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## WHAT MOVES THE PRIMARY STOCK AND BOND MARKETS? INFLUENCE OF MACROECONOMIC FACTORS ON BOND AND EQUITY ISSUES IN MALAYSIA AND KOREA

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### ABSTRACT

*This paper examines the impact of macroeconomic factors on the stock and bond market activities in two Asian countries. We examine the influence of interest rate changes, expected inflation rate, and stock market returns on aggregate stock and bond issuance in Malaysia and Korea. Using vector autoregressive models (VARs) and variance decomposition techniques, our result show that dynamics of equity and bond issuance in both countries vary significantly. Our findings show that there has been a two-way relationship between interest rate changes and bond issuance in the case of South Korea, whereas, stock returns have significantly influenced the bond issuance (instead of equity issuance) in Malaysia. The findings seem to support emerging popularity of corporate bond markets in Asian region.*

**Keywords:** stock and bond markets, macroeconomic factors, VAR, Malaysia, South Korea

### INTRODUCTION

Our knowledge of external corporate financing patterns indicates that factors such as business cycle (Choe, Masulis, & Nanda, 1993) and macroeconomic conditions (Bondt, 2005; Korajczyk & Levy, 2003; Park & Shenoy, 2002) explain aggregate bond and equity issuance. Some researchers have argued that firms issue new equity after dividend and earning announcements to minimize information asymmetry and adverse selection (Korajczyk, Lucas, & McDonald, 1991). In the case of Asian countries, it can be argued that the aggregate bond

and equity issues might have also responded to the macroeconomic factors during the period of financial liberalization. Our choice of macroeconomic factor such as interest rates and expected inflation is motivated from the academic literature (see Korajczyk & Levy, 2003; Park & Shenoy, 2002). First, interest rate liberalization might have led to reliance on other sources of external finance such as corporate bonds due to high cost of commercial borrowing. Second, the investors' expectation about the future inflation rate might also influence the demand for the fixed income securities like bonds, because the effects of rising inflation can erode the real value and purchasing power of interest payments, which are typically fixed over the life of an investment. Indeed Kim and Singal (2000) reported increase in inflation rate in Asian countries after financial liberalization, thus, our analysis would provide a new insight into sensitivity of the Asian fixed income securities market response to the changes in the expected inflation. Furthermore, at firm-level, O'Neil (1998) reports that return of utilities (having bond rating) are more interest rate sensitive.

To our knowledge empirical evidence relating to determinants of aggregate stock and bond issuance for Asian countries is sparse. The prime motivation behind this paper is to fill this gap.

## **BOND MARKETS DEVELOPMENT IN EAST ASIA**

There are several economic and financial benefits of active domestic currency sovereign and corporate bond markets. Bond markets significant contribution is in diversifying the source of finance and reducing the reliance on the domestic banks which has been the case in many East Asian countries. In this way, bond markets stimulate opportunities for risk pooling and risk sharing for both borrowers and lenders. Most importantly, for Asian economies, bond markets can be important means for reducing an economy's vulnerability to maturity risk, exchange rate risk, and "sudden reversal" of global private capital flows. Furthermore, it is plausible that bond markets can indirectly improve corporate governance by developing a "credit culture" (Das, 2005).

The critical issues identified by the researchers that need to be addressed in relation to the overall development of the corporate bond markets in many East Asian countries are the removal of statutory reserve and liquid asset requirements that do not allow institutional investors such as banks to invest in corporate bonds. In addition, lack of liquid benchmark yield curve, irregular frequency of issuance of benchmark government securities,<sup>1</sup> inadequate regulatory frameworks

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<sup>1</sup> In Thailand, Malaysia and Indonesia, this has been due to the fact that the governments have not been active issuers of bonds, in view of their budget surpluses (Sharma, 2001).

and market microstructure are some of the impediments. The government restrictions create a captive demand for government securities. The government securities make up approximately 50% of the market, with 30% issued by financial institutions and the balance issued by local companies. The respective governments have crowded out local currency bond markets. According to Batten, Fetherston, and Hoontrakul (2006), sovereign borrowers from South Korea, China, Malaysia and the Philippines accounted for approximately 83% (about US\$106 billion) of outstanding issues by Asia-Pacific issuers (excluding Australia, Japan, New Zealand and Singapore).

According to Das (2005) there has been two phases of development of the corporate bond market in the case of East Asian countries, i.e., before and after the Asian financial crisis. In the pre-crisis period, Korea was the leader in creating corporate bond market which was fuelled by supply of corporate bonds by a large number of *chaebols* and demand of Investment Trust Companies (ITC). For instance, share of corporate bonds in total corporate financing was 32% followed by 31% of private loans and 28% of equity during 1995–1999 (Davis & Stone, 2004). The purchase of the corporate bonds by ITC companies accounted for almost 80% of the financing activity of non-bank financial firms during the 1990s. On the contrary, in Thailand, listed companies were allowed to issue corporate bonds in 1992, and Indonesia corporate bond market was non-existent until 1987 because of stringent regulations. The bond market did not develop in these countries as in Korea due to lack of supply and demand. The investors' proclivity to hold bonds until maturity due to favorable tax policies reduced active trading in the secondary market.

In the post-crisis period, bond markets became more important source for financing large budget deficits and recapitalization of banks. There was a significant increase in the volume of bond issuance in Malaysia, for instance, measured as a percentage of GDP, the volume of bond market was 51% of GDP while in Korea it was 28% in 2001. Some of the countries such as South Korea even opened up bond markets for non-resident investors. In Malaysia, as a result of major improvements, the cost of bond issuance fell below that of commercial bank loans in recent years (Das, 2005). The surge in bond issuance in the region might have also been the result of regional initiatives such as New Miyazawa Initiative (NMI) in 1999, supported by Japan Bank of International Corporation (JBIC) providing guarantee mechanism or interest rate subsidy for the bond issued by Asian economies. In 2003, Asian Bond Fund (ABF) was created by East Asia Pacific Central Banks. This initiative worked on demand side, ABF-I earmarked \$1 billion for investment in the dollar denominated sovereign or quasi-sovereign bonds issued by member countries. Similarly, recently in 2004, Asian Bond Market Initiative (ABMI) was launched by Asia-Pacific Economic Council (APEC) forum. This forum focused on resolving some of the supply side

impediments that exist in Asian economies to make Asian bond markets more accessible to the Asian issuers.

