Assessing the Impact of the Asian Bond Markets Initiative on Bond Market Development in Asia

Introduction

The development of local bond markets has been a priority for policy makers in the region since the 1997/98 Asian financial crisis. The Asian Bond Markets Initiative (ABMI) attempts to prevent the recurrence of another financial crisis by mitigating the double mismatch in financing—maturity mismatch and currency mismatch—that has been identified as the reason for the financial crisis. The regional initiative also aims to address Asia's savings glut by reinvesting savings within the region. Thanks to ABMI and economy-level efforts, substantial growth has been made in terms of market quantity; that is, more bonds are being issued and traded.

Qualitative growth, however, has been limited by existing regulatory and institutional barriers, and the stark difference in economic and capital market development across the region's economies. In terms of currency mismatch, little progress has been made due to strict foreign exchange regulations on local currency (LCY) transactions. Also problematic is the fact that the infrastructure for cross-border bond issuance and trading is underdeveloped, thus limiting the channeling of savings within the region. Having acknowledged these problems, a working-level committee comprising members from both the private and public sectors established the ASEAN+3 Bond Market Forum (ABMF) in September 2010. ABMF has since pursued the harmonization and the standardization of cross-border bond transactions, and the integration of regional bond markets.

Despite the abovementioned challenges, it is widely accepted that ABMI, as a regional initiative, has contributed much to bond market development in Asia. Several papers have investigated this development such as Eichengreen and Luengnaruemitchai (2006), Bhattacharyay (2011), and Baek and Kim (2013). However, to the best of our knowledge, there is little literature such as Mizen and Tsoukas (2014) that empirically assesses the impact of ABMI on the development of bond markets in the region. For this purpose, we have made further comparative analysis of Asia and Latin America, two regions that have taken different approaches to develop bond markets after experiencing financial crises and credit instabilities in recent decades. Asian economies have collectively tried to develop and integrate their bond markets on a regional platform, pursuing the harmonization and standardization of different rules and regulations. Latin American economies, in competition with one another, have attempted to individually develop their bond markets to attract foreign investors.

The remainder of this theme chapter proceeds as follows. The second section reviews the historical process of bond market development in Asia from the perspective of a regional policy process, ABMI. The third section attempts to analyze empirically the determinants of bond market development and assess the contribution of ABMI to bond market development in Asia. Lastly, we conclude the paper with interpretations of the empirical results and discuss the policy implications for further development of Asian bond markets.

Review of Bond Market Development in Asia

Historical Review of ABMI

The structure of ABMI has been changed four times—in 2005 (ABMI Roadmap), 2008 (New ABMI Roadmap), 2012 (New Roadmap+), and 2016 (New Medium-Term Roadmap)—to ensure tangible outcomes. Risks posed by rising trade protectionism and faster-than-expected tightening in global financial conditions, as well as uncertainties surrounding geopolitical tensions, could threaten the global economic recovery, inducing large capital outflows and financial volatility in Asia. Therefore, the structure of ABMI should address evolving issues and challenges faced by member economies

of the Association of Southeast Asian Nations plus the People's Republic of China (PRC), Japan, and the Republic of Korea—collectively known as ASEAN+3.

Launching of ABMI in 2003

ABMI was formally launched on 7 August 2003 with the ASEAN+3 Finance Ministers' Meeting as its highest decision-making group and the Focal Group, which is a director-level meeting, as its planning and coordination body. Under the Focal Group, six working groups were formed and categorized by subject or issue area (**Table 25**). Five issues were initially selected, with the Technical Assistance Coordination Group being added during the launch of ABMI.

Table 25: Initial Working Group Issues and Tasks of ABMI in 2003

Working Group 1 (Thailand) Creating New Securitized Debt Instruments – Bonds with Withholding Tax Exemption – Issuance of Securitized Debt Instrument – Study on Multi-Currency Bond	**Working Group 4 (PRC) Multilateral Development Banks, Multinational Companies, and Foreign Government Agencies Issuance** – Country Case Studies on Local Currency Bond Issuance by Foreign Issuers
Working Group 2 (Republic of Korea, PRC) Credit Guarantee and Investment Mechanisms – Research on the Regional Guarantee and Investment Mechanisms	**Working Group 5 (Singapore, Japan) Rating System and Information Dissemination** – *AsianBondsOnline* Website – Collaboration with a Caucus of Local Credit Rating Agencies
Working Group 3 (Malaysia) Foreign Exchange Transactions and Settlement Issues – Research on the Regional Clearing and Settlement Mechanism (Asia Link) – Research on the Impediments on Cross-Border Bond Investment and Issuance	**Working Group 6 (Indonesia, Philippines, Malaysia) Technical Assistance (TA) Coordination** – TA brought JAFTA to Develop Regional Bond Markets – Assessment on Actual TA Needs

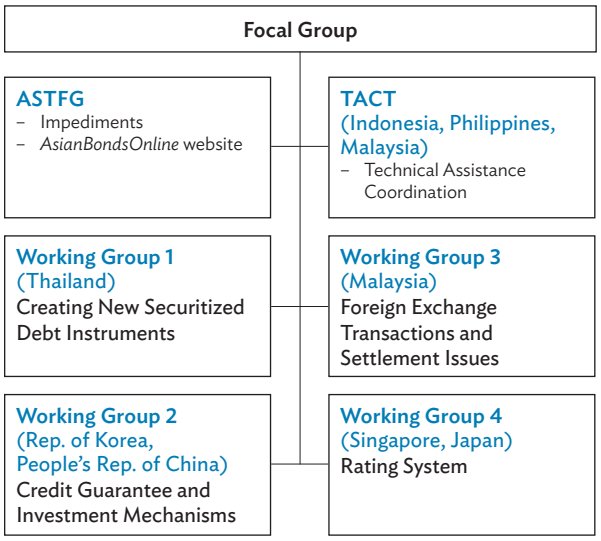
ABMI = Asian Bond Markets Initiative, JAFTA = Japan ASEAN Free Trade Agreement, PRC = People's Republic of China.
Source: Authors' compilation.

