1997, Asian authorities have played a supportive role in developing the regional bond market to circulate effectively the accumulated savings under Asian Bond Market Initiative (ABMI) from the supply side and market infrastructure. On the other hand, Asian Bond Funds (ABF1, ABF2) have been set up to purchase the government bond in the region from the demand side. At the initial stage of regional bond market development, government-led issuances were very meaningful in creating the benchmark yield curve and cultivating the bond market.

Nevertheless it is argued that there isn't sufficient need to continuously issue the government bonds under the current situation of highly accumulated exchange reserves and the fiscal surplus of most Asian governments. Although the regional bond markets are being developed and fostered, the current situations is that most Asian corporations with good reputations and performance still go to EURO bond market and US financial market not to Asian markets for financing. For the continual and sustainable growth of bond market and widening the investor's base, Asian regional bond market should cater to the needs and demands from market participants and investors.

According to the joint research of World Bank, Asian Development Bank and Japan Bank for International Cooperation shows that there exist huge investment demands, approximately 1 trillion dollar during 2005-2010 in infrastructure project in the region. UNESCAP (2006) is also implementing the study of regional cooperation for financing infrastructure investment in Asia Pacific region for which financing demand is very huge (to be estimated as 200-600 billion dollar per year). However, most Asian

countries are confronting vast financing gap owing to the limited capacity of bank financing and under-development of financial market. Nevertheless the absence of long-term debt capital market still forces large-scale infrastructure projects to be funded mainly via the banking system in the domestic as well as in international capital markets. These financing gaps in infrastructure investment impressed upon Asia the needs of long-term debt vehicles to circulate intra-regionally high savings and foreign exchange reserves in order to finance stably regional infrastructure projects.

Developed countries are also suffering from the fiscal burdens for deferred maintenance and upgrading the social infrastructures while less developed countries in Asia are confronting the paucity and under-development of the public infrastructure. Therefore the private financing are being trumpeted as an alternative of traditional financing for infrastructure project. Until mid-1997 there were increasing private investments made in regional infrastructure project in the boom of private participation in infrastructure project financing such as PPP, PFI and privatization. However after the crisis, the infrastructure investments declined sharply and the banks were reluctant to lend to the long-term infrastructure projects because of the non-performing loans and capital adequacy ratio requirement.

Given the vast financing needs and gaps in the infrastructure development in Asia, fostering infrastructure bond market could contribute to regional infrastructure development that induces the economic growth as well as to the further development of the bond market which fills the existing financing gap and matches long gestation periods of the projects. Furthermore developed local currency bond market also helps to lessen over-reliance on foreign currency debt. Recently institutional investors like banks, pension funds and insurance companies are regarding the infrastructure as a new long-term and viable asset class and consequently the private infrastructure funds have

grown by the flurry and operated vigorously with strong appetites for lucrative infrastructure projects.

Many regional infrastructure projects are still being financed mainly by the foreign currency equity and bank loan because most Asian countries don't have long-term maturity bond markets and institutional investors who can invest in long-term maturity bonds. Therefore this paper will investigate how the regional infrastructure bond market can be facilitated from the viewpoint of Asian bond market development and propose the introduction of revenue bond in Asia for financing the infrastructure project and then discuss the possibility & design of this regional infrastructure fund and the public sector role in establishing regional infrastructure fund to catalyze the investments in building and maintaining the infrastructures in the region to promote the development of Asian bond market.

2. Current State of Infrastructure Project Financing in Asia

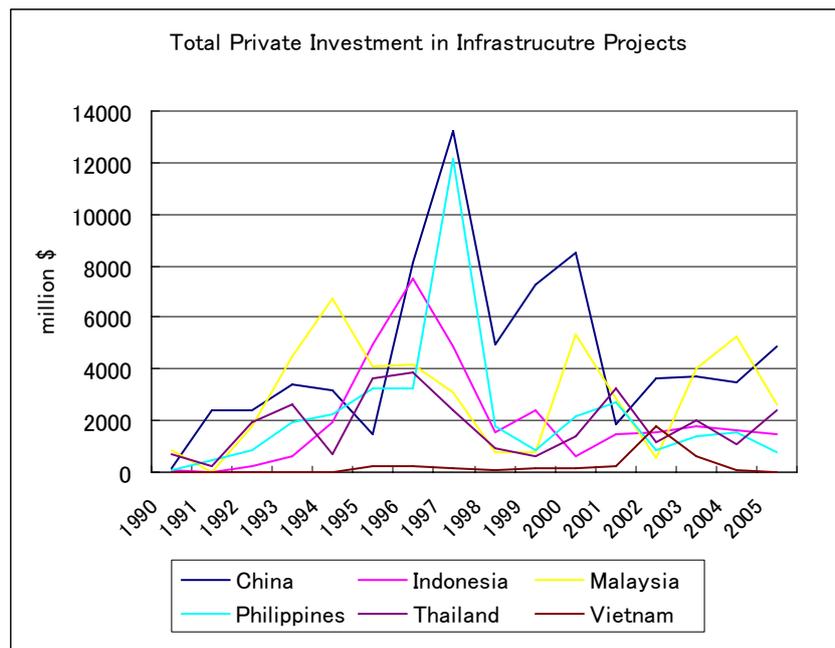
2.1 Private Investment in Infrastructure Project since the Crisis