Table 1  
*Size of Bond Markets in East Asian Countries*

Year	Country								
	Hong Kong	Malaysia	South Korea	Singapore	Thailand	Philippines	Taiwan	China	Indonesia
1995	18.80	17.60	16.40	9.30	7.80	–	–	–	–
1996	25.30	23.30	17.40	10.80	8.80	–	–	–	–
1997	32.70	20.60	11.00	11.20	5.70	–	–	–	–
1998	38.90	33.80	31.30	14.80	10.30	2.90	0.38	0.18	–
1999	44.00	43.30	26.00	19.60	11.60	6.24	0.16	0.10	–
2000	46.60	45.20	23.00	21.20	11.50	3.25	0.57	0.15	–
2001	48.70	47.80	26.70	30.00	12.90	2.59	0.72	0.10	0.09
2002	53.30	40.70	29.90	31.70	12.10	6.22	1.86	0.04	0.22
2003	56.40	43.30	27.70	32.60	13.50	4.68	2.99	0.12	0.29
2004	57.60	42.00	26.90	33.70	12.80	–	–	–	–

Source: IMF *Global Financial Stability Report* and Asian Development Bank

Note: This table shows the ratio of local currency bond issuance to GDP (in %) for Asian countries over the period of 1995–2004

Table 1 shows corporate bond issuance as a percentage of nominal GDP for sample of Asian countries. We can group East Asian countries into four categories: (i) Hong Kong and Malaysia, (ii) South Korea and Singapore, (iii) Thailand, and (iv) Philippines, Taiwan, Indonesia and China. In terms of absolute value, Korea has the largest bond market in East Asia and Malaysian bond market is about the same size as that of Korea relative to GDP. The bond issue concentration varies from 2.9 in South Korea to 7.5 in Malaysia. This issue concentration explains diversity of market in terms of number of corporate issuers. Thus, a very low ratio indicates that there are a lot of corporate issuers in South Korea as compared to Malaysia. Some plausible reasons might be investment grade restrictions. In 1991–1992, Malaysian government suggested that ratings for bank-guaranteed issues should reflect ratings of individual guarantor bank. In addition, the unlisted bond market corporate bond market is much more active than the listed market in the case of Malaysia. On the other hand, annual bond turnover ratio which indicates bond market liquidity varies from as low as 0.28 in the case of Thailand to as high as 1.01 for South Korea (ADB, 2005). The local currency bond market capitalization varies from 34% in Malaysia to as low as 15% in Thailand in 2000 (ADB, 2005). The unique features of corporate bond markets and recent developments motivate this study to examine the macroeconomic determinants of bond and equity issuance. In this paper, we examine the underlying factors that led to this phenomenal increase in

debt and equity finance in these countries. More specifically, we investigate the influence of financial liberalization through interest rates liberalization; the impact of inflation rates and the co-development in stock markets on the aggregate stock and bond issuance.

## **LITERATURE REVIEW**

The theoretical view about timing of equity issuance suggests that managers capitalize on investors' exuberance and high stock prices (Kayhan & Titman, 2006; Hovakimian, A., Hovakimian, G., & Tehranian, 2004; Welch, 2004; Baker & Wurgler, 2002). Baker and Wurgler (2002) renewed the focus on the "market timing" debate by suggesting that managers "time the equity markets" i.e., firms tend to reduce their leverage ratios by raising substantial amounts of capital when the equity market is perceived to be more favorable, i.e., when market-to-book ratios are higher. Hovakimian et al. (2004) find evidence of market timing and conclude that firms tend to issue equity following increases in their stock prices and tend to repurchase shares following stock price declines, which is the opposite of what one might expect if firms tended to rebalance their capital structures towards a static target.

Another theoretical view about changes in stock and bond returns is related to market efficiency literature. According to this view, unanticipated news about the macroeconomic indicators of a country influence the behavior of markets and participants (see e.g., Suanders, 1989; Doukas & Jalilvand, 1986) and markets can be considered efficient only when changes in the prices quickly respond to this unanticipated news.

To date mostly empirical studies have tried to test above "market timing" and "efficient market" hypotheses. These studies have established that changes in macroeconomic variables contain important information for stock market participants (see Chen, Roll, & Ross, 1986; Kim & Wu, 1987; Mookerjee & Yu, 1997; Pearce & Roley, 1983). Some of the studies indicate that aggregate bond issue and stock market return influence aggregate equity issues (Bondt, 2005; Park & Shenoy, 2002). Henderson, Jegadeesh, and Weisbach (2006) examine debt market timing both in the US and internationally for countries. More specifically, they analyze that whether firms' propensity to issue debt in a low interest rate environment allows them to time the market and raise more long-term debt prior to increases in interest rates. They examined the relation between debt and interest rate at the aggregate level rather than at the firm level and found that in most countries market timing consideration seem to uphold the long-term debt issuance. Baker et al. (2003) address a similar issue in the US; however,

their paper focuses on the timing considerations in the choice of debt maturity, whereas Henderson et al. (2006) focus on aggregate levels of long-term debt.

There are some other studies that have explored the influence of changes in country macroeconomic outlook on the stock returns. One such study is of Kaminsky and Schmukler (2002) who examine whether changes in rating of one type of security (equity or bond) affect other asset. They illustrate that a downgrade of sovereign bond might impact on stock markets due to expectation of an increase in tax rate on firm to offset negative budgetary impact of higher interest rate caused by a downgrade. Recently, Pukthuanthong-Le, Elayan, and Rose (2007) investigated the size of price reaction in both the bond and stock markets to changes in the sovereign credit ratings and the changes in the economic outlook of country reported by Standard Poors and Moody's rating agencies for a sample of 34 countries from 1990 to 2000. They found that only bond market returns respond positively to an upgrade in the economic outlook of a country. One of their main contributions lies in finding out the impact of the interactions between rating changes and selected country characteristics on bond and stock returns. The stock market returns respond more negatively when the sovereign rating is downgraded and at the same time a country is experiencing high inflation and low fiscal balance, on the other hand, bond market returns respond negatively when the sovereign rating is downgraded and at the same time a country is less industrialized, high inflation and low current account balance.

In the context of Asian economies, Bekaert, Harvey, and Lumsdaine (2002) show that net equity flows have caused stock returns in Malaysia and South Korea in post-liberalization period using Granger test. They also indicated that these countries experienced significant breaks in equities and bond capital flows using univariate test based on methods in Bai, Lumsdaine, and Stock (1998). The break in net bond flows to GDP occurred earlier in 1989 in South Korea and later in 1991 in Malaysia, and the break in net equity flows to GDP occurred earlier in Malaysia in 1993 and later in 1995 in South Korea. Some studies inform us of significant equity revaluation (Henry, 2000; Kim & Singal, 2000) and increase in inflation rates after financial liberalization (Kim & Singal, 2000). Kaminsky, Lyons, and Schumkler (2001) have shown that private capital flows from the US has been in the form of mutual funds investment in these emerging markets.<sup>2</sup> However, after 1997, institutional funds holding in Asia Pacific countries decline remarkably from their peak level. None of the previous studies has explicitly considered the impact of macroeconomic factors on primary markets i.e., stock and bond markets in the context of Asian countries.