ABMI Roadmap in 2005

The ABMI Roadmap was proposed as a new framework at the November 2004 Focal Group Meeting in Tokyo and was officially endorsed at the April 2005 ASEAN+3 Finance Ministers' Meeting in the Lao People's Democratic Republic. The 2005 ABMI Roadmap was conceived to effectively carry out ABMI following three principles. First, the number of working groups should be kept to the minimum necessary so that the efficiency of the ABMI framework can be maintained. Second, continuity and consistency should be maintained regarding future work that draws on past efforts. Third, flexibility is critical for a new framework to respond to the changing regional environment.

The six existing working groups were reorganized into four working groups (**Figure 33**). Then, two teams—the Ad Hoc Support Team for the Focal Group (ASTFG) and the Technical Assistance Coordination Team (TACT)—were created for the Focal Group. ASTFG's mission is to complement and fortify the functions of the Focal Group and to gather, share, and disseminate information. Additional tasks include compiling and updating progress reports. Through ASTFG, the Focal Group can respond to dynamic changes in the region and deal with emerging issues that cut across the mandates of the working groups.

Figure 33: Operating Framework of ABMI in 2005



ABMI = Asian Bond Markets Initiative, ASTFG = Ad Hoc Support Team for the Focal Group, TACT = Technical Assistance Coordination Team.
Source: Authors' compilation.

"Information Dissemination" was given to ASTFG with the undertaking of the *AsianBondsOnline* website, which was established under Working Group 5. The "Study of Impediments to Cross-Border Bond Investment and Issuance in Asian Countries" under Working Group 3 was also transferred to ASTFG since this study raised issues related to the mandate of all working groups and required a response from each economy. Working Group

6 was transformed into TACT in order to emphasize the importance of the coordination and provision of technical assistance in a more timely, effective, and visible manner given the rapid advancement of the region's bond markets.

New ABMI Roadmap in 2008

In 2008, ASEAN+3 economies agreed to extend the work being conducted under ABMI. A new roadmap was designed to encourage members to make voluntary efforts to develop LCY-denominated bond markets. The efforts of individual economies, as well as those of ASEAN+3 as a whole, were intended to develop a regional bond market that is more accessible for both issuers and investors. In addition, areas that required institutional building were to be identified and solutions devised accordingly.

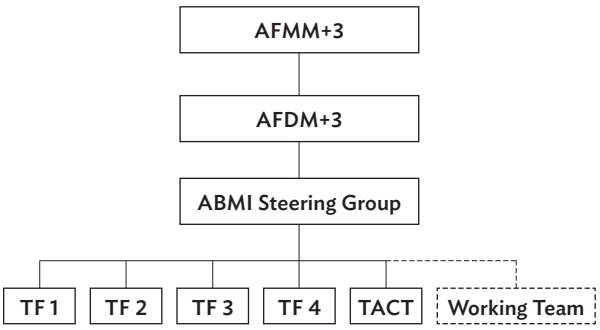
Issues to be addressed were identified and categorized into four key areas with task forces responsible for each area:

(i) Promoting the Issuance of LCY Bonds (TF1)
(ii) Facilitating Demand for LCY Bonds (TF2)
(iii) Improving the Regulatory Framework (TF3)
(iv) Improving the Related Infrastructure for Bond Markets (TF4)

To ensure voluntary efforts by member economies in developing their LCY bond markets, a reference for self-assessment was developed to serve as a benchmark. The organizational framework of ABMI was also modified with a Steering Group replacing the Focal Group as the central planning and coordinating body, and working groups being renamed task forces. The specific tasks of the Steering Group are to (i) set, review, and revise the ABMI roadmap; (ii) oversee and provide guidance to the activities of task forces, TACT, and working teams; (iii) formulate strategies to promote public awareness of ABMI; (iv) monitor the progress of studies by task forces; (v) assign tasks to appropriate task forces or create, if necessary, a working team; and (vi) promote information exchanges among member economies on the development of LCY and regional bond markets through a self-assessment process. The Steering Group will report to the ASEAN+3 Finance Deputies' Meeting, which will in turn report to the ASEAN+3 Finance Ministers' Meeting.

A working team is a contingent group, set into motion if necessary to execute a specific recommendation by the Steering Group once a decision has been made on its institutional design or mechanism. Given the importance of technical assistance, TACT lessens the disparity in bond market development among member economies. The operational framework of ABMI following the 2008 restructuring is shown in **Figure 34**. The four working groups were changed into four task forces and the range of tasks was adjusted. To increase the speed and efficiency of the decision-making process, the Focal Group and ASTFG were integrated into the Steering Group, mostly comprising director general-level members.

Figure 34: Organizational Structure of ABMI in 2008



ABMI = Asian Bond Markets Initiative, AFDM+3 = ASEAN+3 Finance Deputies' Meeting, AFMM+3 = ASEAN+3 Finance Ministers' Meeting, TACT = Technical Assistance Coordination Team, TF = task force.
Source: Authors' compilation.