Optimistic views prevalent for the high growth potential in Asia, especially rapid growth of China and Southeast Asia and the development of social and economic infrastructure attracted local and international investments through increasing private sector participations until the midst of 1990s. And local debt markets in several countries such as Malaysia, Indonesia and Thailand were emerging with financing the infrastructure projects. But these nascent debt markets suffered from a narrow investor base, limited ratings capacity, primitive and restrictive legal and regulatory frameworks and the lack of bench mark yield curve especially for the long-term maturity.

The financial crisis of 1997 deteriorated the financial markets of Asian countries and the financing conditions for private investments and consequently the private investments in infrastructure projects sharply declined and had negative impacts on the

large-scale infrastructure project financings. Large share of private investments take the forms of medium and long-term loans that are transformed with the short-term deposits by banks. So it is not a sustainable financing vehicle especially when banks are exposed to the systemic risk by the economic or financial crisis. (Figure 1)

Figure 1) Trends of Total Private Investment in Infrastructure Project in Asia



Source) World Bank, <http://ppi.worldbank.org/book>

2.2 Financing Needs and Gaps

With the recovery of Asian countries from the crisis, market participants expect infrastructure sector will be promising and profitable and accordingly private investments also rise. However, Asian region confronts the huge infrastructure investment requirements and vast financing gap simultaneously. The joint study of World Bank, ADB and JBIC shows the financing needs in infrastructure amounts to 228 billion dollar per year during the 2006-2010 but the only 48 billion dollar could be financed for the infrastructure projects. UN ESCAP study also shows Asia and Pacific region need 608 billion dollar per year but financing gap of 220 billion dollar still exists.

Table 1) Estimates on Annual Infrastructure Financing Needs

<i>Source</i>	<i>Infrastructure Needs Estimate (billion \$)</i>	<i>Financing Gap (billion \$)</i>
ADB, JBIC and World Bank	228	180
Asia-Pacific Infrastructure Forum	300	
UN ESCAP	608	220

Source) UN ESCAP (2006)

2.3 Double Mismatch Problem in Project Finance

The table 1 shows financing composition of the infrastructure projects; the bond finance (7.9%), bank finance (80.4%) and equity finance (11.8%). Seen from the below table, there are two mismatches in the project financing. One is the maturity mismatch because most long-term projects are financed with the bank loan (80.4%) transformed by the short-term deposits. And the other is the currency mismatch because project revenues are generated in the local currency but the projects are financed with the foreign currency (72.9%). And exchange rate fluctuations and limited convertibility and transferability of currency impose additional risks burden on foreign investors and financiers. Therefore the efficient long-term debt market in the region should be developed to bridge the financing gap and to finance stably the infrastructure project. Given the vast financing needs & gap and the merit of bond financing especially in the infrastructure projects, the regional infrastructure bond market can further the development of Asian bond market in the context of ABMI.

Table 2) Private Sector Project Financing by Market and Instruments (unit: million dollar)

	BondF	BondD	LoanF	LoanD	EquityF	EquityD	Total
Cambodia	0	0	0.75 (100)	0	0	0	0.75
China	1812.2 (5.0)	603.9 (1.7)	24493.99 (67.3)	5336.55 (14.7)	4172 (11.5)	0	36418.64
Hong	91.72	38.8	14885	8758.23	2790	457.89	27021.64

Kong	(0.3)	(0.1)	(55.1)	(32.4)	(10.3)	(1.7)	
Indonesia	1280 (4.5)	0	20985.33 (74.5)	2523.93 (9.0)	3314.43 (11.8)	69.49 (0.2)	28173.18
Malaysia	528.95 (2.5)	4783.59 (22.6)	3229.13 (15.3)	10396.26 (49.1)	1147.32 (5.4)	1077.19 (5.1)	21162.44
Myanmar	0	0	29.8 (100)	0	0	0	29.8
Philippines	2027.5 (14.1)	0	10661.56 (73.9)	34.47 (0.2)	1697.5 (11.8)	0	14421.03
Singapore	0	0	2027 (66.7)	924.26 (30.4)	0	87.33 (2.9)	3038.59
Thailand	180 (1.2)	294.55 (2.0)	7912.49 (54.7)	3864.72 (26.7)	1454.36 (10.0)	767.38 (5.3)	14473.5
Vietnam	0	0	2347.703 (89.9)	18 (0.7)	246 (9.4)	0	2611.703
Total	5920.37 (4)	5720.84 (3.9)	86572.753 (58.8)	31856.42 (21.6)	14821.61 (10.1)	2459.28 (1.7)	147351.273

Source) Kotecha and Sharon (2004)

* D stands for domestic currency and F for foreign currency.

