

Capital Market Development and End-User Needs

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Book Launch Conference

Asian Capital Market Development and Integration

- Challenges and Opportunities -

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Motivation

- ❖ **Assess the development experience of Asian capital market since the Asian Financial Crisis of 1997-1998**
- ❖ **What are the critical economic factors that affect the development of capital markets in Asia?**
- ❖ **What are the potential economic benefits of integrating the ASEAN+3 capital markets?**
- ❖ **How intense are the spillover effects from the integration of domestic capital markets with overseas markets? Discuss policy measures that can be deployed to address contagion risks.**
- ❖ **Are some of the Asian currencies ready for internationalization? What role do domestic capital markets play in currency internationalization and can Japan's experience shed some light on this issue?**

Determinants of Bond Market Development in Asia

by In Seok Baek and Pil-Kyu Kim

❖ Motivation

- Despite the remarkable growth of Asian bond markets since the 1997 crisis:
 - Market depth is much lower than that of developed countries
 - The pace of market development differs significantly across countries
- Little efforts have been made to understand the determinants of domestic bond markets development in Asian countries

❖ First purpose

- To identify the macroeconomic and institutional determinants of bond markets development in nine Asian countries for the period between 1997 and 2011
- To investigate differences among bond markets segments

❖ Second purpose

- To investigate the effects of the Asian financial crisis in 1997-1998 and the recent global financial crisis in 2008 on bond markets development in Asia
- To indirectly evaluate the contribution of ABMI to the development of domestic bond markets in the region

Determinants of Bond Market Development in Asia

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❖ Asian bond markets in the world bond market

- Asian countries showed remarkable growth since the Asian financial crisis
- However, it is far from sufficient because

Ratio of total domestic bonds outstanding over GDP (%)

	'97	'03	'08	'10	average growth	'97-'10 growth
Advanced countries	78.1	93.3	104.3	110.6	3.1	41.6
Emerging Europe	17.1	29.0	30.1	33.2	6.4	93.5
Emerging Latin America	19.8	35.4	33.9	33.7	5.0	70.1
Emerging Asia	21.0	48.1	57.0	63.8	10.4	204.2
Japan	95.9	181.7	203.3	250.2	8.1	160.8

Data: BIS (2012)

(1) its depth is much lower than that of advanced countries,

Ratio of total domestic bonds outstanding over GDP (%)

	'97	'03	'08	'10	average growth	'97-'10 growth
Advanced countries	78.1			110.6		
Japan	95.9	181.7	227.9	250.2	8.1	160.8
Malaysia	54.5	75.1	93.7	123.7	7.8	127.3
Korea	29.7	89.3	92.7	109.5	17.9	268.9
Thailand	6.7	36.9	47.6	65.6	26.3	882.8
Singapore	22.7	62.5	57.8	59.9	8.6	163.6
Hong Kong	23.3	29.1	23.3	54.4	9.2	133.2
China	8.8	27.3	48.9	51.1	15.1	482.7
Philippines	20.3	36.6	30.0	32.1	4.4	57.8
Indonesia	2.0	28.0	13.9	14.4	45.4	625.9

Data: BIS (2012)

(2) there is still much heterogeneity across countries and market segments.

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❖ Data

- China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand
- Annual data for the period between 1997 and 2011

❖ Empirical method

- Panel GLS regression methods with
 - heteroskedastic error structures
 - panel-specific autocorrelation coefficients modeled by AR (1) process
- Dependent variable: development of domestic bond market
 - **Ratio of domestic bonds outstanding over GDP (BIS Quarterly Review, Table 16A)**
 - domestic currency bonds issued by residents and targeted to domestic investors
 - **Total bond market, government and private (corporate+financial) bond markets**
 - Burger and Warnock (2006), Eichengreen and Luengnaruemitchai (2006), among many others

Determinants of Bond Market Development in Asia

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❖ Macroeconomic factors, Asian financial crisis, Global financial crisis (1997-2011)

		total	total	total	gov	gov	gov	pri	pri	pri
(1)	Country size (<i>gdp</i>)	0.039 (0.031)	-0.046* (0.026)	0.047** (0.020)	-0.087*** (0.017)	-0.089*** (0.016)	-0.079*** (0.016)	0.029** (0.014)	0.042*** (0.012)	0.066*** (0.017)
(2)	Economic development (<i>gdppc</i>)	0.086*** (0.024)	0.091*** (0.020)	0.136*** (0.016)	-0.005 (0.013)	0.025** (0.012)	0.055*** (0.016)	0.048*** (0.014)	0.068*** (0.010)	0.148*** (0.014)
	Stock market size (<i>stock</i>)	-0.092*** (0.022)	-0.067*** (0.019)	-0.040** (0.018)	-0.045*** (0.009)	-0.044*** (0.010)	-0.040*** (0.010)	-0.006 (0.010)	-0.004 (0.009)	0.008 (0.008)
(3)	Bank size (<i>bank_size</i>)	0.178*** (0.060)	0.159*** (0.053)	0.251*** (0.050)	0.059** (0.028)	0.014 (0.027)	0.039 (0.026)	0.038 (0.025)	0.010 (0.027)	0.035 (0.024)
	Bank concentration (<i>bank_con</i>)	-4.605*** (1.274)	-4.905*** (1.217)	-2.489** (1.010)	-1.049* (0.574)	-0.875 (0.604)	-0.406 (0.592)	-0.435 (0.591)	-1.352* (0.692)	-0.519 (0.532)
(4)	Inflation (<i>inflation</i>)	-0.851*** (0.326)	-1.107*** (0.314)	-0.533** (0.261)	-0.432*** (0.151)	-0.390** (0.158)	-0.237 (0.160)	-0.044 (0.151)	-0.241 (0.180)	0.074 (0.146)
	FX (<i>fx</i>)	-0.209*** (0.061)	-0.296*** (0.057)	-0.274*** (0.051)	-0.124*** (0.029)	-0.129*** (0.030)	-0.122*** (0.029)	-0.021 (0.026)	-0.082*** (0.031)	-0.045 (0.028)
(5)	Asian financial crisis (<i>ikmt</i>)		0.328*** (0.047)			0.098*** (0.025)			0.238*** (0.029)	
	Asian financial crisis (<i>ikmpt</i>)			0.478*** (0.048)	positive		0.164*** (0.038)	positive		0.352*** (0.040)
(6)	Global financial crisis (<i>Lehman</i>)		0.257*** (0.068)	0.039 (0.058)	positive	0.324*** (0.033)	0.282*** (0.035)	negative	-0.042 (0.035)	-0.152*** (0.035)

standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Determinants of Bond Market Development in Asia

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❖ Institutional factors (2004-2010): democracy, legal rights, credit information

	total	total	gov	gov	pri	pri	
gdp	-0.093*** (0.029)	0.024 (0.036)	-0.065*** (0.014)	-0.061** (0.027)	0.041*** (0.010)	0.062*** (0.022)	
gdppc	0.193*** (0.029)	-0.091 (0.064)	0.062*** (0.015)	0.044 (0.044)	0.134*** (0.016)	-0.006 (0.042)	
stock	-0.192*** (0.022)	-0.198*** (0.027)	-0.081*** (0.014)	-0.110*** (0.019)	-0.034*** (0.009)	-0.074*** (0.011)	
bank_size	0.433*** (0.054)	0.489*** (0.041)	0.163*** (0.041)	0.343*** (0.045)	-0.106*** (0.025)	-0.094*** (0.022)	
bank_con	-9.777*** (1.679)	-5.035** (2.208)	-2.756*** (0.863)	-2.074 (1.432)	-2.898*** (0.951)	-2.548*** (0.779)	
inf	1.343 (0.901)	0.813 (1.018)	-0.001 (0.438)	-0.727 (0.662)	-0.188 (0.398)	0.311 (0.375)	
fx	-0.490*** (0.165)	-0.706*** (0.171)	-0.326*** (0.071)	-0.492*** (0.116)	0.005 (0.085)	0.056 (0.075)	
democ		0.278*** (0.057)	(1)	0.084* (0.047)		0.026 (0.032)	level of institutionalized democracy
legal_rights		0.107*** (0.028)		0.001 (0.019)		0.080*** (0.014)	strength of legal rights
credit_info		-0.009 (0.026)	(2)	-0.032 (0.020)		0.039*** (0.013)	depth of credit information
Lehman	0.081 (0.051)	0.179*** (0.056)	0.059** (0.028)	0.077 (0.047)	-0.057** (0.025)	-0.022 (0.026)	

standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

p-value=0.102

Determinants of Bond Market Development in Asia

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❖ For the development of private bond markets