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<sup>2</sup> The holding of dedicated emerging market fund assets was US\$8.2 billion in Malaysia; US\$10.3 billion in South Korea and US\$9.8 billion in Thailand in 1995. The holding of dedicated emerging market fund assets increased for Malaysia reaching US\$12 billion by the end of 1996.

There is very limited empirical evidence relating macroeconomic variables to stock and bond markets for Asian countries. For instance, Gunasekarage, Pisedtasalasai, and Power (2004) investigated the influence of the money supply, the treasury bill rate (as a measure of interest rates), the consumer price index (as a measure of inflation), and the exchange rate as macroeconomic variables on the Colombo share price index. They found that the lagged values of macroeconomic variables such as the consumer price index, the money supply and the treasury bill rate have a significant influence on the stock market using ECM. The treasury bill rate had the strongest influence on price changes compared to other variables. On the other hand, Variance Decomposition and Impulse Response Function (IRF) analyses showed that shocks to economic variables explained only a minority of the forecast variance error of the market index; these effects did not persist for very long. Creighton, Gower, and Richards (2004) test the response of bond yield spreads and equity prices to credit rating changes in Australian financial markets. They found that both yield spreads and equity prices move in the expected direction following rating changes. Using firm-level data of rating changes, they found that announcement effects are larger for smaller firms.

We argue that this paper builds on this line of work in important way and complements the growing literature on the Asian countries. This study has important implications for international institutional investors and policymakers of Asian countries.

## **DATA AND METHODOLOGY**

In this section, we describe the dataset and outline the econometric methodology. We have used aggregate corporate bond and stock issue for Malaysia and South Korea.<sup>3</sup> The selection of Malaysia and South Korea stems from the following facts. First, according to BIS (2001) report the private sector debt securities grew by nearly 380 times from MYR0.4 billion as at end-1987 to MYR152 billion at the end of September 2001 and the private debt securities market is now equivalent to 28% of GDP. Another unique feature of the private bond market is that it also includes issues based on Islamic principles, which accounted for 25% of the markets. Second, in the case of South Korea there is an interlocking relationship between corporations and banks that has provided unprecedented corporate bond culture. We obtained quarterly flow of fund data for corporate bond and equity issues from 1995 to 2004 from Bank for International Settlements (BIS) domestic securities statistics. This data is mainly derived from

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<sup>3</sup> There was lack of quarterly data or shorter time series data for other countries such as Indonesia and Thailand.

the market sources and provide information on aggregates of amounts outstanding and new issues. The changing financing profile of corporate sector i.e., percentage of equity and bond issuance in total external financing is shown in Figure 1. It shows two different development paths followed by stock and bond markets in Malaysia and South Korea. The corporate bond issuance has been higher in South Korea than in Malaysia. On average, corporate bond issuance has been more than 20% of total external financing in South Korea, while equity issuance has been less than 20% of total external financing over 1995–2004 with exception of year 1999, when aggregate stock issuance was higher than corporate bond issuance in Korea.

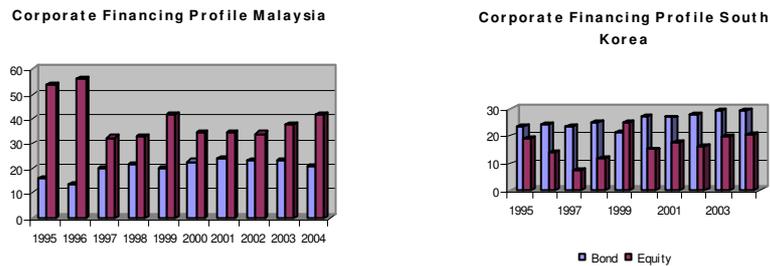


Figure 1. Corporate financing profile in Malaysia and South Korea over the period of 1995–2004

On the contrary, equity issuance has been more than 30% of total external financing in Malaysia, while corporate bond issuance has been less or equal to 20% of total external financing over the period of 1995–2004. Besides the dominance of equity issuance over corporate bond issuance in Malaysia, the trend shows that after 1996, there has been a major shift in preference of corporate issuers. The percentage of issuance indicates a sudden dramatic shift from stock market towards bond market which also coincides with early signs of financial capital outflows and Asian financial crisis in 1997. On the other hand, corporate bond issuance in South Korea has increased consistently. The equity issuance only picked up after 1998 and since then has shown a gradual increase till 2004. In sum, we can conclude that corporate bond markets have shown significant development in Malaysia during the last ten years in terms of increase in the local currency corporate debt issuance.

We examine the effect of macroeconomic conditions on new and bond equity issuance at aggregate level.<sup>4</sup> We focus on the influence of interest rate

<sup>4</sup> Although previous empirical studies have even used firm level data to examine the effects of macroeconomic conditions on the decision to issue debt (equity) or purchase debt (equity) but we

changes, expected inflation rate, and stock market performance. We have collected the interest rate, expected stock price index, and inflation rate from the *IMF International Financial Statistics* and *Datastream*. We could have also included business cycle variable such as index of industrial production but interest rate changes already capture the business cycle (see Sensier, Artis, Osborn, & Birchenhall, 2004: 347), therefore, we excluded the business cycle variable. The exact form of our four variable VAR model and the appropriate tests for short- and long-run statistical causation will depend critically on the stationary and co-integration properties of variables. We used Philips and Perron (PP) tests to investigate the stationary properties of each variable. Table 2, which presents test statistics for PP test, shows that null hypothesis of a unit root cannot be rejected in the levels specification. However, the null hypothesis of a unit root is rejected for the first difference specification in all cases.

Table 2  
Unit Root Statistics

Country	Variable	PP statistics intercept and trend	
		Level	First difference
Malaysia	Bond	-2.3371	-4.6671***
	Equity	-1.9918	-5.1580***
	Interest rates	-2.4351	-4.7366***
	Exp. inflation	-1.6671	-2.9567*
	Stock market return	-2.4354	-7.8570***
South Korea	Bond	-2.1210	-4.0778***
	Equity	-2.0441	-3.0676**
	Interest rates	-1.1587	-5.1875***
	Exp. inflation	-2.5299	-7.1589***
	Stock market return	-2.2971	-5.0146***

Notes: This table shows the statistics of Phillip and Perron (PP) unit root tests for level and first difference in the series for Malaysia and Korea

\*, \*\*, \*\*\* denote significant at 10%, 5% and 1% level of significance.  
p-values are shown in parenthesis

We cannot reject that all variables are I(1), we next performed co-integration tests to determine whether there are stable long-run relationships between our measures of economic activity and the aggregate bond and equity issuance. Table 3 shows stable relationship between these variables for both countries. We find at least one co-integration vector for both countries.