2.4 Bank Financing versus Bond Financing

To compare bank financing with bond financing in especially project financing, bank loan is made via the direct relationship between a lender and a borrower by financial intermediary function and it can be characterized as a negotiable financing tool such as flexible disbursement and rescheduling of repayment. Conditions and terms of loans could be negotiated between the related parties through the clause amendment and waivers of loan agreement. Banks investigate the creditability of prospective borrowers (or projects) and screen safe borrowers from less safe ones. After the loan is made, banks often monitor the borrower's business to prevent the moral hazard problem. Activities such as information gathering and monitoring are conducted on a bilateral basis between a borrower and a lender.

On the other hand, bond issuance could be described as the direct financing via

financial markets from the broad base of investors. In order to issue bonds, a firm's financial conditions are scrutinized and rated and the information gathered in the process is open to the public if necessary. Underwriting is important for the dissemination of the debtor's information to the public as well as for the treatment of risks related to public offers.

Bonds are standardized financial vehicles and most importantly transferable financing tools through the capital markets. This kind of bond financing can cater to the financing needs of especially infrastructure project by matching the long gestation periods and by financing the large amount of funds for construction and maintenance of social infrastructures considering the inherent characteristics of the infrastructure financing. Given this nature of infrastructure projects, bond financing is an alternative avenue since bank financing cannot match the long gestation period and large funds requirements in infrastructure industry which are characterized as capital intensive infrastructure projects because of single lending limits and large credit control and concentration risk.

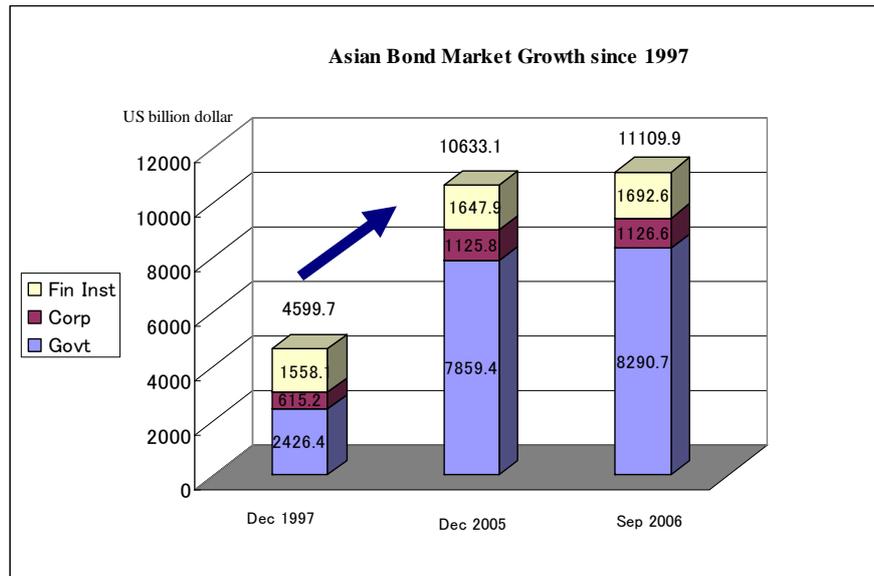
3. Asian Bond Markets Initiative (ABMI)

The 1997 financial crisis in Asia substantially impressed upon us the needs for the debt markets in Asia to channel the regional savings into the regional investments. Therefore from the supply side and market infrastructure of the bond market development, the Asian Bond Markets Initiative (ABMI) promotes the Asian regional bond market to circulate inter-regionally the highly accumulated savings in Asia. The Executives' Meeting of East Asia Pacific Central Banks (EMEAP) is a forum of central banks and monetary authorities in the East Asia and Pacific region set up for strengthening cooperation among its members. From the demand side, EMEAP already

established the Asian Bond Funds (ABF1 & 2) to purchase the government bonds issued in the region in order to promote the development of regional bond markets and to circulate the accumulated funds. However, the capital transactions in the region are not so active while the size of the trade of goods is very large and GDP growth is also brisk compared with that of the US and EU area.