- Country size matters
 - Handicap for most Asian countries except for China and Japan
 - Can be overcome via regional cooperation
 - Primary focus of ABMI should be placed on private bond markets development
- Legal and institutional infrastructures are also important
 - Protect the rights of credit market participants by improving the collateral and bankruptcy laws
 - Improve the depth of credit information available
 - Improve the rule of law and regulatory quality
- Our results provide empirical grounds for the recent policy efforts led by ABMI
 - Efforts to establish regional rating agencies
 - Introduction of Credit Guarantee and Investment Facility (CGIF)

Determinants of Bond Market Development in Asia

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❖ For the development of government bond markets

- Macroeconomic stability is important
 - Macroeconomic efforts such as more credible monetary policy (low inflation) and more effective management of FX risk can aid the development of government bond markets
- Quality of general governance also should be improved

❖ Banking sector policy

- Competition among banks is important for all bond markets
 - Policy makers must make efforts to promote the growth and competition of banks simultaneously

ASEAN+3 Capital Market Integration: Cost of Capital and Investment

by Ki Beom Bihn and Yong-Rin Park

- ❖ **Motivation of research is to examine and quantify financial benefits of capital markets integration in Asia in a hypothetical setting**
 - Analyze 5 countries of ASEAN (Singapore, Malaysia, Indonesia, Thailand, and Philippines) + 3 (China, Japan, and Korea)
 - Focus on the effect of consolidation of fragmented liquidity on the cost of capital for corporations in ASEAN+3 countries and corporate investment
- ❖ **Benefits from integration include:**
 - Increased liquidity
 - Lower cost of capital for firms seeking to invest in productive areas
 - Lower the transactions costs associated with investment

ASEAN+3 Capital Market Integration: Cost of Capital and Investment

by Ki Beom Bihn and Yong-Rin Park



❖ Assumptions and Caveats

- The analysis focuses solely on the stock and bond markets and restricts the study on the impact of pure market deepening and the increase in liquidity on cost of capital
- Assumes that integration is both timeless and complete in the sense that investors are free to allocated each unit of capital to its most productive use anywhere in the region
- Impact of capital markets integration on the banking sector, which take up the majority of corporate access to ASEAN+3 financial markets are not considered
 - To minimize complexity and increase tractability
 - Since the analysis ignores the beneficial impact of removing restrictions currently in place in capital market sub-sectors such as banking and insurance ,the potential benefits can be greater
- There are other channels through which integration decreases the cost of capital
 - The reduction in financial service fees resulting from increased competition
 - A broader opportunity set for investors, which implies greater opportunities for diversification and a resulting decrease in the required rate of return
 - Convergence to regional best practices as a result of harmonization of national supervisory infrastructure

ASEAN+3 Capital Market Integration: Cost of Capital and Investment

by Ki Beom Bihn and Yong-Rin Park

Model I: Liquidity and cost of equity (stock market)

$$\left\{ \begin{array}{l} \ln EPS_{i,t}^c = \alpha + \beta_1 \ln EPS_{i,t-1}^c + \beta_2 \ln MTURN_t^c + \beta_3 \ln SIGMA_{i,t}^c + \beta_4 \ln MV_{i,t}^c \\ \quad + \beta_5 \ln MTV_t^c + \beta_6 \ln MMV_t^c + \lambda' D_t^{month} + \mu_i + \nu_c + \varepsilon_{i,t}^c \\ \ln P_{i,t}^c = \delta + \gamma_1 \ln P_{i,t-1}^c + \gamma_2 \ln EPS_{i,t}^c + \gamma_3 \ln SIGMA_{i,t}^c + \gamma_4 \ln MV_{i,t}^c + \gamma_5 \ln Index_t^c \\ \quad + \varphi' D_t^{month} + \kappa_i + \xi_c + u_{i,t}^c \end{array} \right.$$

- ❖ Investigation of the relationship between the liquidity and cost of equity in the stock market: EPS (effective percentage spread), P (stock price)

Model II: Change in cost of equity due to integration

- ❖ Local CAPM vs. ASEAN+3 CAPM for stock pricing

cost of equity of firm i under domestic market CAPM

$$= \hat{E} \left(R_{f,t}^c + \hat{\beta}_i^c (R_t^{MSCI,c} - R_{f,t}^c) \right)$$

cost of equity of firm i under ASEAN + 3 market CAPM

$$= \hat{E} \left(R_{f,t}^{Japan} + \hat{\beta}_i^c (R_t^{MSCI,Asia} - R_{f,t}^{Japan}) \right)$$

ASEAN+3 Capital Market Integration: Cost of Capital and Investment

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Model III: Liquidity and cost of corporate bond

$$\ln(y_{i,t}^c) = \alpha + \beta_1 \ln(QPS_{i,t}^c) + \beta_2 \ln(CR_{i,t}^c) + \beta_3 \ln(CM_{i,t}^c) + \beta_4 \ln(DU_{i,t}^c) + \beta_5 \ln(ISS_{i,t}^c) + \beta_6 \ln(OUT_{i,t}^c) + \beta_7 D_i^{gov/corp} + \beta_8' D_i^{Rating} + \beta_9' D_i^{Refund} + \beta_{10}' D_i^{currency} + \lambda' D_t^{year} + \mu_c + \alpha_i + \varepsilon_{i,t}^c$$

❖ **Investigation of the relationship between the liquidity and cost of debt in the bond market**

- y (yield): cost of debt proxy
- QPS (quoted percentage spread): Liquidity proxy

Model IV: Change in cost of bond due to capital market integration

cost of debt of firm i under domestic market CAPM

$$= \hat{\mathbf{E}} \left(R_{f,t}^c + \hat{\beta}_{s,i} (R_{t+1}^{MSCI,c} - R_{f,t}^c) + \hat{\beta}_{b,i} (R_{t+1}^{HSBC,c} - R_{f,t}^c) \right)$$

cost of equity of firm i under ASEAN + 3 market CAPM

$$= \hat{\mathbf{E}} \left(R_{f,t}^{Japan} + \hat{\beta}_{s,i} (R_{t+1}^{MSCI,Asia} - R_{f,t}^{Japan}) + \hat{\beta}_{b,i} (R_{t+1}^{JP,Asia} - R_{f,t}^{Japan}) \right)$$