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are not able to get firm level detailed information about size and type of equity issue (common or preferred) or bond maturity (straight or convertible).

Table 3  
The Johansen Co-integrating Tests

Country		Trace tests	
		Trace statistic	C.V. at 5%
	$r = 0$	150.8637	69.8188
	$r = 1$	91.5560	47.8561
	$r = 2$	50.2351	29.7970
	$r = 3$	18.8508	15.4941
	$r = 4$	6.5584	3.8414
Malaysia		Maximal Eigen value	
		Max-Eigen statistics	C.V. at 5%
	$r = 0$	59.3076	33.8768
	$r = 1$	41.3209	27.5843
	$r = 2$	31.3843	21.1316
	$r = 3$	12.2923	14.2624
	$r = 4$	6.5584	3.8415
Country		Trace tests	
		Trace statistic	C.V. at 5%
	$r = 0$	113.2467	69.8188
	$r = 1$	61.8594	47.8561
	$r = 2$	35.2935	29.7970
	$r = 3$	11.7596	15.4947
	$r = 4$	2.3919	3.8414
South Korea		Maximal Eigen value	
		Max-Eigen statistics	C.V. at 5%
	$r = 0$	51.3872	33.8768
	$r = 1$	26.5658	27.5843
	$r = 2$	23.5339	21.1316
	$r = 3$	9.3676	14.2646
	$r = 4$	2.3919	3.8414

*Note:* This table reports Johansen test statistics for co-integration between macroeconomic variables and stock and bond issuance for Malaysia and Korea.

The trace tests and maximum Eigen values reject the null hypothesis of no co-integrating ( $r = 0$ ). We find more than one co-integrating vector for Malaysia compared to two co-integrating vector for South Korea. After the co-integration test, we used VAR methodology as in previous studies to investigate dynamic of the primary and secondary markets as in previous studies (Park & Shenoy, 2002; Campbell & Ammer, 1993). The VAR analysis is a useful methodology for estimating the dynamic response of each variable to innovations in other variables in the system. Each endogenous variable in VAR is explained by its lagged or past values and the lagged values of all other endogenous variables in the model (Gujarati, 1995).

$$x_{1,t} = a_{1,0} + \sum_i^k a_{1,i}x_{1,t-1} + \sum_i^k b_{1,i}x_{2,t-1} + \sum_i^k c_{1,i}x_{3,t-1} + \sum_i^k d_{1,i}x_{4,t-1} + u_{1,t} \quad (1a)$$

$$x_{2,t} = a_{2,0} + \sum_i^k a_{2,i}x_{1,t-1} + \sum_i^k b_{2,i}x_{2,t-1} + \sum_i^k c_{2,i}x_{3,t-1} + \sum_i^k d_{2,i}x_{4,t-1} + u_{2,t} \quad (1b)$$

$$x_{3,t} = a_{3,0} + \sum_i^k a_{3,i}x_{1,t-1} + \sum_i^k b_{3,i}x_{2,t-1} + \sum_i^k c_{3,i}x_{3,t-1} + \sum_i^k d_{3,i}x_{4,t-1} + u_{3,t} \quad (1c)$$

$$x_{4,t} = a_{4,0} + \sum_i^k a_{4,i}x_{1,t-1} + \sum_i^k b_{4,i}x_{2,t-1} + \sum_i^k c_{4,i}x_{3,t-1} + \sum_i^k d_{4,i}x_{4,t-1} + u_{4,t} \quad (1d)$$

$$x_{5,t} = a_{5,0} + \sum_i^k a_{5,i}x_{1,t-1} + \sum_i^k b_{5,i}x_{2,t-1} + \sum_i^k c_{5,i}x_{3,t-1} + \sum_i^k d_{5,i}x_{4,t-1} + u_{5,t} \quad (1e)$$

where  $x_{1,t}$  is interest rates,  $x_{2,t}$  expected inflation rate,  $x_{3,t}$  is stock market return,  $x_{4,t}$  is a measure of aggregate equity issuance, and  $x_{5,t}$  is a measure of aggregate bond issuance. In the sections that follow, we focus on equations (1d) and (1e). We used four quarters as the length of lag  $k$  for VAR model using AIC criteria. The lagged relationship between variables in equations (1d) and (1e) is rationalized as follows: it is reasonable to expect a lagged effect in the study. The investors usually decide according to the expectations. If the expectations are realized, there will be no unexpected movement of the prices. This is valid for the markets which are efficient. However, most of the markets are not efficient and they respond to changes with a time lag. Other possible explanations of the lagged response might be that investors may wait until they realize the real effect of the changes, to understand whether the changes are permanent or temporary, or some factors show their effects with a time lag because of characteristics. For instance, a shock of interest rates may show its effects later since in the short run most of the companies have already entered a credit agreement (Gunsel & Cukur, 2007). Hence, lagged variables used up to four quarters.

## RESULTS

The Granger-causality tests reported in Table 4 indicate that we can reject the hypothesis of no Granger-causality between equity and bond issuance in both countries. We can reject the hypothesis of no Granger-causality between stock returns and bond issuance only in South Korea. But we do not reject the hypothesis of no Granger-causality between bond and equity issuance, and stock returns and equity issuance in both countries. However, there are some interesting results shared between these countries. First, equity issuance Granger-cause stock returns in Malaysia. There is a two-way causality between stock returns and bond issuance in Malaysia. The inflation rates have no influence on primary markets activities in both countries. Only in case of interest rate, bond issuance Granger-

cause interest rate changes for both countries as expected. In sum, our results seem to suggest that liberalization of interest have significant effect on bond market in South Korea.