At the initial stage of ABMI, the governments in the region are endeavoring to nurture and develop the domestic market in order to create the bench mark yield curve and further the domestic capital market development. Namely it has been supply-driven growth by the governments. However Asian countries are confronting difficulties such as different stage of development of financial markets and heterogeneous legal and institutional systems. Additionally the needs of continual issuing the government bonds are very limited because of the excessive holdings of foreign exchange reserves by current account surplus and fiscal surplus of the government in some countries. The current situation in Asia is that Asian countries accumulated the foreign reserve against the recurrence of future financial crisis and they invest their savings into the US in the form of US government bonds and EU area rather than into the Asia. Therefore for the next stage of ABMI, the growth of bond market should be driven by the investment demands and financing needs of market participants.

Figure 2) Asian Bond Markets Growth



Source) AsianBondsOnline, Asian Development Bank.

3.1 Foreign Exchange Holdings in Asia since the Crisis

In Mar 2006, China held 877.6 billion dollar and Japan held 837.7 billion dollars in foreign reserves, and ASEAN+3 countries held 2.25 trillion US dollars for foreign reserves. The share of foreign exchange holdings by Asian countries has been rapidly increasing especially since the crisis. This excessive dependence on US dollar can cause the exposure to sudden reversal of foreign capital flows and the currency crisis again. It also has the possibility that we may face the loss from the weakening of dollar because most Asian countries hold their foreign exchange reserve in the form of US dollar.

Table 3) Foreign Reserve of ASEAN+3 Countries (Mar 2006) unit:thousand

Country	US dollar
China	877637000
Japan	837712000
Korea	217271000
Singapore	121412000
Malaysia	73097100
Thailand	53709300
Indonesia	38172300
Philippines	17848000

Vietnam	10742000
Cambodia	1007340
Myanmar	890021
Brunei	480349
Lao PDR	249478
Total	2250227888

Source) IMF, International Financial Statistics

Central banks in the region have endeavored to sterilize the potential expansionary effects of increasing foreign reserves on domestic money supply and credit mainly through open market operation or reserve requirement in order to stabilize the exchange rates as well as to retain the control of monetary policy. China, Malaysia and Thailand recently have depended heavily on this sterilization policy (World Bank, 2007). The excessive current account surplus has induced the liquidity to increase and consequently spurs overheating of the economy and investment boom. This sterilization policy tends to make domestic interest rates higher than otherwise, attracting more capital inflows. It also causes the central banks to pay the opportunity cost by holding the reserve as well as the loss from paying the interest on the liabilities issued to sterilize the capital inflows.

3.2 Biased Securities Investment in Asia

In recent years, a high percentage of the US current account deficit has been supplemented by the investments into US government bonds and foreign exchanges holdings of Asian countries. The funds accumulated in Asia flow into the US and European countries and a large proportion of these funds return to Asia in the form of US investment or hedge funds. Additionally this intermediation of funds is largely handled by financial institutions and settlement systems outside the Asian region. This situation might lead to a hollowing-out of financial intermediary functions in Asia.

Most Asian countries invest their high savings into mainly EU area (41%) and US and Canada (32%) and only 4% of debt securities investment is made from Asia. Looking at the investment pattern of debt securities into Asian countries, 56% of total debt securities investment is made into Asia (56%) by EU area and US & Canada. And Asian countries investment into Asia amounts to only 17% of total debt securities investment. This statistics shows the bias and lethargy of Asian countries toward investment behaviors compared with the investments of EU and US even though there is absence or lack of financial information and financial products in the region.

Figure 2-1) Debt Securities Investment from Asia (2004)