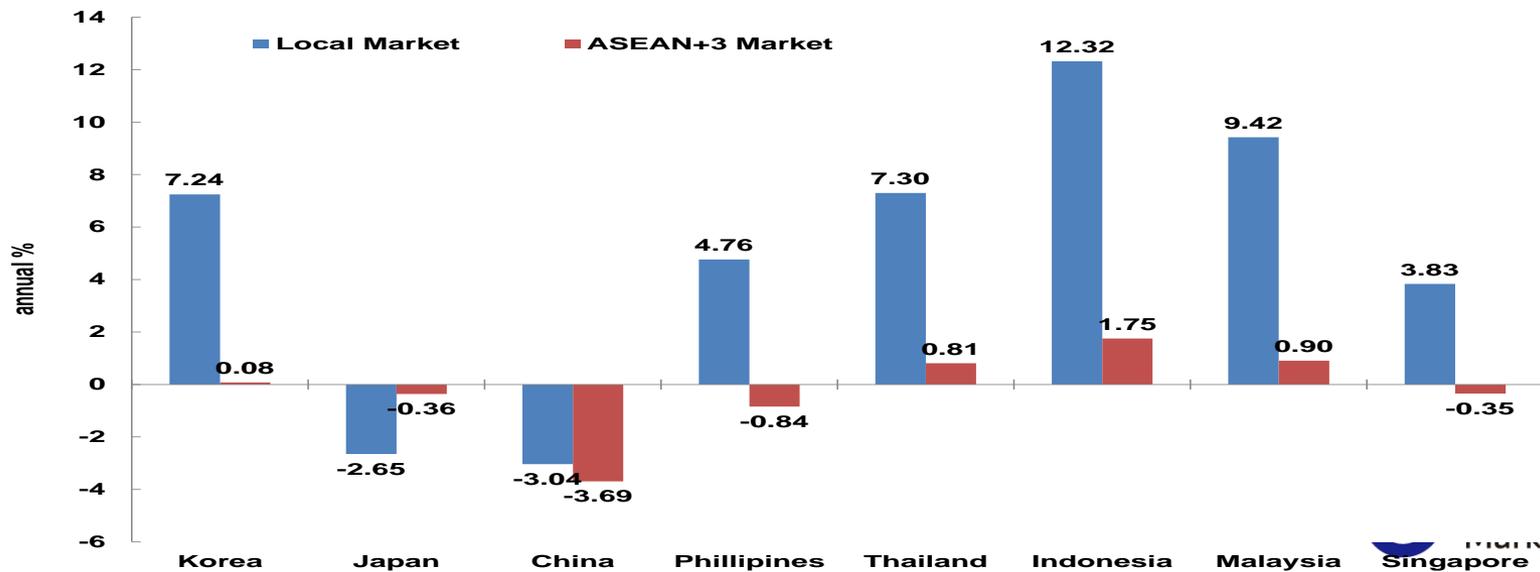
ASEAN+3 Capital Market Integration: Cost of Capital and Investment

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Model I: Liquidity and cost of equity

	Model I		Model II		Model III	
	ln(EPS)	ln(P)	ln(EPS)	ln(P)	ln(EPS)	ln(P)
ln(EPS)		-0.0012*** (0.00)		-0.0012*** (0.00)		-0.0012*** (0.00)
ln(MTURN)	-0.0783*** (0.01)		-0.0624*** (0.00)		-0.0642*** (0.00)	
...
Fixed Effects	controlled	controlled	controlled	controlled	controlled	controlled
N	2,841,610	3,382,447	2,841,610	3,382,447	2,841,610	3,382,447
N(firms)	10,563	10,775	10,563	10,775	10,563	10,775

Model II: Change in cost of equity due to integration



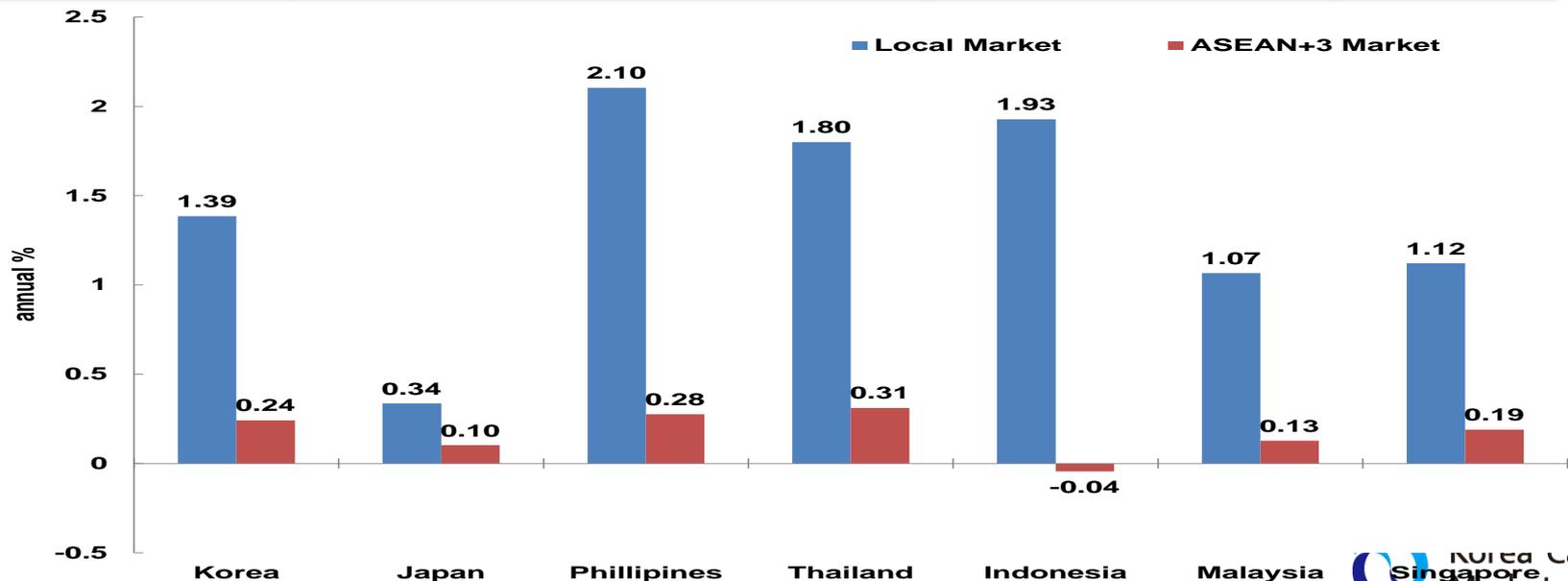
ASEAN+3 Capital Market Integration: Cost of Capital and Investment

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Model III: Liquidity and cost of corporate bond

	Model I		Model II		Model III		Model IV		Model V	
	FE	RE								
ln(QPS)	0.1609*** (0.00)	0.1613*** (0.00)	0.1090*** (0.00)	0.1090*** (0.00)	0.1090*** (0.00)	0.1090*** (0.00)	0.1076*** (0.00)	0.1074*** (0.00)	0.1076*** (0.00)	0.1074*** (0.00)
...						...				
N	348,393	348,393	342,958	342,958	342,958	342,958	343,700	343,700	343,700	343,700
R ²	0.527		0.603		0.603		0.600		0.600	
N(firms)	1,745	1,745	1,698	1,698	1,698	1,698	1,714	1,714	1,714	1,714

Model IV: Change in cost of bond due to capital market integration



ASEAN+3 Capital Market Integration: Cost of Capital and Investment

by Ki Beom Bihn and Yong-Rin Park



❖ Change in Weighted Average Cost of Capital

	Change in the cost of equity	Change in the cost of corporate bond	Change in the cost of loans	Change in WACC
Korea	-7.2%	-1.14%	0%	-3.2%
Japan	2.29%	-0.23%	0%	0.3%
China	-0.66%	0.00%	0%	-0.2%
Singapore	-4.18%	-0.93%	0%	-2.3%
...
Indonesia	-10.56%	-1.97%	0%	-5.7%

❖ Econometric Model for Corporate Investment

$$\ln I_{it} = \alpha + \beta_1 \ln WACC_{it} + \beta_2 \ln I_{i,t-1} + \beta_3 \ln P_{it} + \beta_4 \ln GDP_{it} + \beta_5 \ln GDP_{i,t-1} + \beta_6 \ln M1_{it} + \beta_7 \ln GOV_{it} + \beta_8 \ln FX_{it} + \lambda_t + \nu_i + \varepsilon_{it}$$

	Model I	Model II	Model III	Model IV
WACC	-0.0453*	-0.0286**	-0.0287**	-0.0387**
	(0.26)	(0.13)	(0.14)	(0.17)
...
Year Effects	included	included	included	included
Country Effects	included	included	included	included
N	96	96	96	96
N(countries)	8	8	8	8

ASEAN+3 Capital Market Integration: Cost of Capital and Investment

by Ki Beom Bihn and Yong-Rin Park

- ❖ **The preliminary analysis shows that capital markets integration has an important effect on the cost of capital and corporate investment**
- ❖ **Despite the practical hurdles and challenges in the implementation of integrated capital market across the ASEAN+3 region, current research sheds light on the quantitative gains of the capital markets integration**
- ❖ **The ensuing task after assessing the potential benefits of integrated capital market would be an investigation on the side effects of market integration: “spill-over effect” or “contagion”**
 - Two chapters are devoted to this issues.