Table 4  
*Granger-Causality Tests*

Country	Equity issue do not Granger-cause bond issue	Bond issue do not Granger-cause equity issue	Interest rates do not Granger-cause bond issue	Bond issue do not Granger-cause interest rate
Malaysia	36.0550*** (0.0000)	0.9095 (0.9232)	1.7583 (0.7801)	14.2779*** (0.0065)
South Korea	7.6911* (0.0528)	1.1971 (0.5784)	6.2984* (0.0980)	12.2672*** (0.0065)

Country	Inflation rate do not Granger-cause bond issue	Bond issue do not Granger-cause inflation	Interest rates do not Granger-cause equity issue	Equity issue do not Granger-cause interest rate
Malaysia	2.6311 (0.6213)	9.2813* (0.0544)	6.6629 (0.1548)	3.9156 (0.4175)
South Korea	2.5303 (0.4698)	3.8436 (0.2789)	2.4709 (0.4806)	1.7444 (0.6271)

Country	Stock returns do not Granger-cause equity issue	Equity issue do not Granger-cause stock returns	Stock returns do not Granger-cause bond issue	Bond issue do not Granger-cause stock returns
Malaysia	4.1844 (0.3816)	9.7933* (0.0441)	10.5865** (0.0316)	10.2986** (0.0357)
South Korea	0.5803 (0.9009)	6.8484* (0.0769)	1.2828 (0.7332)	3.0752 (0.3802)

*Notes:* This table reports the Granger-causality tests for aggregate bond and equity issuance for Malaysia and South Korea over the period of 1995–2004

\*, \*\*, \*\*\* denote significant at 10%, 5% and 1% level of significance. *p*-values are shown in parenthesis

In order to test stability or changing dynamics of relationship, we used the break dates provided in Bekaert et al. (2002) for net equity flows to GDP for both countries to test whether causality has sustained in the long-run as well. The Granger-causality tests are reported in Table 5. The results show significant changes in post-break period for both countries. The equity issuance Granger-causes bond issuance and, Bond issuance, Granger-causes the equity issuance only in South Korea. Likewise, there is two-way causality between interest rate

and bond issuance in South Korea. We do not reject the hypothesis of no Granger-causality between stock returns and equity issuance in both countries.

Table 5  
Granger-Causality Tests

After net equity capital flows break				
Country	Equity issue do nto Granger- cause bond issue	Bond issue do not Granger-cause equity issue	Interest rates do not Granger- cause bond issue	Bond issue do not Granger-cause interest rate
Malaysia	17.6107*** (0.0015)	1.2937 (0.8624)	2.2345 (0.0692)	9.2813* (0.0544)
South Korea	218.9082*** (0.0000)	9.2941** (0.0542)	11.9568** (0.0177)	11.1116** (0.0253)

Country	Inflation rate do not Granger- cause bond issue	Bond issue do not Granger- cause inflation	Interest rates do not Granger-cause equity issue	Equity issue do not Granger-cause interest rate
Malaysia	2.6311 (0.6213)	1.4083 (0.8427)	6.6629 (0.1548)	3.9156 (0.4175)
South Korea	15.5666*** (0.0037)	4.1758 (0.3827)	3.1947 (0.5258)	122.1419*** (0.0000)

Country	Stock returns do not Granger- cause equity issue	Equity issue do not Granger- cause stock returns	Stock returns do not Granger- cause bond issue	Bond issue do not Granger-cause stock returns
Malaysia	11.6542 (0.0201)	10.3707** (0.0346)	17.9288*** (0.0013)	10.4767** (0.0331)
South Korea	0.7266 (0.9480)	41.3812*** (0.0000)	3.1799 (0.5282)	158.2203*** (0.0000)

Notes: This table reports the Granger-causality tests for aggregate bond and equity issuance for Malaysia and South Korea over the period of 1995–2004

\*, \*\*, \*\*\* denote significant at 10%, 5% and 1% level of significance. *p*-values are shown in parenthesis

In order to discern the dynamics of endogenous variables and their effects, we used impulse response function (IRF) to provide visual representation of the dynamic pattern of the bond and stock issue. The results for bond and stock issues are shown in Figures 2 and 3 for Malaysia and Figures 4 and 5 for South Korea, respectively. The initial shock in a variable is set to be equal to one standard error of innovation. Figure 2(a) shows that a shock in interest rates results in an opposite reaction in aggregate bond issues and it last up to one quarter. Figure 2(b) shows that a shock in expected inflation rate has persistent

positive reaction in bond issuance as expected theoretically because increase in the nominal interest rate induced by inflation increase the tax advantage underlying debt financing. Figure 2(c) shows that increase in stock market return has contemporaneous effect on aggregate bond issue which lasts for three quarters. An increase in stock issues has one quarter lagged effect on the aggregate bond issues as shown in Figure 2(d). These findings are similar to Park and Shenoy (2002).

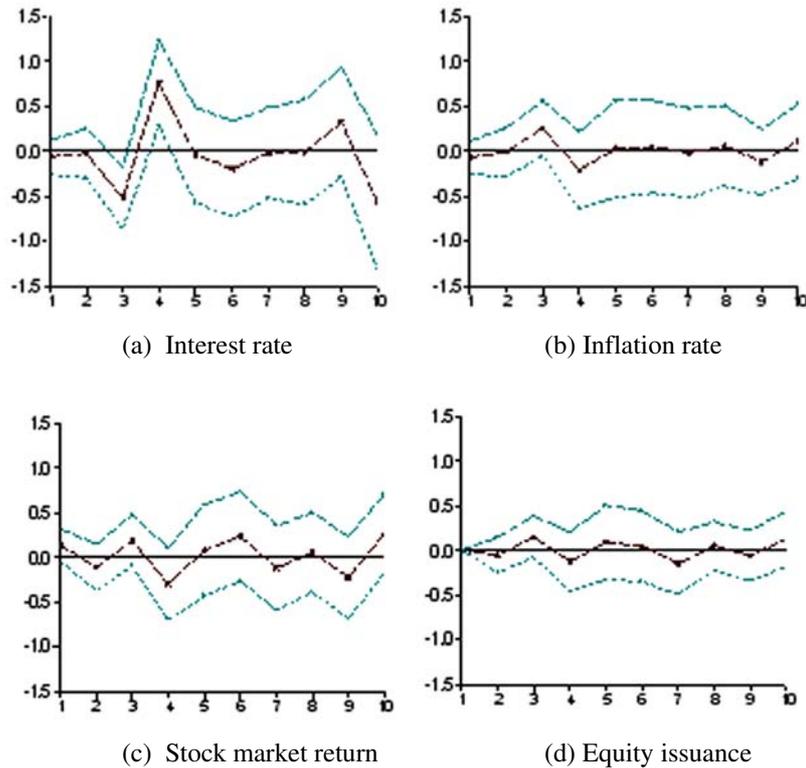


Figure 2. Response of aggregate bond issuance to changes in interest rate, inflation rate, stock market return and equity issuance

Figure 3(a) shows that change in interest rate produces a cyclical pattern in aggregate stock issues in the case of Malaysia. We do not report the effect of expected inflation rate on the stock return but results are consistent with "fisher effect" i.e., investors were more than compensated for the anticipated rate of inflation. Figure 3(b) shows that expected inflation rate has a persistent positive effect on the stock issues. Figure 3(c) shows that changes in stock market return leads to positive response in stock issues for at least one quarter which confirms "window of opportunity" hypothesis (see Korajczyk & Levy, 2003; Myers &

Majluf, 1984; Marsh, 1982; Taggart, 1977) as well as "market timing view" (see e.g., Baker & Wurgler, 2002). Figure 3(d) shows that an increase in aggregate bond issues leads to drop in aggregate stock issue in one quarter, but one quarter later stock issues increase which last for two quarters. We do not include the graphs for the impulse response function using prime lending rate because they show a similar relationship with other variables.