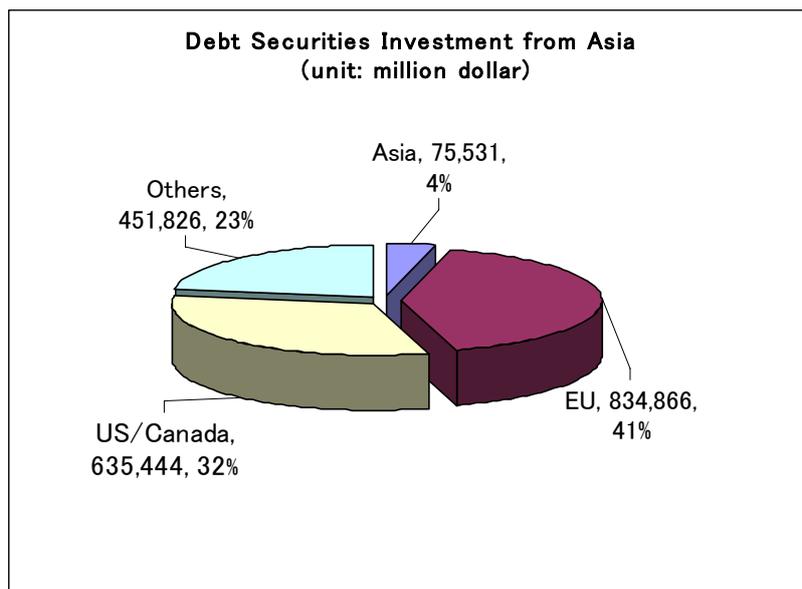
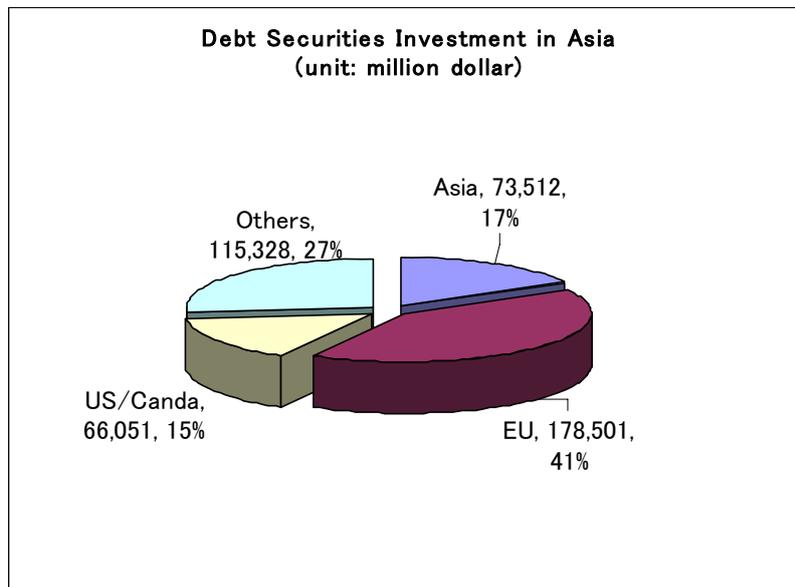


Figure 2-2) Debt Securities Investment in Asia (2004)



Source) IMF, Portfolio Investment: Coordinated Portfolio Investment Survey (CPIS)

From the lesson of the financial crisis of 1997, alternative intermediary mechanism which can lessen the excessive dependence of bank financing and provide the long term local currency funding mechanism needs to be created. Also efficient and systematic cross-border intermediation of regional affluent savings and foreign exchange holdings like regional bond markets can be an option to fill the financing gaps of the infrastructure. So the infrastructure financing-friendly bond market must be essential to circulate regional savings and foreign exchanges¹.

4. Revenue Bond for Financing Infrastructure Project

Revenue bond can be introduced to finance the infrastructure projects as well as to promote the bond market development in Asia. Infrastructure building depends heavily on bank finance and foreign borrowing under the current financial scheme in

¹ To facilitate the cross-border infrastructure bond market, developing the currency swap market is very crucial consequently swap market also should be advanced in parallel with the bond market development. ADB already implemented swap program of hard currency for local currency with its developing member countries for tenors stretching up to 15 to 20 years.

Asia. So local currency denominated revenue bonds can mitigate the double mismatch problems and moral hazard problem caused by existing government bonds which secure the principal and interest payment even when the projects fail since the revenue bonds are secured by only the future cash flows (revenues) generated by the project. It also diversifies project financing while lessening the over-dependence of bank loan.

It is difficult to issue the revenue bond, one of municipal bond in US in most Asian countries because of the lack of institutional factors such as regional monoline insurance company, bankruptcy law for bankruptcy remoteness and credible regional rating agency. So this paper proposes the feasible scheme of the issued revenue bond issuance to finance the infrastructure projects in Asia.

From the perspective of market attractiveness, we don't have regional monoline insurance company in Asia to provide the credit guarantee to the revenue bond like US. So the fixed portion of public money (or tax) by government at the initial stage is injected and direct payments which are made in the pre-determined conditions² will function as internal enhancement which consequently can enhance the credit rating of the project. The amount of this public injection can be adjusted to secure the reasonable market interest rate of the issued revenue bond to investors.