New ABMI Roadmap+ in 2012

The New Roadmap+ was adopted in 2012 to produce tangible outcomes, with support from the Asian Development Bank (ADB), and to reinvigorate ABMI discussions. The New Roadmap+ lists nine priorities based on three directions and is subject to periodical review every 3 years to reprioritize the agenda and/or introduce new items. Given the different pace of progress, each task force is encouraged to set its own review schedule.

Three Basic Directions in the New Roadmap+

- To produce tangible outcomes, current and critical ongoing issues need to be further developed.

- To strengthen the momentum for ABMI discussions, important but undiscussed issues related to bond markets should be added.
- To meet and accommodate changing global financial needs, including the mitigation of volatility in capital flows, relevant issues need to be addressed.

Nine Priorities in the New Roadmap+

- Launch guarantee programs of the Credit Guarantee and Investment Facility
- Develop infrastructure-financing schemes (including a Lao People's Democratic Republic–Thailand pilot project)
- Foster an investment-friendly environment for institutional investors and share ABMI findings with them
- Enhance ABMF activities such as the ASEAN+3 Multi-Currency Bond Issuance Framework (AMBIF)
- Facilitate establishment of the Regional Settlement Intermediary
- Further develop government bond markets
- Enhance financial access to consumers and small and medium-sized enterprises
- Strengthen the foundation for a regional credit rating system
- Raise financial awareness

To achieve the objectives of ABMI, policy makers want to facilitate access to bond markets by expanding the number and variety of issuers, promoting a diverse range of bonds, and by creating an environment to support bond markets development. Every 3 years, ASEAN+3 policy makers review the progress made under the ABMI framework and modify its scope and activities as appropriate. As the scope and activities have evolved over time, the review assesses the progress made by looking at all measures that ABMI has supported since its launch in 2003.

New Medium-Term Roadmap in 2016

The 19th meeting of the ASEAN+3 Finance Ministers and Central Bank Governors in 2016 endorsed ABMI's New Medium-Term Roadmap outlining activities to be supported under ABMI over the next 3 years. The New Medium-Term Roadmap promotes green bonds, covered bonds, prime collateral for repo markets, and municipal finance in selected member economies to help meet the demand for infrastructure development with LCY-denominated bonds.

The factors for promoting such bonds include the heightened international recognition of the importance of a "green economy" and "green growth" in the case of green bonds, and in the case of covered bonds, their efficiency as a means of fund-raising for infrastructure investment. In addition, activities under the roadmap are to build on achievements made to date and advance regional market integration.

In 2018, ADB published a report on promoting LCY green bonds for infrastructure development under the New Medium-Term Roadmap. Furthermore, the Credit Guarantee and Investment Facility's Medium-Term Business Strategy and the Capital Increase Proposal (from USD700 million to USD1.2 billion) were both approved, and the *AsianBondsOnline* website was revamped as a flagship information source on the region's bond markets by improving its usability and database.

Bond Market Development in Asia

Due to the underdevelopment of the region's bond markets, Asian economies have depended heavily upon short-term bank borrowing in a foreign currency. This bank-centered financial system in Asia has been blamed for the so-called double mismatch that makes the region vulnerable to volatility in short-term capital flows. Bank-centered financial systems are susceptible to the systemic risk of credit crunches and bankruptcies when regulations fail to contain asset bubbles. Excessive short-term loans in the banking sector have usually been financed in United States dollars, while most of the underlying assets were denominated in the domestic currency and longer-term with regard to the revenue being generated.

The development of bond markets was identified by ASEAN+3 authorities as one solution to the abovementioned problems. Well-functioning local bond markets can substitute or complement the banking sector in terms of financial intermediation. There is also the need to effectively recycle regional savings into regional investments. The development of local bond markets was deemed necessary to implement intra-regional recycling and alleviate the problem of global

imbalances. In short, the objectives of ABMI, against which progress can be assessed and measured, can be summarized as follows:

(i) develop robust domestic and regional bond markets,
(ii) avoid the double mismatch of maturity and currency, and
(iii) promote regional financial harmonization and standardization.

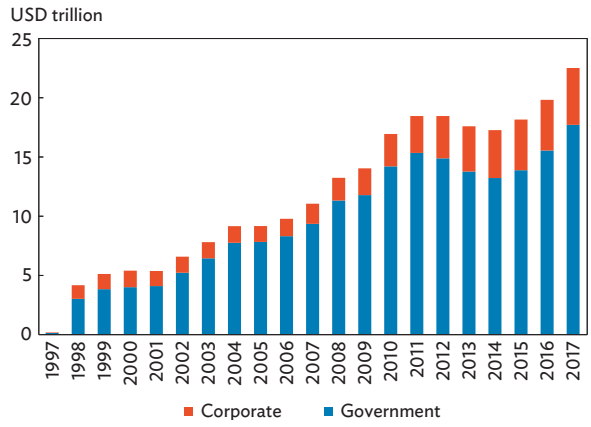
Growth of Bond Markets in ASEAN+3

The 1997/98 Asian financial crisis convinced the authorities in ASEAN+3 member economies of the need for regional financial cooperation, with a focus on bond market development. In response to the crisis, Asian economies actively encouraged the development of domestic bond markets through financial collaboration and cooperation with each other. Governments and central banks in Asia prioritized domestic bond market development for the purpose of financial deepening in order to reduce the vulnerability of their financial systems.