Decomposition of Volatility in Asian Equity Markets

by Ki Hoon Hong, Jangoo Kang, and Doowon Lee



- ❖ **Determine the degree to which price volatility generated in equity markets outside Asia spills over into Asian equity markets**

- ❖ **Why is this important?**
 - Degree of volatility in equity reflects the amount of risk borne by the investors who hold that equity as an investment
 - Higher volatility translates to higher discount factor that reduces firm value and raises the cost of capital

- ❖ **If the prices of equities traded on Asia markets have indeed become more volatile because of this “volatility spillover effect” then only two outcomes are possible:**
 - Investors in equities traded on Asian markets are compensated for bearing this additional risk, by being paid rates of return on investment higher than would be the case in the absence of the increased volatility
 - Investors are not compensated for bearing the additional risk and welfare is reduced

Decomposition of Volatility in Asian Equity Markets

by Ki Hoon Hong, Jangoo Kang, and Doowon Lee

❖ **Eight Asian equity markets are examined**

- PRC, Indonesia, Hong Kong China, Thailand, Singapore, Malaysia, ROK, Philippines

❖ **Four sources of unexpected returns are modeled to investigate the components of the increase in volatility in the Asian equity markets during the AFC and GFC:**

- Volatility driven by events at the domestic level, by events at the regional level, global shocks originating the US, and global shocks originating in the EU

❖ **Estimation procedures:**

- MGARCH model used to fit the weekly returns and the conditional covariance matrix is specified
- Error vector of the model is orthogonalized
- Asymmetric GARCH(1,1) shock spillover model is constructed for estimation

Decomposition of Volatility in Asian Equity Markets

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Results of Test of Spillover Effect in the Eight Economies under Study of Volatility Shocks Originating in Global and Regional Markets

		US return	Asia return	EU return	US Inno.	Asia Inno.	EU Inno.	Wald(US)	Wald(Asia)	Wald(EU)
RPC	Est.	0.012	-0.093	0.116	0.690	0.198	0.462	139.35	20.01	28.57
	P-Val	0.873	0.031	0.106	<.001	<.001	<.001	<.001	<.001	<.001
Indonesia	Est.	0.256	-0.013	0.059	0.588	0.168	0.51	131.69	19.38	43.29
	P-Val	0.001	0.727	0.372	<.001	<.001	<.001	<.001	<.001	<.001
Hong Kong, China	Est.	0.194	-0.061	0.135	0.815	0.243	0.528	1199.3	103.02	118.09
	P-Val	<.001	0.014	0.001	<.001	<.001	<.001	<.001	<.001	<.001
Thailand	Est.	0.277	-0.037	0.033	0.522	0.21	0.389	155.61	34.52	28.95
	P-Val	<.001	0.308	0.560	<.001	<.001	<.001	<.001	<.001	<.001
Singapore	Est.	0.195	-0.021	0.049	0.647	0.243	0.497	562.00	126.11	132.14
	P-Val	<.001	0.347	0.166	<.001	<.001	<.001	<.001	<.001	<.001
Malaysia	Est.	0.108	0.010	0.062	0.411	0.185	0.359	199.59	58.97	53.54
	P-Val	0.006	0.68	0.107	<.001	<.001	<.001	<.001	<.001	<.001
South Korea	Est.	0.148	-0.001	0.111	0.792	0.331	0.407	309.63	76.35	35.42
	P-Val	0.017	0.974	0.053	<.001	<.001	<.001	<.001	<.001	<.001
Philippines	Est.	0.206	-0.061	0.004	0.494	0.133	0.336	141.64	17.04	23.25
	P-Val	0.001	0.066	0.943	<.001	0.001	<.001	<.001	<.001	<.001

Wald tests the null hypothesis that there is no spillover effect from external markets shocks

Decomposition of Volatility in Asian Equity Markets

by Ki Hoon Hong, Jangoo Kang, and Doowon Lee



Compensation through Increased Rates of Return on Investment for Additional Investor Risk due to Regional and Global Shocks

<i>Panel A. Weekly Return/Risk ratio for all components</i>					<i>Panel B. Weekly Return/Risk ratio for innovation components</i>				
Country	Regional & Global	Difference	P-value		Country	Regional & Global	Difference	P-value	
China	0.156	0.345	-0.189	0.099b	0.159	0.316	-0.157	0.016b	
Indonesia	0.111	0.413	-0.302	0.014c	0.157	0.310	-0.153	0.010b	
Hong Kong	0.193	0.412	-0.220	0.012b	0.182	0.331	-0.149	0.011b	
Thailand	0.163	0.436	-0.273	0.007a	0.107	0.326	-0.219	0.032a	
Singapore	0.223	0.400	-0.178	0.052	0.243	0.327	-0.084	0.212	
Malaysia	0.249	0.402	-0.153	0.234	0.243	0.323	-0.080	0.632	
South Korea	0.105	0.377	-0.273	0.007c	0.150	0.311	-0.161	0.045	
Philippines	0.144	0.411	-0.268	0.003a	-0.014	0.328	-0.342	<.001a	

<i>Panel C. Excess Return/Risk ratio for all components</i>					<i>Panel D. Excess Return/Risk ratio for innovation components</i>				
Country	Regional & Global	Difference	P-value		Country	Regional & Global	Difference	P-value	
China	0.093	0.237	-0.144	0.214	0.096	0.209	-0.114	0.088	
Indonesia	-0.063	0.114	-0.178	0.148	-0.017	0.012	-0.029	0.623	
Hong Kong	0.153	0.332	-0.179	0.051c	0.142	0.256	-0.114	0.072	
Thailand	0.066	0.280	-0.213	0.054b	0.051	0.173	-0.122	0.243c	
Singapore	0.218	0.357	-0.139	0.115	0.221	0.285	-0.063	0.301	
Malaysia	0.163	0.247	-0.084	0.531	0.158	0.171	-0.013	0.937	
South Korea	0.013	0.234	-0.221	0.036	0.058	0.169	-0.110	0.182	
Philippines	0.030	0.114	-0.084	0.348	-0.128	0.031	-0.159	0.078	

Decomposition of Volatility in Asian Equity Markets

by Ki Hoon Hong, Jangoo Kang, and Doowon Lee



- ❖ **The governments of the economies under study reacted to the AFC and its aftermath through restructuring their respective financial markets to embrace more free flow of capital**
- ❖ **The intensity of the spillover effect is heightened by increasing the level of openness of the home country's stock market**
- ❖ **Given that increased openness leads to increased volatility, the result of integration is increase in investor risk**
- ❖ **However, to the extent that such increased investor risk is appropriately compensated by increased financial returns to investment, the additional volatility that results from integration with markets outside the home country is not necessarily undesirable**

Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

by Inhyung Lee, Seungho Lee, and Ilhyock Shim

- ❖ **Asian FX swap markets were affected by the GFC – to what degree?**
 - Probe the extent of dislocations in the FX swap markets (JPY, HKD, SGD, KRW FX swap markets)
 - Extreme volatility and overshooting in foreign exchange market for the Korean case
 - Analysis of the factors that caused deviations from the covered interest rate parity condition

- ❖ **To what extent were the experiences different for the four Asian markets?**
 - Comparative studies
 - Baba and Packer (2008, 2009) for G10 countries
 - Hui, Genberg and Chung (2011) including Europe, Japan, HK, and Singapore