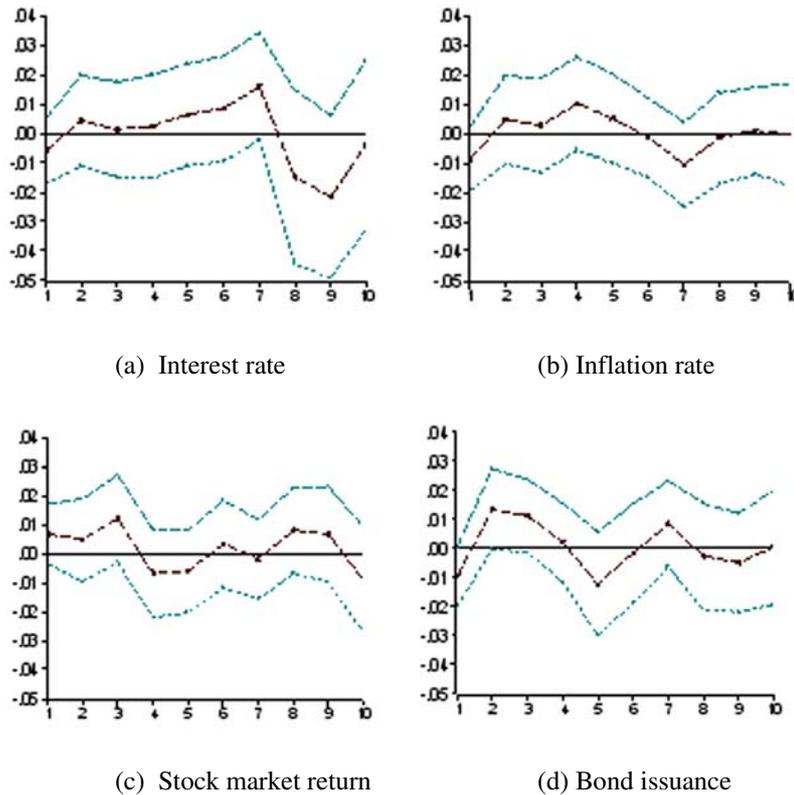


Figure 3. Response of aggregate equity issuance to changes in interest rate, inflation rate, stock market return and bond issuance

Figure 4(a) shows that a shock in interest rates results in decline in aggregate bond issues and it last up to one quarter in the case of South Korea. Figure 4(b) indicates that bond issuance initially increases but after a year changes in the economic forecast about inflation decreases further issuance. It might be due to the fact that corporate issuers capitalize on high value of their physical assets and issue more private debt. Figure 4(c) shows that increase in stock market return has contemporaneous effect on aggregate bond issue. Figure 4(d) shows that an increase in stock issues has one quarter lagged effect on the

aggregate bond issues. Figure 5(a) shows that interest rate changes have a significant positive effect on the changes in stock issuance in Korean market, this effect can be attributed to interest rate channel. Similarly, Figure 5(b) indicates that expected inflation rate has a persistent positive effect on the stock issue. Figure 5(c) shows that changes in the stock market return has positive effect on the stock issuance lasting for one year. The changes in the aggregate bond issues produce cyclical pattern in the aggregate stock issuance in Figure 5(d), i.e., aggregate bond and stock issue track each other for one year before falling down. In sum, impulse response function neatly summarizes impact of changes in macroeconomic indicators i.e. interest rate, inflation rate and stock returns on aggregate bonds and equity issuance.

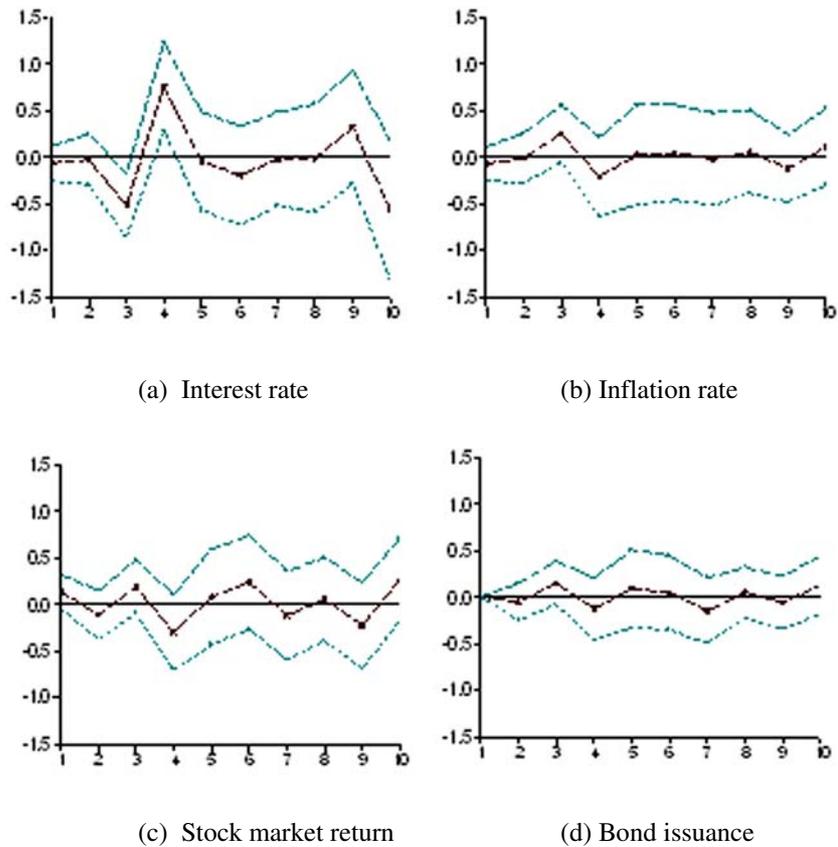


Figure 4. Response of aggregate bond issuance to changes in interest rate, inflation rate, stock market return and equity issuance