Through regional initiatives such as ABMI and Asian Bond Funds (ABF), bond markets in Asia have substantially grown since the 1997/98 Asian financial crisis (**Figure 35**). According to Jang and Hyun (2009), Spiegel (2009), and Turner (2012), these policy efforts combined with domestic-level support to drive steady growth in Asian bond markets. As a result, the size of the ASEAN+3 bond markets grew from USD1.3 trillion in 2003 to USD22.5 trillion in 2017.[9] The government bond market continues to dominate the overall LCY market, suggesting there is more room for developing corporate bond markets in the region.

The Bank for International Settlements (2012) highlighted the renewed attention that LCY bond market development received following the global financial crisis from regional policy makers who were interested in enhancing the markets' ability to act as a "spare tire" in cushioning a credit contraction. The increase in LCY issuance within the region since 2008, as shown in Figure 35, is significant because it indicates that corporate bond markets can play this important role. In 2002, then Federal Reserve Chairman Alan Greenspan

Figure 35: Historical Growth of ASEAN+3 Bond Markets



Source: *AsianBondsOnline*.

suggested that if well-functioning bond markets had provided Asian economies with a spare tire for financial intermediation in the late 1990s, then these economies might have better weathered the 1997/98 Asian financial crisis. Chan et al. (2012) provide a discussion on the spare tire role of LCY corporate bond markets. The experience of 2008–2009 lends support to that idea.

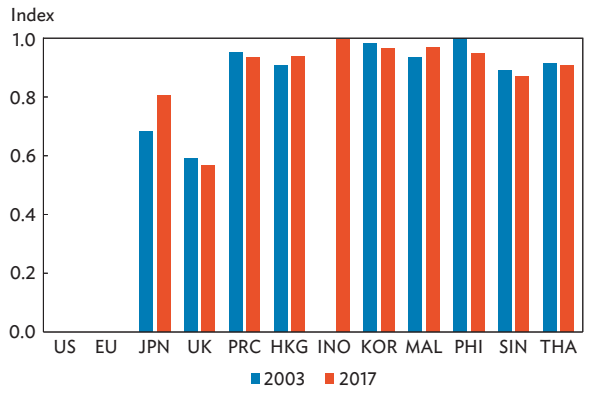
Avoiding the Currency Mismatch

ABMI aims to mitigate the impacts of currency mismatch by developing domestic and regional bond markets. The "original sin" hypothesis is defined by Barry Eichengreen and Ricardo Hausmann (1999) and Eichengreen, Hausmann, and Panizza (2002) as most economies not being able to borrow abroad in their own currency. Original sin is usually measured as shares of LCY-denominated bank loans and international bond debt. Looking at currency mismatch, as measured in **Figure 36**, the levels of the original sin index for Asian economies that experienced the 1997/98 Asian financial crisis remained the same between 2003 and 2017, suggesting that they are still exposed to currency mismatch due to strict foreign exchange regulations and the noninternationalization policies of their currencies.

$$\text{Original Sin Index}_i = 1 - \frac{\text{securites issued by economy } i \text{ in currency } i}{\text{securities issued by economy } i}$$

[9] The ASEAN+3 economies include the People's Republic of China; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; the Philippines; Singapore; Thailand; and Viet Nam.

Figure 36: Original Sin Index



EU = euro area; HKG = Hong Kong, China; INO = Indonesia; JPN = Japan; KOR = Republic of Korea; MAL = Malaysia; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; THA = Thailand; UK = United Kingdom; US = United States.
Source: Bank for International Settlements.

Harmonization and Standardization of Asian Bonds through ABMF

The promotion and standardization of cross-border transactions is impetus to further advance ABMI. Increased involvement from the private sector is required to further develop Asian bond markets; to date, ABMI has mainly been policy-driven by the public sector. To facilitate more participation from the private sector, ABMF was established in September 2010 as a common platform to foster the standardization of market practices and the harmonization of regulations related to cross-border transactions in the region.

ABMF reports its activities to Task Force 3 of ABMI under the institutional framework of the ASEAN+3 Finance Ministers Meeting. The activities of ABMF are becoming increasingly important. Therefore, the relationship between ABMF and ABMI must be clarified to facilitate private sector participation. In particular, comprehensive discussions should be implemented within ABMF and various topics should be discussed for the purpose of promoting cross-border transactions in the region.

ABMF launched its activities with the establishment of two sub-forums: (i) Sub-Forum 1 (SF1) to collate and compare regulations and market practices in the region and produce a comprehensive bond market guide for each economy; and (ii) Sub-Forum 2 (SF2) to harmonize and standardize transaction procedures and bond-messaging formats to enhance straight-through-processing and reduce the cost of cross-border deals. Steady progress has been made toward implementing central securities depository–real-time gross settlement linkages between the Bank of Japan and the Hong Kong Monetary Authority, in accordance with the roadmap for establishing a regional settlement intermediary in ASEAN+3.

SF1 members consist of industry associations, exchanges in the region, and other organizations such as research institutes. SF2 members mainly comprise domestic central securities depositories as well as local, regional, and global custodians.[10] The ASEAN+3 Bond Market Guide was first published in 2012 as an outcome of these activities and is periodically updated to bridge the information gap in the region. The guide offers extensive information on market infrastructure, regulatory frameworks, and market trading practices for bond markets in the individual economies of the region.

A common bond issuance framework has been implemented for the ASEAN+3 region through AMBIF. As a regional platform for market participants, ABMF is expected not only to lead the region toward more harmonized and integrated markets, but also to act as the nexus between ASEAN+3 and the rest of the world for international standard-setting and rule-making. ABMF seeks enhanced dialogue between the private sector and ASEAN+3 government officials to develop bond markets and promote harmonization, standardization, and, consequently, integration in the region. Additionally, ABMF provides opportunities to exchange knowledge, expertise, and experience between the private and public sectors.