- ❖ **How effective were the central bank swap lines?**

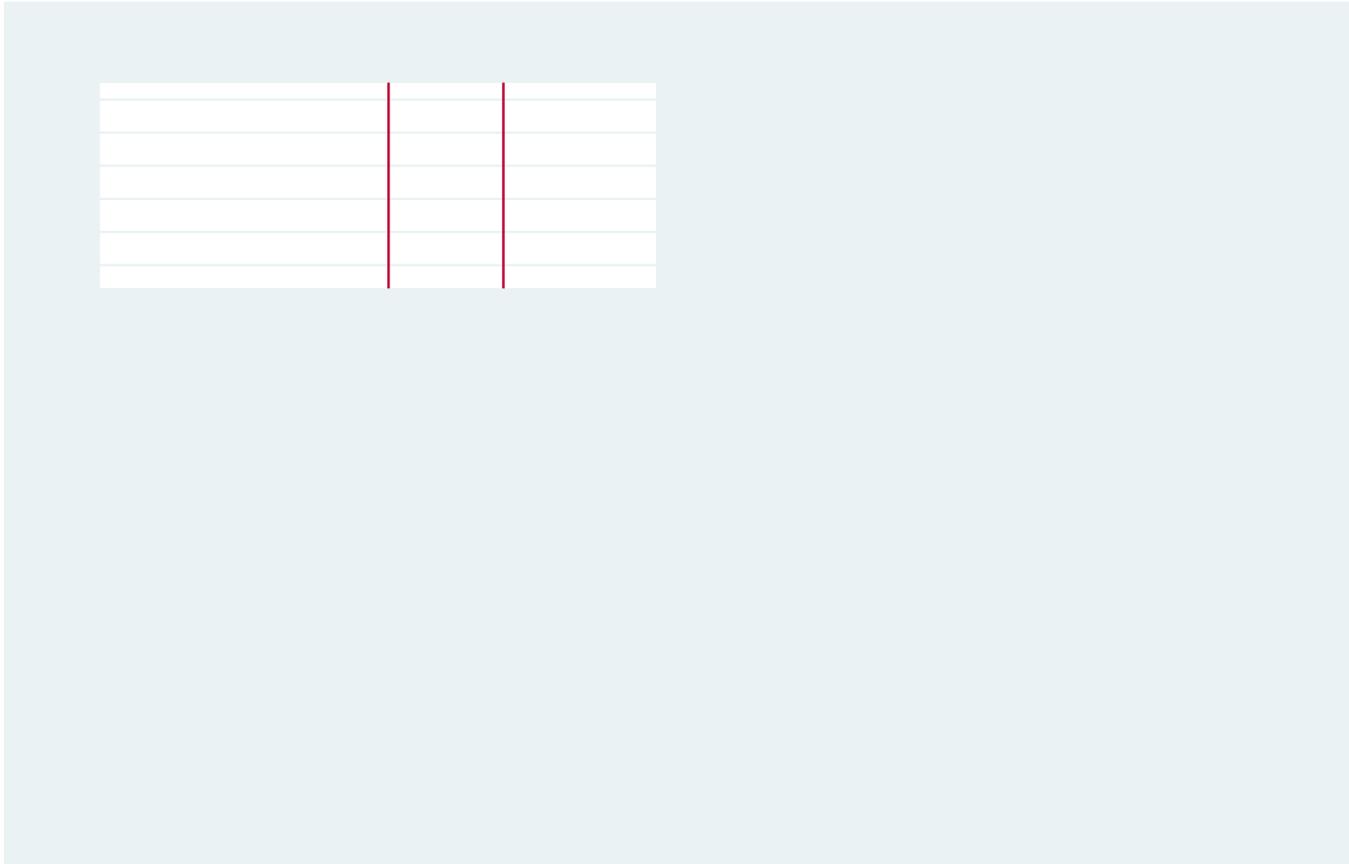
- ❖ **What kind of policy objectives and tools are necessary to prevent future contagion?**
 - Banking sectors foreign debt – treat it as a systemic risk?
 - Macroprudential regulations needed to curb the leverage?

Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

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Deviation from Covered Interest Rate Parity



Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

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Relationship between DCIP and Liquidity and Counter Party Risk

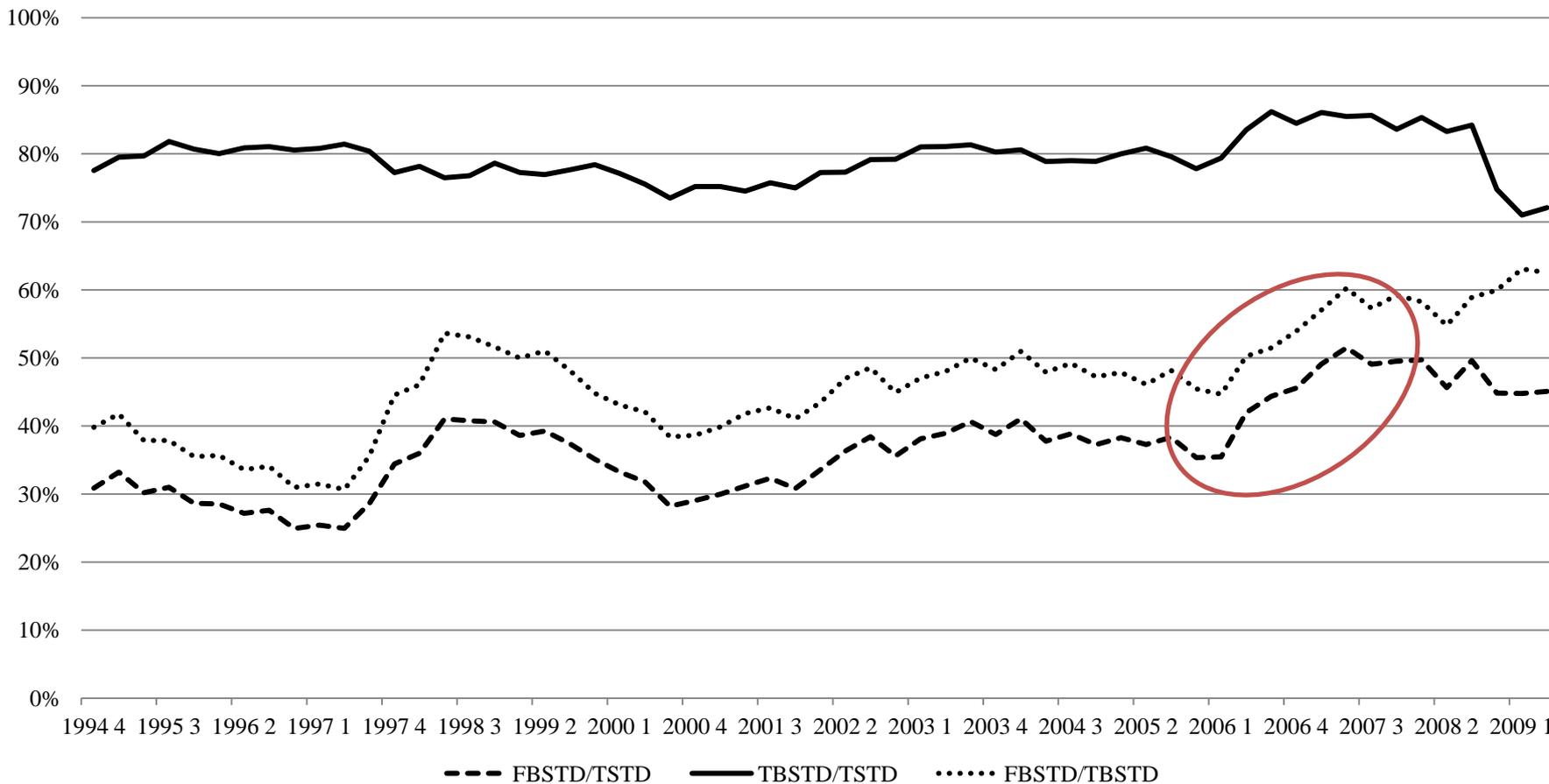
	JPY	HKD	SGD		KRW
Post-Lehman Period					
LFR_t^D	-2.667 (0.316)	0.595*** (0.003)	0.213 (0.275)	0.786*** (0.001)	0.900*** (0.000)
LFR_t^{US}	1.398 (0.117)	-0.475 (0.190)	-0.564 (0.223)	-0.349 (0.344)	-0.327 (0.375)
CR_t^D	9.251** (0.016)	-0.344 (0.558)	-1.055 (0.324)	0.629 (0.230)	
CR_t^{US}	-3.861*** (0.001)	-0.077 (0.853)	0.024 (0.955)		0.885** (0.032)
Constant	0.132 (0.812)	0.122 (0.366)	0.060 (0.782)	-0.635*** (0.008)	-0.600*** (0.007)
Observations	338	338	338	338	338
Adjusted R-squared	0.552	0.306	0.312	0.239	0.239

Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

by Inhyung Lee, Seungho Lee, and Ilhyock Shim



Foreign Banks' Portion of External Short-Term Debt



Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

by Inhyung Lee, Seungho Lee, and Ilhyock Shim



Effects of USD Provision Funded by Swap Line with the Federal Reserve

	JPY		KRW
Post-Lehman Period			
	-2.766 (0.286)	0.575*** (0.002)	0.665*** (0.001)
	1.385 (0.132)	-0.372 (0.299)	-0.356 (0.306)
	9.316** (0.015)	0.494 (0.301)	
	-4.015** (0.001)		0.706* (0.084)
	-0.767*** (0.003)	-0.060** (0.000)	-0.060** (0.000)
Constant	0.023 (0.672)	-0.573*** (0.008)	-0.545*** (0.009)
Observations	338	338	338
Adjusted R-squared	0.561	0.299	0.299

Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

by Inhyung Lee, Seungho Lee, and Ilhyock Shim



- ❖ **Regulatory discussions that took place after the GFC in Korea centered on implementing prudential measures focused on managing FX related positions and transactions of the domestic banks**
 - FX derivative position limit
 - Withholding tax on foreign bond investment reenactment
 - Bank levy on non-core liability

- ❖ **The aim of the regulations introduced were mainly preemptive measures to prevent contagion**
 - Will the prudential measures be effective in the future?

Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

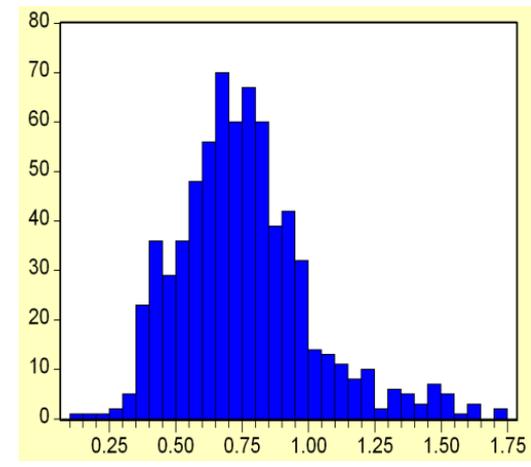
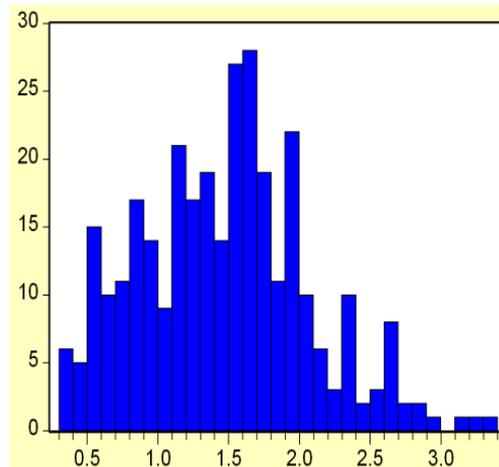
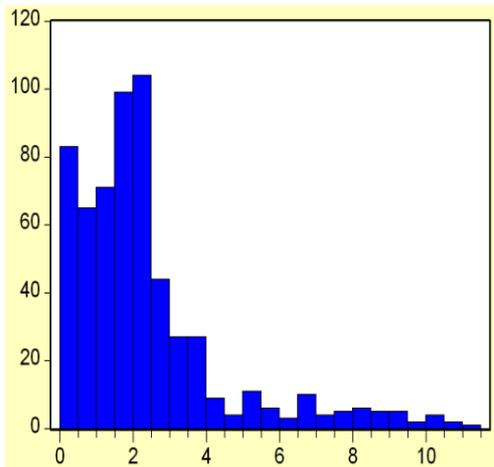
by Inhyung Lee, Seungho Lee, and Ilhyock Shim



- ❖ Following the introduction of the regulation on FX derivatives position in Oct. 2010, the size and variance of CIRP gap fell further and helped to restore the FX swap market

Characteristics of DCIP by period

	Mean	Std. Dev.	Median	Max	Min
Period 1 (Jan. 2007-Jun. 2009)	2.36	2.10	1.88	11.23	0.18
Period 2 (Jul. 2009-Sept. 2010)	1.45	0.60	1.49	3.33	0.33
Period 3 (Oct. 2010-Aug. 2013)	0.76	0.25	0.73	1.74	0.13



Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007–2009

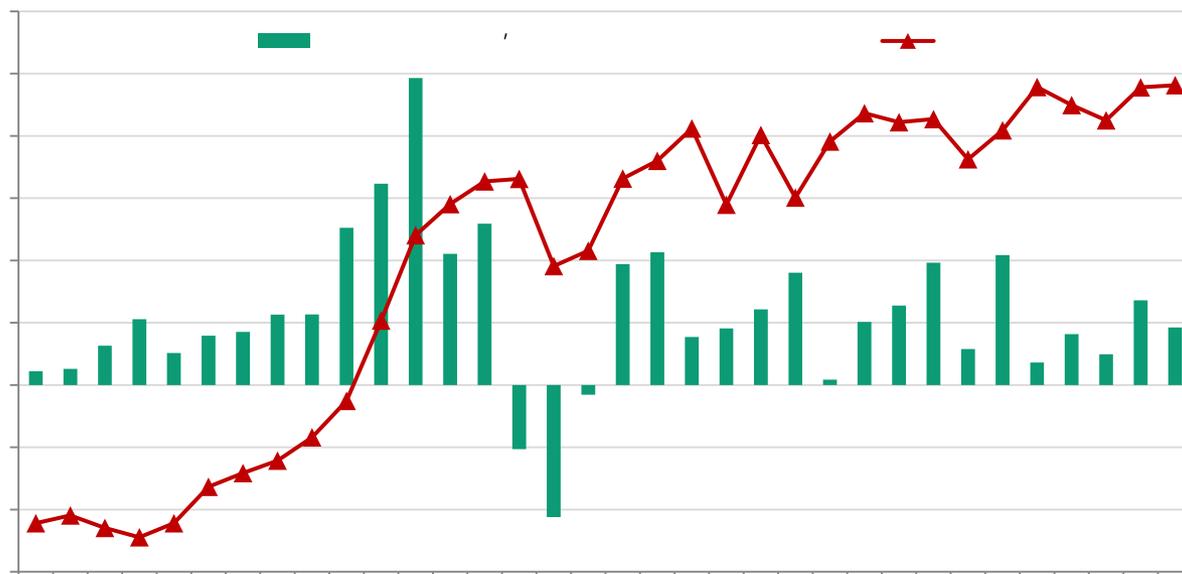
by Inhyung Lee, Seungho Lee, and Ilhyock Shim



❖ Capital inflows into the domestic debt market remains steady

- As a quantitative indicator of free capital movement, foreign investors' domestic bond investment has been steady while daily average FX swap turnover increased

Capital Inflows and FX Swap Daily Turnover



Currency Internationalization and Bond Market Development in Asian Economies

by Suk Hyun and Shigehito Inukai



- ❖ **Establishing an international (cross-border) bond market in Asian local currencies will constitute a major venue for recycling Asian savings into Asian investment**
 - Can also mitigate the asset-liability currency mismatch problem

Issuer	Currency	Place of Issuance		
		Domestic Market	Foreign Market	
			Eurobond Market	Other Country's Domestic Market
Resident	Domestic currency (*1)	Domestic bond	Eurobond (Euro-*1 bond)	
	Foreign currency (*2)	Foreign currency denominated (domestic) bond	Eurobond (Euro-*2 bond)	Foreign currency denominated bond
Non-resident	Domestic currency (*1)	Domestic currency denominated foreign bond	Eurobond (Euro-*1 bond)	
	Foreign currency (*2)	Foreign currency denominated foreign bond	Eurobond (Euro-*2 bond)	Foreign currency denominated foreign bond

Currency Internationalization and Bond Market Development in Asian Economies

by Suk Hyun and Shigehito Inukai



- ❖ **The experience of internationalization of the Japanese yen and development of yen-denominated bond market (1977-1999)**
 - Relaxation of restriction in domestic yen bonds issued by non-residents
 - Lifting of the ban on issuance abroad of bonds denominated in yen by non-residents and residents
 - Relaxation of restrictions on the reflux (selling back) to the Japanese domestic market of yen denominated bonds issued abroad