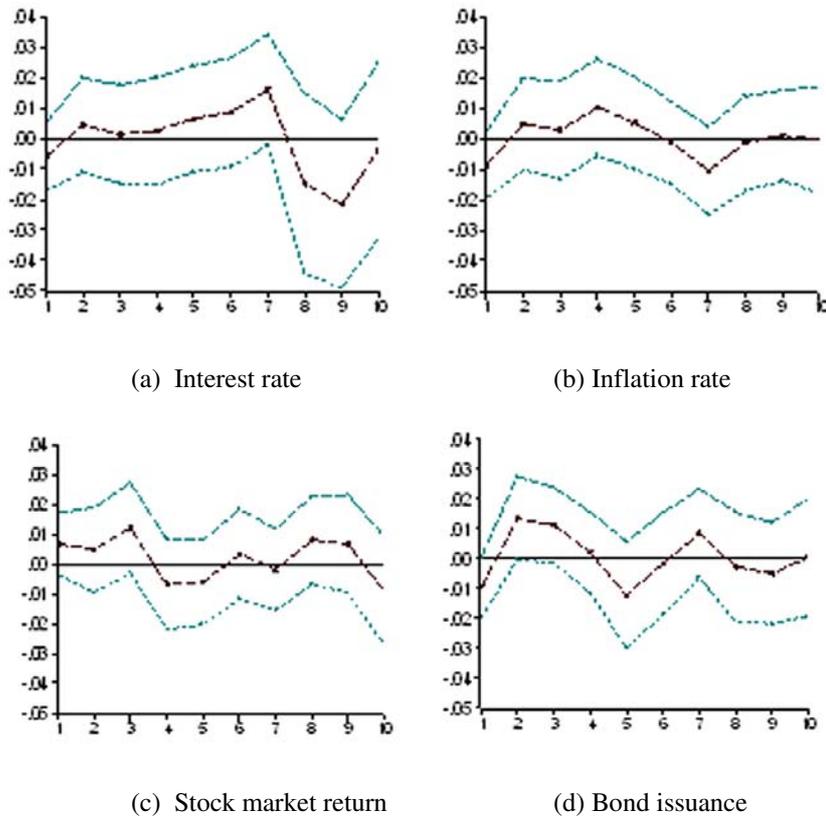


Figure 5. Response of aggregate equity issuance to changes in interest rate, inflation rate, stock market return and bond issuance

We have used variance decomposition method to test the sensitivity of aggregate bond and equity issuance to interest rate changes, stock market return, and expected inflation rate at the quarterly interval 1, 2, 4 and 8. First, in case of Malaysia, our results show that innovations in the interest rate changes explain a relatively large part of the forecast error variance for bond issuance about 20% to 30% (see Table 6). However, on the other hand, influence of innovations in the bond issuance explains just 10% of forecast error variance in interest rate changes. The innovation in stock market return also explains substantial variations in the bond issuance, which is also seen in impulse response function. For stock issuance, we found that innovations in bond issuance explain higher forecast error variation than stock market return. Stock issues account for larger variation in the stock return forecast errors. This result indicates that stock market returns lags changes in aggregate stock issues. One conclusion that can be drawn

from this finding is that information asymmetry exists between issuers and market participants.

Table 6  
*Malaysia Bond and Equity issue Variance Decomposition Analysis*

Period	S.E.	Interest rate	Inflation	Stock market return	Bond issues	Equity issues
<b>Interest rate</b>						
1	0.0398	100.0000	0.0000	0.0000	0.0000	0.0000
2	0.0457	87.3655	0.7275	0.0810	11.8184	0.0072
4	0.0693	44.8576	35.9587	7.5746	9.5129	2.0960
8	0.0763	38.0792	36.2473	8.0023	13.2442	4.4268
<b>Expected inflation rate</b>						
1	0.1511	0.1087	99.8912	0.0000	0.0000	0.0000
2	0.1678	13.7215	84.9737	0.0006	1.2606	0.0434
4	0.2074	22.3481	68.8583	6.1841	0.9224	1.6869
8	0.2234	18.9266	70.2806	5.9744	1.3342	13.5652
<b>Stock market return</b>						
1	0.1472	6.0793	3.0034	90.9172	0.0000	0.0000
2	0.1738	4.5170	2.9636	78.0053	14.5389	0.0024
4	0.2332	21.2799	13.9896	49.7987	11.7590	4.2679
8	0.2669	24.4466	17.8951	38.8934	11.7540	7.0107
<b>Bond issuance</b>						
1	0.5014	14.3927	0.7695	19.4459	65.3918	0.0000
2	0.7040	40.0749	0.3924	21.4763	37.8465	0.2098
4	0.7463	36.1970	3.9080	21.7160	36.6351	1.5436
8	0.9688	25.9870	23.1065	16.0856	33.3649	1.4557
<b>Equity issuance</b>						
1	0.5139	13.0071	0.2282	15.3728	55.4616	15.9301
2	0.6624	26.1876	0.5378	20.2175	43.1276	9.9291
4	0.7074	23.1615	7.2409	20.8668	38.5254	10.2052
8	0.9558	19.1958	20.2451	15.6693	35.4207	9.4689

*Notes:* This table shows the average percentage of forecast error variance accounted for by the innovations of each variable in the system composed of interest rate changes, stock market return, expected inflation rate, changes in bond and equity issues for Malaysia.

S.E. stands for standard error of forecast, each entry in the table represent forecast ( $k$ -quarters ahead, where  $k = 1, 2, 4$  and  $8$ ) error variance that is explained by innovations in the column variable. Cholesky ordering interest rates, inflation rate, stock market return, bond issuance and equity issuance.

In Table 7, we found quite similar reaction of aggregate bond and stock issue to macroeconomic changes in the case of South Korea. For South Korean corporate bond issues, we found that a relatively large part of the forecast error variance of about 70% is explained by innovations in the interest rate changes, whereas, stock market returns explain forecast error variance of about 10%. For equity issues, we observe that innovations in bond issuance explain nearly 20% of forecast error variance. At fourth quarter level, stock market return explains

increasing level of forecast error variance in stock issues. This indicates the market learning process has been more than one year for the timing of new equity issues. This finding is consistent with previous findings that indicate that managers time their equity issue when the stock prices are high. Stock market liberalization has significant effect on the aggregate stock issuance in the East Asian economies. The opening of stock markets leads to increase in share prices, which increases both aggregate stock and bond issue in long run.