Challenges for the Further Development of ABMI

Based on historical process and the degree of bond market development, there are three levels of development under ABMI. The first (cognitive) level on which a consensus is formed and promulgated; the second (policy) level from which authorities in individual countries direct policies to develop their bond markets; and the third (market) level where the public and

[10] The General Principles for participation of non-ASEAN+3 economies as ABMF observers was approved in 2018.

private sectors participate financially in the expansion of bond markets.

Some have criticized the ABMI process as being slow and overly focused on research rather than implementation. ABMI has reached the third level of development and thus has to implement more concrete financial schemes in collaboration with government financial institutions such as export–import banks and private financial institutions to realize tangible outcomes from the various discussions and research performed to date.

ABMI has made some concrete achievements since 2003, especially in response to the turmoil of the global financial crisis and the European debt crisis. Examples include the Credit Guarantee and Investment Facility, ABMF, and *AsianBondsOnline*. Utilization of regional savings to finance regional investment has been partially achieved through bond markets development.

ADB acts as the secretariat for ABMI discussions. While this is a helpful and necessary function, ABMI knowledge support should be enhanced in close cooperation with other ASEAN+3 institutions such as the ASEAN+3 Macroeconomic Research Office. With a long-term perspective and accumulated mutual cooperation experiences, ASEAN+3 might consider establishing an independent secretariat to facilitate ABMI and promote policy coordination among ASEAN+3 members.

Empirical Analysis

Empirical Framework for Bond Market Development

Literature Survey

There is an extensive literature that investigates the determinants of bond markets development, including Burger and Warnock (2006); Claessens, Klingebiel, and Schmucker (2007); Borensztein et al. (2008); Adelegan and Radzweicx-Bak (2008); and Burger, Warnock, and Warnock (2012). However, there are few studies that have attempted to solely identify the determinants of bond market development in Asia.

To find the determinants of bond market development in Asian economies, Eichengreen and Luengnaruemitchai (2006) exploit panel data for 41 economies worldwide for the period 1990–2001. They find that economy size (measured as gross domestic product [GDP]) is associated with bond market development. In addition to economy size, both the size and concentration of the banking system (measured as domestic credit provided by the banking sector and the spread between bank lending and deposit rates, respectively) influence bond market depth. Eichengreen and Luengnaruemitchai (2006) also suggest that institutional quality (adherence to internationally recognized accounting standards, level of corruption, and bureaucratic quality) is important for bond market capitalization.

Bhattacharyay (2011) examines the determinants of Asian bond market development. Based on data for 10 Asian economies during 1998–2008, he separately investigates government and corporate bond markets as well as bond markets as a whole. Combining the results obtained from various multivariate regression models, he suggests that the size of the economy, stage of economic development, exchange rate volatility, and spread between bank lending and deposit rates affect the size of government bond markets. Similarly, he finds that the stage of economic development and economic openness (measured by exports as a share of GDP) enhance the depth of corporate bond markets.

Baek and Kim (2013) explore the determinants of domestic bond market development, primarily focusing on nine Asian economies—the PRC; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; the Philippines; Singapore; and Thailand—for the period 1997–2010. It includes implicitly the impacts of the 1997/98 Asian financial crisis and the global financial crisis. Based on empirical results, they find that economy size, level of economic development, and banking sector size are positively correlated with bond market development. Institutional factors such as the strength of legal rights and depth of credit information also play a critical role.

However, there is not much literature that empirically examines the direct impact of ABMI on the development of bond markets in the region.[11]

[11] The Bank for International Settlements (2012) has suggested that ABMI has had a greater impact on sovereign issuance, while the later ABF initiatives encouraged greater investor participation (Chan et al. 2012). Spiegel (2012) noted that it would be reasonable to expect an improvement in market liquidity between the launch of ABMI and the beginning of the global financial crisis.

Mizen and Tsoukas (2014) investigate bond market development by exploring the determinants of firms' decisions to issue public debt in Asian economies by using a panel data of nine economies—the PRC; Hong Kong, China; Indonesia; the Republic of Korea; Malaysia; the Philippines; Singapore; Taipei,China; and Thailand—covering the period 1995–2007. They used Taipei,China as a control to separate the effect of regional development from the effect of regional policy initiatives with difference-in-differences analysis because Taipei,China does not participate in regional initiatives such as ABMI or ABF. They conclude that regional initiatives have been an important step toward greater bond issuance among firms in Asia, mostly by fostering market deepening and improving liquidity.

While they seek to assess the impact of ABMI on bond market development in Asia, the control group includes only one economy, Taipei,China. To assess this impact more accurately, our analysis includes Asia and Latin America for the purpose of comparison as both regions have developed their bond markets, albeit using different approaches, after experiencing financial crises and credit instabilities in recent decades. Asian economies have aimed to collectively develop and integrate their bond markets on a regional platform, pursuing harmonization and standardization of different rules and regulations. In contrast, Latin American economies have attempted to individually develop their own bond market to attract foreign investors, thus competing with neighboring economies.

Data

We explore the determinants of bond market development in ASEAN+3 (the PRC; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; the Philippines; Singapore; Thailand; and Viet Nam) and Latin America (Argentina, Bolivia, Brazil, Ecuador, El Salvador, Chile, Colombia, Costa Rica, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela). The sample covers the period 1995–2017, which incorporates the impact on bond market development of the 1997/98 Asian financial crisis, recent Latin American banking crises, and the global financial crisis. The crisis dummy variable is taken mainly from Reinhart (2010).