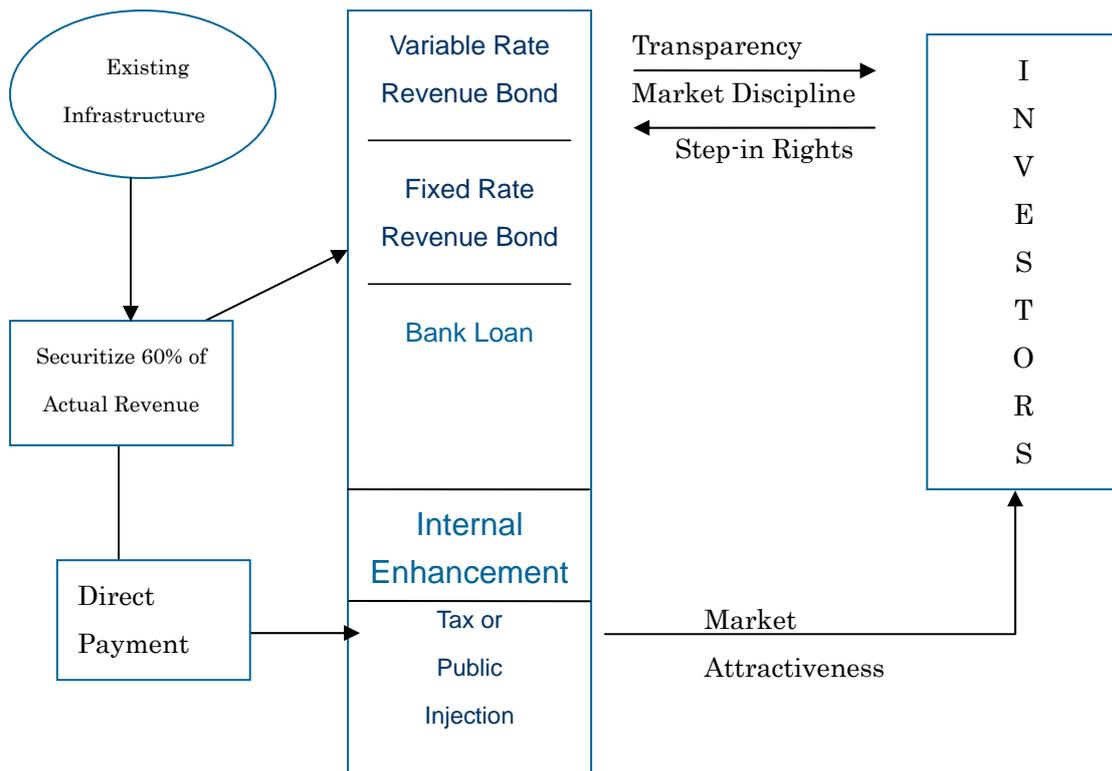
And from the perspective of market discipline, the variable rate revenue bonds (revenue-linked bonds) will be issued by linking purely with the future cash flows generated by the projects clarifying the performance of the infrastructure projects and bonus or incentives will be given to the operators so that they manage and operate efficiently the infrastructure. Consequently this variable rate revenue bonds enable investors to monitor the projects with step-in rights while clarifying the generating

² Direct payment might be made by 1) business interruption events, 2) toll adjustment events, and 3) operator services events. The payable direct payments is calculated as the difference between the net toll revenues after the event and the net toll revenues in the same period of the previous year.

mechanism of project revenue.

However it is very difficult to forecast exactly the future cash flows from the project so it is a good and feasible way to securitize the existing infrastructures which has enough historical data (track records) for stable and reliable forecasting in order to issue the revenue bond in Asia³. It also can secure investors if partial portion (for example, 60%) of actual revenues would be securitized, investors will bear the risk only when the revenues fall below the 60% of the future cash flows.

Figure 3) Revenue Bond Scheme in Asia



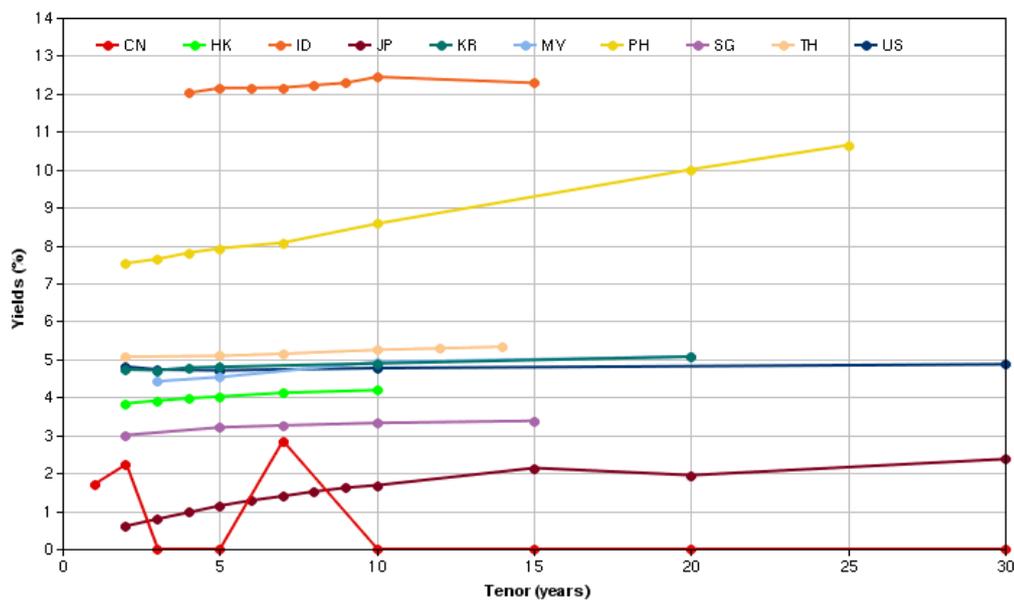
5. Possibility of Asian Infrastructure Bond Fund