Currency Internationalization and Bond Market Development in Asian Economies

by Suk Hyun and Shigehito Inukai



Bonds Breakdown by Issuer & Issuing Place: Japan

Issuer	Currency	Place of Issuance		
		Domestic Market (Japanese bond market)	Foreign (international) Market	
			Offshore (Eurobond) Mkt	Other Country's Domestic Market
Resident (Japan)	Domestic (Japanese yen)	Domestic bond	Euro-yen bond*#	<i>e.g.: Alpine bond*# (Japanese yen bond in Swiss market)</i>
	Foreign (e.g.: US dollar)	Foreign currency denominated (domestic) bond	Eurobond (e.g.: Euro-dollar bond)	Foreign currency denominated bond (e.g.: Yankee bond)
Non-resident	Domestic (Japanese yen)	Yen-denominated foreign bond (Samurai bond*)	Euro-yen bond*#	<i>e.g.: Alpine bond*# (Japanese yen bond in Swiss market)</i>
	Foreign (e.g.: US dollar)	Foreign currency denominated foreign bond (Shogun bond*)	Eurobond# (e.g.: Euro-dollar bond)	Foreign currency denominated foreign bond# (e.g.: Yankee bond)

*: These items are related to **foreign exchange control and currency internationalization**.

#: These items are related to investor protection policy (selling back restriction to Japan).

Currency Internationalization and Bond Market Development in Asian Economies

by Suk Hyun and Shigehito Inukai



Bonds Breakdown by Issuer & Issuing Place: Korea

Issuer	Currency	Place of Issuance		
		Domestic Market (Korean won bond market)	Foreign (international) Market	
			Offshore (Eurobond) Mkt	Other Country's Domestic Market
Resident (Korea)	Domestic (Korean won)	Domestic bond	*#	*#
	Foreign (e.g.: US dollar)	Foreign currency denominated (domestic) bond	Eurobond# (e.g.: Euro-dollar bond)	Foreign currency denomi nated bond# (e.g.: Yankee bond)
Non-reside nt	Domestic (Korean won)	Won denominated foreign bond (Arirang bond*)	*#	*#
	Foreign (e.g.: US dollar)	Foreign currency denominated foreign bond (Kimchee bond*)	Eurobond# (e.g.: Euro-dollar bond)	Foreign currency denominated foreign bond# (e.g.: Yankee bond)

*: These items are related to **foreign exchange control and currency internationalization**.

#: These items are related to investor protection policy (selling back restriction to Korea).

Currency Internationalization and Bond Market Development in Asian Economies

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❖ What are the pre-conditions for currency internationalization?

- Macroeconomic conditions
 - GDP share or trade share vis-à-vis the world
 - Trade dependency
 - Inflation
- Capital market conditions
 - Stock market capitalization/GDP
 - Issuance ratio of the international bonds denominated in local currency
- Institutional conditions
 - Financial openness

❖ Classification of currency internationalization

- Full currency internationalization and partial currency internationalization

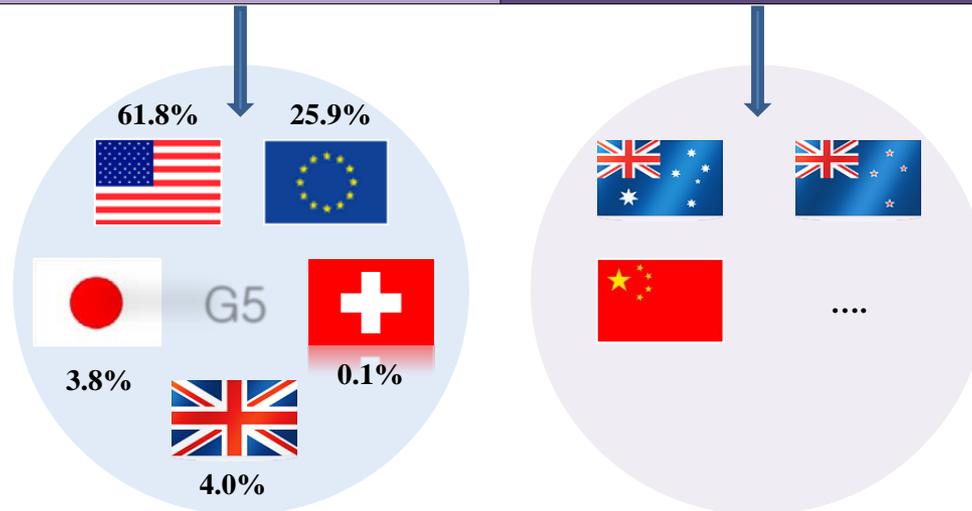
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Two Categories of Currency Internationalization: Full vs. Partial

Functions	Full	Partial
Invoicing currency ?	Yes	Yes
Investment currency ?	Yes	Yes
Reserve currency ?	Yes	Less used



Source: 2010 COFER, IMF

Currency Internationalization and Bond Market Development in Asian Economies

by Suk Hyun and Shigehito Inukai



❖ Employ ordered logit model to compute the probability of currency internationalization

– Ordered Logit Model

$$\Pr(y_{i,t} = j) = \Pr(\kappa_{j-1} < ME_{i,t}\psi + CM_{i,t}\lambda + \delta IS_{i,t} + u_{i,t} \leq \kappa_j)$$

- $j = 3$ Full int. if U.S. dollar, euro, yen, pound sterling, Swiss franc
- $= 2$ Partial int. if the cross-border transaction in the foreign exchange market is larger than local
- $= 1$ Non-int. if the local transaction in the foreign exchange market is larger than cross-border

– Probability of Currency Internationalization

$$\Pr(y_{i,t} = 3) = 1 - \frac{1}{1 + \exp(-\kappa_2 + \bar{M}E_{i,t}\hat{\psi} + \bar{C}M_{i,t}\hat{\lambda} + \delta \bar{I}S_{i,t})}$$

$$\Pr(y_{i,t} = 2) = \frac{1}{1 + \exp(-\kappa_2 + \bar{M}E_{i,t}\hat{\psi} + \bar{C}M_{i,t}\hat{\lambda} + \delta \bar{I}S_{i,t})} - \frac{1}{1 + \exp(-\kappa_1 + \bar{M}E_{i,t}\psi + \bar{C}M_{i,t}\lambda + \delta \bar{I}S_{i,t})}$$

$$\Pr(y_{i,t} = 1) = \frac{1}{1 + \exp(-\kappa_1 + \bar{M}E_{i,t}\hat{\psi} + \bar{C}M_{i,t}\hat{\lambda} + \delta \bar{I}S_{i,t})}$$

Currency Internationalization and Bond Market Development in Asian Economies

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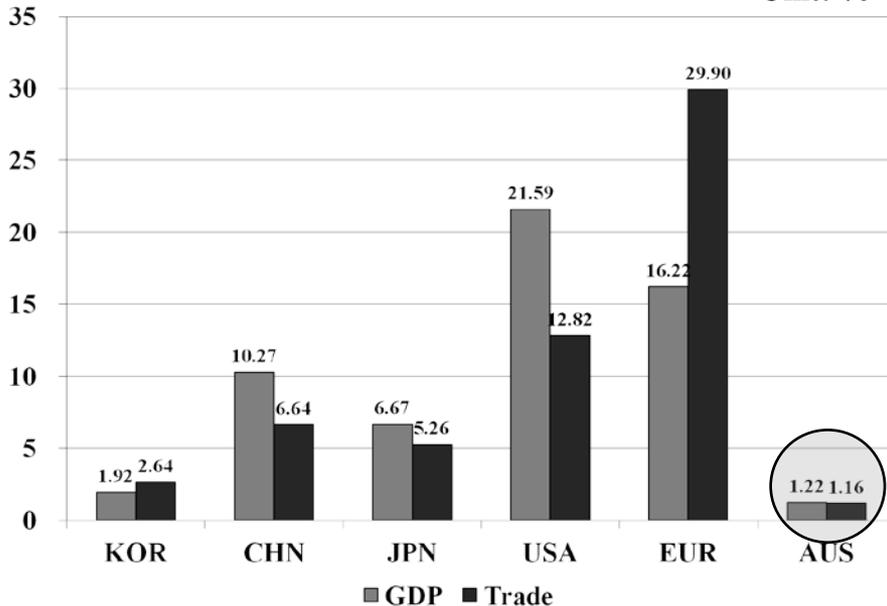
Probability	KOR	CHN	JPN	USA	EUR	AUS
Full [95% confi.]	0.002 [0.002, 0.002]	0.006 [0.000, 0.012]	0.49 [0.33, 0.65]	0.99 [0.97, 1.00]	0.99 [0.98, 0.99]	0.06 [0.03, 0.09]
Partial [95% confi.]	0.60 [0.47, 0.72]	0.76 [0.61, 0.91]				0.92 [0.91, 0.93]

Why?