As for the measure of bond market development, the size of the bond market is expressed as a percentage of GDP in line with other empirical studies. The size of the bond market is defined as the total value of outstanding domestic and international debt securities (government and corporate bonds). As for the measure of currency mismatch, the original sin is measured as shares of LCY-denominated international bond debt as explained in the previous section and in line with the definitions of Eichengreen and Hausmann (1999), and Eichengreen, Hausmann, and Panizza (2002).

For the explanatory variables, first, economy size (measured as GDP) is positively related to bond market development because small economies may lack the minimum efficient scale needed for deep and liquid bond markets. Second, economic development (measured as GDP per capita) is positively correlated with bond market development as Burger and Warnock (2006), and Eichengreen and Luengnaruemitchai (2006) suggest. Third, budget balance (measured as revenue minus expenditure) is assumed to be negatively correlated with bond market development; that is, a fiscal deficit is closely associated with the development of a government bond market.

Fourth, financial development facilitates bond market development. Burger and Warnock (2006) find that a banking system develops in parallel with a bond market. Eichengreen and Luengnaruemitchai (2006) suggest that the banking sector is prone to complementary bond market development. However, they point out that a concentrated banking system has a negative impact on bond market development because of the absence of competition among banks. Banking size is measured as the total value of bank credit divided by GDP. Stock market size is measured as stock market capitalization divided by GDP and used as a proxy variable of financial development.

Fifth, as for proxy variables of volatility that negatively affect bond market development, inflation is measured as the 3-year moving average of the inflation rate, and volatility of the exchange rate is measured as the standard deviation of monthly volatility of the exchange rate. Economies with a lower inflation rate and a stable exchange rate tend to have larger bond markets.

Sixth, an economy's improving score for the investment freedom index represents bond market development through a broadening of the investor base and an increase in the number of potential issuers because

there are fewer constraints on the flow of investment capital, allowing individuals and firms to move their resources both internally and across the border without restriction.[12]

Methodology: Difference-in-Difference

A simple way to assess the contribution of ABMI to the development of Asian bond markets is to detect the structural impact of ABMI on bond market development with a dummy variable. Since its launch in 2003, ABMI has represented the regional effort to develop domestic and regional bond markets. A positive and significant coefficient on the ABMI dummy would indicate that, given all the other variables in explaining the growth of domestic bond markets, the post-ABMI period shows a permanent shift in the size of the regional bond market.

However, it is difficult to directly interpret the results of the dummy variable in a simple regression. Therefore, this analysis includes two regions for comparison, Asia and Latin America, which are similar in terms of indicators such as market size, public and private composition, and the currency denomination of bonds, with both regions' markets lagging behind those of advanced economies. To evaluate the impact of ABMI more accurately, we employ a difference-in-difference (DID) method to observe the two regions, Asia (treatment group) and Latin America (control group), for the two time periods (before 2003 and after 2003) to delineate the launch of ABMI.

Since the work by Ashenfelter and Card (1985), and Card and Krueger (1994), DID methodology has become very popular for policy evaluation.[13] It estimates the impact of a treatment (policy variable) on an outcome (response variable) by comparing the average change over time in the outcome variable for the treatment group to the average change over time for the control group. The simple model is set up for two regions for two periods. One region (Asia) is exposed to a treatment (ABMI) in the second period but not in the first period. The other group (Latin America) is not exposed to the treatment during either period.

In this case where the same units within a group are observed in each time period, the average in the second group (Latin America) is subtracted from the average in the first group (Asia). This removes biases in second-period comparison between the treatment and control group that could result from permanent discrepancies between the groups in addition to biases from comparisons over time in the treatment group that could be the result of trends. The equation is written as follows:

$$y_{i,t} = \alpha + \beta_0 \text{REGION}_i + \beta_1 \text{ABMI}_t + \beta_2(\text{REGION}_i \cdot \text{ABMI}_t) + \gamma X_{i,t} + \varepsilon_{i,t}$$

where $y_{i,t}$ stands for the development of a bond market and REGION_i is a dummy variable taking the value 1 if the economy belongs to ASEAN+3 and 0 if it does not. ABMI_t is a dummy variable taking the value 1 in the second period and 0 in the first period. $X_{i,t}$ is a set of control variables that may affect the development of a bond market including economy size, economic development, financial sector development, and other macroeconomic variables. The coefficient of interest β_2 is an interaction term, $\text{REGION}_i \cdot \text{ABMI}_t$, which is the same as a dummy variable equal to 1 for those observations in ASEAN+3 with ABMI in the second period.

This method removes fixed differences across the regions and common trends or changes over time in factors that affect the two regions equally. The identifying assumption is that in the absence of the introduction of ABMI, there would have been no differences between Asia and Latin America in the development of bond markets. All equations are estimated using panel feasible generalized least squares with corrections for heteroskedasticity and panel-specific autocorrelation within economies in line with Eichengreen and Luengnaruemitchai (2004), and Classens, Klingebiel, and Schmucker (2007).

Empirical Results

Looking at the descriptive statistics in **Table 26**, ASEAN, ASEAN+3, and Latin America show similarities in terms of GDP and GDP per capita, while other macroeconomic

[12] Economies with no investment restrictions have a score of 100 on the investment freedom index. In practice, most economies have a variety of restrictions on investment. Some have different rules for foreign and domestic investment; some restrict access to foreign exchange; some impose restrictions on payments, transfers, and capital transactions; in some, certain industries are closed to foreign investment. Labor regulations, corruption, red tape, weak infrastructure, and political and security conditions can also affect the freedom that investors have in a market.