However, there are lack of institutional investors' base in the region and also lack of regional debt instruments with long-term maturity that can satisfy the needs of a few

³ See Hong Kong Link 2004 for more details.

regional institutional investors who want to manage their assets for long-term investments. There are only 4 countries, Philippines, Korea, China and Japan which have a benchmark yield curve with more than 20 years maturity and which consequently result in the maturity mismatch with long gestation period of infrastructure projects of over 20 years.

Figure 4) Benchmark Yield Curve for LCY Bonds



Source) AsianBondsOnline, Asian Development Bank.

In the region, Japan has the largest base of institutional investors and then Hong Kong, Korea, and Singapore. However, Hong Kong and Singapore function as regional finance centers to attract large capitals from US and Europe. So it cannot be necessarily said that they circulate the Asian savings for long-term investments in the region. Therefore institutional investors in Japan and Korea are expected to play an important role in investing the long-term maturity bonds and developing the infrastructure bond markets to circulate the regional high savings.

Table5) Size of Regional Institutional Investors (unit: billion US dollar)

	Pension Fund	Life Insurance	Trust Investment	Total
China	28.0	136.0	27.0	191.0 (2.2%)
Hong Kong	38.0	9.0	465.6	512.6 (6%)
Indonesia	5.4	10.5	11.1	27.0 (0.3%)
Korea	161.0	133.0	186.0	480.0 (5.6%)
Malaysia	70.0	21.0	23.0	114.0 (1.3%)
Philippines	7.9	2.7	1.4	12.0 (0.1%)
Singapore	68.0	33.0	105.7	206.7 (2.4%)
Thailand	20.0	17.0	19.0	56.0 (0.7%)
Japan	2981.0	3452.0	524.0	6957.0(81.3%)
Total	3379.3	3814.2	1362.8	

Source) Japan Research Institute (2007), Asia Monthly, No 73, Vol 07.

The infrastructure assets, considered as traditionally public sector such as toll road, railways, airports, tunnels, bridges and ports are being handed over to the private sectors by private public partnership (PPP), private finance initiative (PFI) and privatization etc. Private project finance is being trumpeted as a solution to the fiscal burden of building and maintaining the social infrastructures under the increasing demand of infrastructures.

Good returns and low correlation between other infrastructure asset classes have recently attracted many private infrastructure funds (see the below table). Among them, the Australian-based infrastructure blockbuster has obtained the rate of return of 19.4 % (usually ranging from 10 to 30 per cent) over the past 11 years. And another rapidly growing factor is that the long-term lifecycle of infrastructure assets can meet the demands of the long-term investment periods that institutional investors such as pension funds seek for their portfolio investments. This increasing trend has continued over the next few decades.

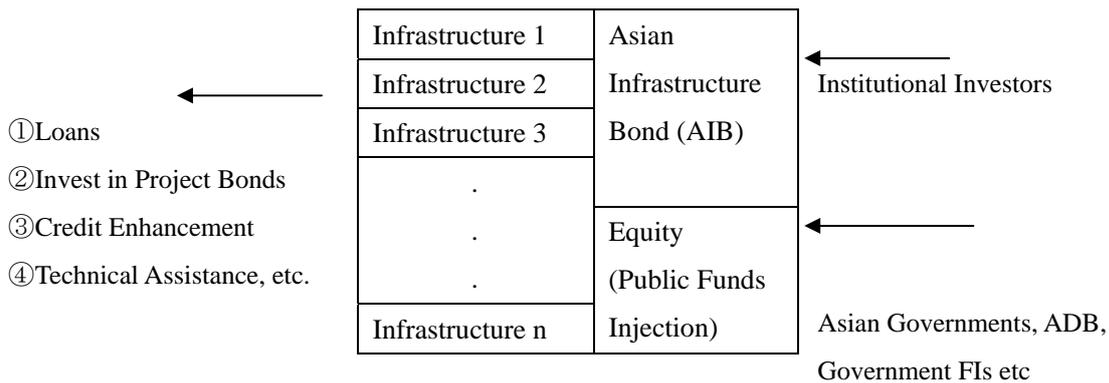
Table 6) The Cases of Infrastructure Funds