Macroeconomic conditions

GDP and Trade share

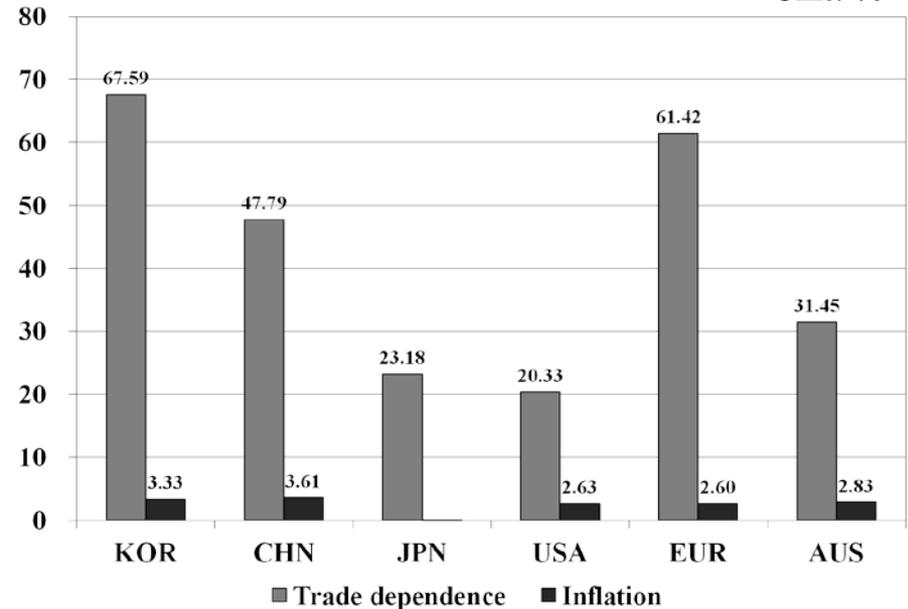
Unit: %



Source: IMF

Trade dependence and Inflation

Unit: %



Source: IMF

Currency Internationalization and Bond Market Development in Asian Economies

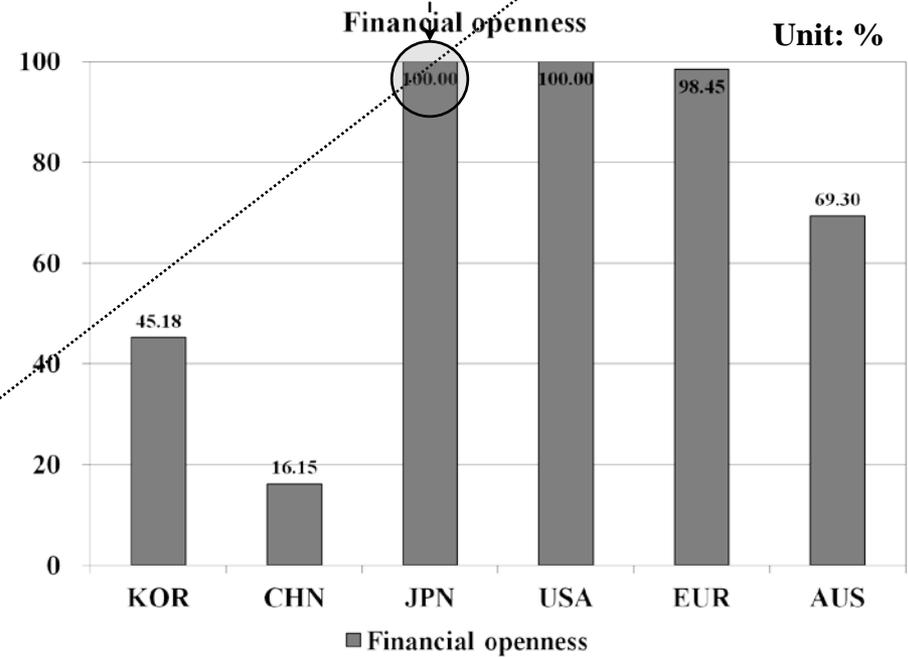
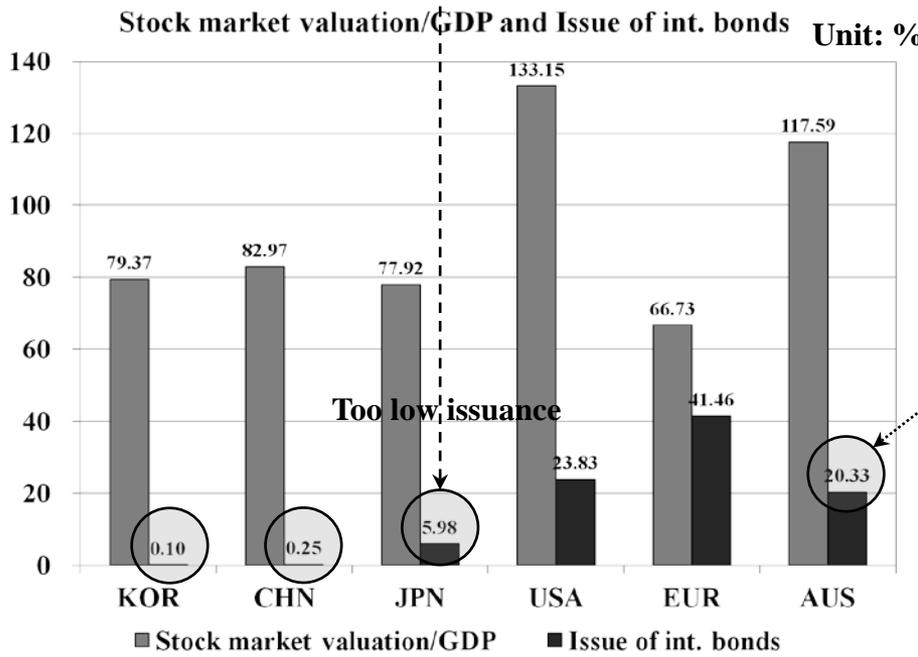
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Partial [95% confi.]	0.60 [0.47, 0.72]	0.76 [0.61, 0.91]				0.92 [0.91, 0.93]

For currency internationalization, economic size matters but capital market development is also critical.

Capital market and institutional conditions



Note : Bonds denominated in local currency
Source: IMF

Source: IMF

Currency Internationalization and Bond Market Development in Asian Economies

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❖ Assessment

- To achieve the goal of utilizing Asian savings and mitigating the currency mismatch, an international (cross-border) bond market and (partial) currency internationalization may be required
- Some Asian currencies have relatively high probability of being partially internationalized
- Nurturing regional bond markets requires the liberalization of restrictive policies on foreign exchange related transactions
- However, policy makers have been managing foreign exchange policy at their own pace in view of overriding domestic macroeconomic policy objectives (economic growth rate, employment etc.)

Thank you!

❖ **More detailed descriptions can be found in the book:**

Chapter 6. Deviation from Covered Interest Parity in Asian Foreign-Exchange Swap Markets during the Financial Crisis of 2007-2008

Chapter 10. Determinants of Bond Market Development in Asia

Chapter 11. Currency Internationalization and Bond Market Development in Asian Economies

Chapter 12. Decomposition of Volatility in Asian Equity Markets

Chapter 13. ASEAN+3 Capital Market Integration: Cost of Capital and Investment