[13] One famous DID analysis is Card and Krueger (1994). They compared employment in the fast food sector in New Jersey and Pennsylvania in February 1992 and November 1992 after an increase in New Jersey's minimum wage in April 1992.

Table 26: Descriptive Statistics (%)

Variable	ASEAN+3	ASEAN	Latin America	Total
Bonds/GDP	82.302 (60.808)	58.383 (36.786)	52.022 (27.851)	71.615 (53.567)
Government Bonds/GDP	40.719 (43.510)	26.968 (11.980)	31.218 (20.774)	37.257 (37.116)
Corporate Bonds/GDP	42.786 (27.830)	31.921 (28.185)	20.803 (18.683)	34.904 (27.047)
Original Index×100	91.114 (8.760)	93.348 (5.116)	92.118 (8.096)	91.485 (8.521)
GDP(log)	6.690 (1.224)	6.184 (0.769)	4.960 (1.462)	5.652 (1.612)
GDP per Capita (log)	9.489 (1.007)	9.216 (1.006)	9.137 (0.526)	9.278 (0.775)
Budget Balance/GDP	−0.603 (4.237)	−0.212 (4.434)	−2.327 (3.806)	−1.631 (4.071)
Bank Credit/GDP	99.471 (47.408)	78.788 (41.246)	37.027 (19.396)	62.447 (45.586)
Stock Market Size/GDP	152.669 (235.412)	94.354 (72.506)	35.947 (30.373)	98.844 (183.344)
Inflation	3.896 (4.271)	4.944 (4.545)	16.379 (84.351)	11.279 (65.180)
Exchange Rate	2.896 (2.664)	2.855 (2.946)	19.225 (267.153)	12.694 (206.977)
Investment Freedom	54.130 (22.172)	48.876 (20.979)	59.869 (19.192)	57.573 (20.610)
No. of Observations	230	138	245	575

ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product.
Notes:
1. Bonds = government bonds + corporate bonds + international bonds (corporate bonds include financial bonds).
2. ( ) signifies standard deviation.
3. ASEAN comprises Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam.
4. ASEAN+3 comprises ASEAN plus the People's Republic of China, Japan, and the Republic of Korea.
5. Latin America comprises Argentina, Bolivia, Brazil, Ecuador, El Salvador, Chile, Colombia, Costa Rica, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Sources: Bank for International Settlements, Bruegel, Heritage Foundation, International Monetary Fund, World Bank.

factors, banking sector size, and bond and stock market size are different. Based on the literature review, we select control variables to influence bond market development and identify major determinants using feasible generalized least squares in line with Eichengreen and Luengnaruemitchai (2004), and Classens, Klingebiel, and Schmucker (2007). Then we focus on whether a regional policy initiative (ABMI) explains the discrepancy in the development of bond markets between Asia, as represented by ASEAN and ASEAN+3, and Latin America after controlling for major determinants (control variables).

In **Table 27**, economy size (GDP) has a coefficient that is positive and statistically significant as expected. Eichengreen and Luengnaruemitchai (2004) insist that liquid securities markets have a certain minimum efficient scale and therefore small economies in Asia face problems in developing bond markets. Economy size is a critical determinant of bond market development. Second, economic development measured as GDP per capita is positively related to bond market development in Asia; however, it has a negative sign for Latin America. Third, the general government balance negatively affects bond markets because economies with a fiscal deficit are likely to issue more bonds. Fourth, domestic credit provided by banks (banking sector size) has a positive sign but is not significant in either Asia or Latin America, while stock market size has a positive sign and is statistically significant in both regions. Fifth, the coefficients of inflation and exchange rate volatility are not statistically significant in Asia. Sixth, the coefficient of the global financial crisis dummy is negative and statistically significant for Asia only.

Table 27: FGLS Estimation for Bond Markets Development

Variable	ASEAN+3	ASEAN	Latin America
ln(GDP)	21.996***	6.953*	17.846***
	(2.577)	(4.037)	(3.610)
ln(GDP per Capita)	45.161***	43.078***	−24.591***
	(3.151)	(4.767)	(10.778)
Budget Balance/GDP	−1.613***	−2.436***	−1.449**
	(0.286)	(0.385)	(0.673)
Bank Credit/GDP	0.018	0.074	0.130
	(0.025)	(0.046)	(0.085)
Stock Market Size/GDP	0.013*	0.064*	0.330***
	(0.007)	(0.038)	(0.070)
Inflation	0.656	0.681	3.779***
	(0.430)	(0.423)	(0.824)
FX Volatility	0.341	0.187	−0.288
	(0.210)	(0.225)	(0.401)
Investment Freedom	−0.312***	−0.430***	0.638***
	(0.104)	(0.124)	(0.204)
Latin America Crisis Dummy			−19.281
			(12.385)
AFC	0.280	4.424	
	(4.539)	(5.196)	
GFC	−8.166***	−8.016**	−1.614
	(2.482)	(3.781)	(3.772)
Constant	−503.070	−397.062	93.159
	(31.132)	(48.678)	(95.349)
AR(1)-test	21.352	7.390*	22.420***
[p-value]	[0.0017]	[0.0531]	[0.0052]
χ^2(df)-test	404.530 (10)	278.170 (10)	113.150 (10)
[p-value]	[0.000]	[0.000]	[0.000]
No. Observations	162	89	78

AFC = Asian financial crisis, AR = autoregressive, ASEAN = Association of Southeast Asian Nations, FGLS = feasible generalized least squares, FX = foreign exchange, GDP = gross domestic product, GFC = global financial crisis.