<i>Arranger</i>	<i>Major Fields</i>	<i>Size (US dollar)</i>
Macquarie Korea Infrastructure Fund Macquarie Shinhan Infrastructure Asset Management (MSIAM)	Toll roads, Tunnels, Bridges etc	964 million March 14, 2006
Alinda Capital Partners LLC	North America & Europe	1 billion
Infrastructure Development Finance Corporation	India Infrastructure Initiative	350-450 million
Carlyle Group	US	1 billion
MENA Infrastructure Fund Dubai International Capital and HSBC	The infrastructure sector such as in utilities, energy, transportation and public private partnerships across the Middle East and North Africa (MENA) region	500 million Mar 2006
Islamic Development Bank Infrastructure Fund Emerging Market Partnership (principal adviser)	Promote the use of Islamic finance in infrastructure development	730 million
Goldman Sachs International	Global Fund for Infrastructure	3 billion
KB Asset Management	J/V ING group and Korea Kookmin Bank Consortium of 17 domestic pension funds and insurance company investors	1.2 billion
Carlyle Group and Riverstone Holdings	Renewable Energy Infrastructure	685 million
GE and Credit Suisse	Infrastructure such as Power Plants, Pipeline, Airports, Railroads and toll roads	500 million

These kinds of private infrastructure funds have been invested mostly in the form of equity and bank loan. However, for private infrastructure building, the debt financing is very important for leverage especially the bond financing among others for the development of Asian bond market as well as infrastructure financings which require long gestation period and large funds as mentioned already in section 2.4. Besides, the role of public sector is also important in making an appropriate framework to share the cost and risk of infrastructure investment between public and private sectors (such as

political risk, construction risk, revenue fluctuation risk). Therefore the role of public sector cannot be overlooked in infrastructure building even initiated by the private sectors such as PPP and PFI.

Figure 5) Conceptual Structure of Asian Infrastructure Bond Fund



From the liabilities side of this fund, this infrastructure fund can be setup from mainly two portions, bond and equity. This fund consists mainly of Asian Infrastructure Bond (AIB) which can be purchased by regional institutional investors and equity participation from public funds injections by the governments, other government financial institutions (FIs), multilateral development banks and professional market players in the region.

From the assets side, this infrastructure fund would mainly make the low-interest rate (below the market rate) loans for building and maintaining the infrastructures and invest in the infrastructure bonds (project bonds or revenue bonds) in the region. This institutionalized fund is expected to enable regional investors to invest in projects which are inherently risky owing to the long gestation period and uncertainty in future cash flows and fill the existing financing gap by facilitating the Asian infrastructure bond market development.

This institutionalized fund would be established through the participation and

cooperation of the governments, financial authorities, government financial institutions and professional market players in Asia. This paper attempts to propose the basic concepts and the necessity of the infrastructure bond fund in Asia and there are still many tasks remaining to be discussed further with the future co-founding members such as the set-up of the preparatory committee and the professional investment committee which could be organized to select the feasible infrastructures and decide the investments in infrastructure bonds and loans to infrastructure buildings.

6. Summary

Under-development of the local currency denominated and long-term bond markets in the region forces the regional infrastructure project to be financed through mainly bank loan and to tap the international loan markets for the long term finance which cause the double mismatch problem (maturity and currency mismatch). Given the vast investment needs and financing gap in infrastructure project, the development of infrastructure bond market will become important from now on. The liquid and long-term infrastructure bond market can contribute not only to the regional bond market development but also to the social infrastructure building which would induce the regional economic growth.

Revenue bond could be introduced to Asia bond markets in order to lessen the fiscal burdens in building and maintaining infrastructure as well as to prevent the moral hazard problems caused by government guarantees to the principal and interest payment by clarifying the revenue generating mechanism with revenue-linked (variable) rate bonds. Internal enhancements such as public injection, direct payments and securitization of partial revenue could secure the investors in Asia in replacement of monoline insurance company.

Owing to the absence or lack of institutional investors and appropriate framework for private infrastructure building in some Asian countries, Asia may need an infrastructure fund which can facilitate the investments especially in infrastructure bond markets or investments in new products such as revenue bonds. This institutionalized infrastructure bond fund scheme could facilitate the local currency denominated and long-term maturity infrastructure bonds for wide range of investors and catalyze the debt securities investment in Asia. For that, however, various key issues would have to be discussed further, including an appropriate framework to share the cost and risk of infrastructure investment between the public and the private sectors

as well as the detail designs including the formulation of investment criteria and investment committee etc.

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