Table 7  
South Korea Bond and Equity Issue Variance Decomposition Analysis

Period	S.E.	Interest rate	Inflation	Stock market return	Bond issues	Equity issues
Interest rate						
1	0.1015	100.0000	0.0000	0.0000	0.0000	0.0000
2	0.1039	96.0554	0.2000	1.3595	2.3753	0.0095
4	0.1319	70.7500	4.4699	12.8372	7.1787	4.7639
8	0.1689	72.9063	3.2224	10.8487	6.2306	6.7918
Expected inflation rate						
1	0.1398	5.4739	94.5260	0.0000	0.0000	0.0000
2	0.1808	23.1030	66.1807	7.5659	1.5818	1.5684
4	0.1919	24.3574	59.3549	11.9097	1.5959	1.6718
8	0.2272	31.5141	46.0117	13.8511	5.0991	3.5238
Stock market return						
1	0.1292	47.0586	0.1279	52.8133	0.0000	0.0000
2	0.1430	41.2461	11.9800	43.8966	2.8491	0.0279
4	0.1643	48.7161	13.1351	33.5795	2.1793	2.3897
8	0.1955	53.2177	10.4436	28.5966	4.2173	3.2205
Bond issuance						
1	0.5518	1.6271	1.6745	6.2092	90.4890	0.0000
2	0.6713	1.3029	1.1638	7.2127	89.6799	0.6405
4	1.3146	48.7092	6.6277	9.3256	32.8836	2.4536
8	1.4439	42.4321	5.7642	11.5087	36.6602	3.6346
Equity issuance						
1	0.0330	3.3947	6.8607	4.0581	8.4309	77.2553
2	0.0368	4.1126	7.1431	4.9472	20.4248	63.3721
4	0.0428	3.4097	11.3385	14.1182	22.0831	49.0505
8	0.0541	22.1953	11.9221	12.8110	21.6913	31.3800

Notes: This table shows the average percentage of forecast error variance accounted for by the innovations of each variable in the system composed of interest rate changes, stock market return, expected inflation rate, changes in bond and stock issues for South Korea.

S.E. stands for standard error of forecast, each entry in the table represent forecast ( $k$ -quarters ahead, where  $k = 1, 2, 4$  and  $8$ ) error variance that is explained by innovations in the column variable. Cholesky ordering interest rates, inflation rate, stock market return, bond issuance and equity issuance.

We do not find the evidence of price pressure hypotheses which indicates that stock market return should decrease after increase in equity issues. In order

to test the reliability of our VAR model, we used VAR residual serial correlation LM diagnostic tests (Table 8), as well as VAR stability tests, which show that VAR produce stable results (see Figures 6 and 7), no root falls outside the unity circle, which indicates that our VAR model has stability. Also there is no serial correlation in our VAR model.

Table 8  
VAR Residual Serial Correlation LM Test

<i>k</i>	Malaysia		South Korea	
	LM	<i>p</i> -value	LM	<i>p</i> -value
1	23.40944	0.5537	23.6022	0.5424
2	22.26436	0.6204	29.3159	0.2502
3	23.95477	0.5220	18.8129	0.8059
4	31.27772	0.1800	15.1659	0.9374
5	14.71500	0.9478	29.5713	0.2407
6	21.55956	0.6610	21.5155	0.6635
7	26.60161	0.3761	34.6910	0.0939
8	19.70855	0.7619	22.4842	0.6076

Notes: This table reports the residual serial correlation LM test statistics and associated *p*-values.

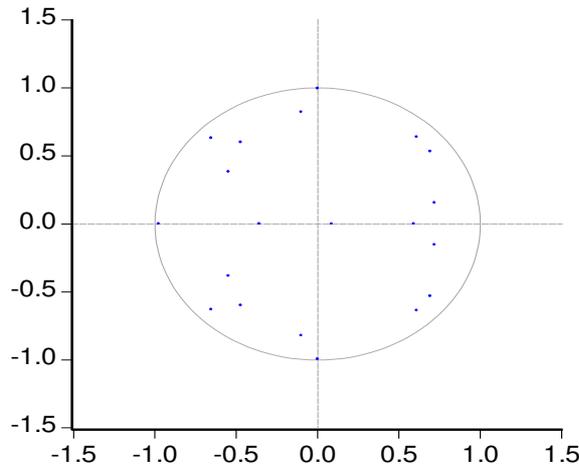


Figure 6. Stability of VAR model – Malaysia

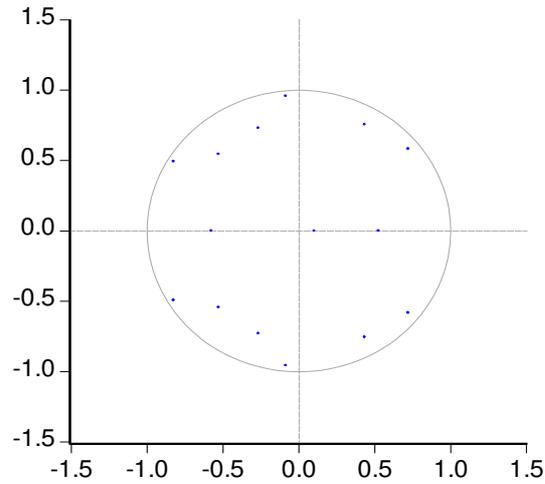


Figure 7. Stability of VAR model – South Korea

## CONCLUSION

We can conclude that macroeconomic variables have important influence on the aggregate stock and bond issuance. First, interest rate liberalization changed the attitude from private to public borrowing, i.e., bond market. Second, equity issuance increased stock market return, which eventually led to increase in equity finance in both countries.

The results have policy implications with respect to developmental agenda for capital markets in the Asian countries. Although foreign private capital inflows have increased capital market liquidity in these countries but the risk of reversal of capital flows always looms larger as witnessed after Asian financial crises. Therefore, policymakers should not only design new policies to attract foreign investors such as tax incentives but also modernize functional aspect of the local bond markets. It is important to streamline bond IPO process so that the potential benefits of bond issuance can be understood by corporate issuers.

The future research work can explore the momentum effect in the bond and equity markets for the Asian countries. It would be interesting to know whether changes in stock prices of recent changes in bond prices are better proxy for fundamental news. The equity and bond markets in Asia are attracted to different types of local and international investors, if the psychological biases

causing momentum are more applicable to some particular investors than others, then such momentum effect could be observed in either bond or stock markets. Furthermore, it would be interesting to examine whether ratings convey different information for different group of firms. For example, firms with less transparent accounting standards and less disclosure would be more affected by rating changes. In the Asian context, a qualitative research into the motives of using particular debt rating agency for different classes of debt can be another area of fruitful investigation.

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