Notes:

1. All models are estimated using panel FGLS with corrections for heteroskedasticity and AR(1).
2. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.
3. ( ) signifies standard error, ( ) in χ^2 statistics signifies the degree of freedom.
4. ASEAN comprises Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam.
5. ASEAN+3 comprises ASEAN plus the People's Republic of China, Japan, and the Republic of Korea.
6. Latin America comprises Argentina, Bolivia, Brazil, Ecuador, El Salvador, Chile, Colombia, Costa Rica, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Source: Authors' estimates.

As for the estimation of original sin in **Table 28**, economy size (GDP) is not statistically significant while economic development (GDP per capita) is negatively correlated to the original sin index. The results show that the more developed an economy is, the lower the original sin index becomes. No other variables are statistically significant in any specification except for banking sector size and bond market size.

In order to separate ABMI impacts from general factors that can influence bond market development as identified in the appendix, we introduce another region (Latin America) that does not participate in ABMI for comparison. Therefore, the coefficient of our interest in **Table 29**, an interaction term, $REGION_i \cdot ABMI_t$, shows that ABMI as a regional initiative has contributed to corporate bond market development in Asia, while the coefficient of government bond market is not statistically significant in the model that includes all control variables. The empirical results indicate that ABMI will facilitate more issuance of corporate bonds in line with the result of Mizen and Tsoukas (2014). However, in the case of original sin, the coefficient of $REGION_i \cdot ABMI_t$ in **Table 30** indicates that ABMI does not contribute to

Table 28: FGLS Estimation for Original Sin

Variable	Original Sin Index×100					
	I	II	III	IV	V	VI
Bonds/GDP	−0.012* (0.007)					
ln(GDP)		0.113 (0.494)				−0.135 (0.712)
ln(GDP per Capita)		−2.019*** (0.564)				−1.887*** (0.626)
Bank Credit/GDP			−0.002 (0.003)			−0.001* (0.002)
Stock Market Size/GDP			−0.002 (0.002)			0.001 (0.002)
Inflation				0.015 (0.009)		0.004 (0.016)
FX Volatility				0.00001 (0.000)		0.002 (0.013)
Investment Freedom					−0.005 (0.009	−0.007 (0.012)
Constant	93.059*** (50.851)	110.584*** (4.841)	93.171*** (0.796)	91.206*** (0.677)	93.274*** (0.896)	111.347*** (5.495)
AR(1)-test [p-value]	18.265 [0.000]	41.186 [0.000]	45.498 [0.000]	46.649 [0.000]	47.257 [0.000]	40.220 [0.000]
χ^2(df)-test [p-value]	2.850 [0.241]	14.690 (6) [0.002]	3.670 (6) [0.299]	6.290 (6) [0.098]	1.270 (5) [0.530]	32.520 (11) [0.00]
No. of Observations	216	314	269	305	314	262

AR = autoregressive, ASEAN = Association of Southeast Asian Nations, df = degrees of freedom, FGLS = feasible generalized least squares, FX = foreign exchange, GDP = gross domestic product.
Notes:
1. All models are estimated using panel FGLS with corrections for heteroskedasticity and AR(1).
2. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.
3. ( ) signifies standard error, ( ) in χ^2 statistics signifies the degree of freedom.
4. Dummy variables are included for the banking crisis in Latin America, 1997/98 Asian financial crisis, and the global financial crisis.
5. ASEAN comprises Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam.
6. ASEAN+3 comprises ASEAN plus the People's Republic of China, Japan, and the Republic of Korea.
7. Latin America comprises Argentina, Bolivia, Brazil, Ecuador, El Salvador, Chile, Colombia, Costa Rica, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela.
Source: Authors' estimates.

the mitigation of currency mismatch in the model that includes control variables because most Asian economies maintain strict foreign exchange regulations on LCY trading with and between nonresidents. Under this environment, most Asian economies are still exposed to original sin, which is not being able to borrow abroad in their domestic currency even though their domestic bond market has grown in size.

Summary and Implications

This paper attempts to evaluate the impact of ABMI on the development of bond markets in Asia using the DID method. ASEAN+3 economies have taken a collective approach to developing and integrating a regional bond market on a common platform, while Latin American economies have taken an individual approach to developing their respective bond markets to attract foreign investors, thereby competing with neighboring economies.

After controlling for the major determinants of bond market development, the DID results indicate that ABMI as a regional initiative has contributed to corporate bond market development in Asia (the coefficient of the government bond market is not statistically significant) by facilitating more issuance of corporate bonds in line with the result of Mizen and Tsoukas (2014). However, ABMI

Table 29: DID Analysis for ABMI: ASEAN+3

Variable	Bonds/GDP	Government Bonds/GDP	Corporate Bonds/GDP
Model I: Excluding control variables			
ASEAN+3	47.269***	6.086	27.136***
	(9.919)	(4.038)	(6.174)
ASEAN+3×ABMI	2.351	−2.350	4.014
	(7.929)	(2.781)	(3.287)
ABMI(2003)	7.495	3.250	−0.677
	(6.956)	(2.410)	(2.661)
Constant	34.060***	27.020***	16.997***
	(8.216)	(2.685)	(4.120)
χ^2(df)−test	56.650 (3)	3.610 (3)	32.290 (3)
[p−value]	[0.000]	[0.307]	[0.000]
Model II: Including control variables			
ASEAN+3	0.122	−8.413*	6.844*
	(7.801)	(4.439)	(3.737)
ASEAN+3×ABMI	12.753*	0.284	5.886*
	(7.495)	(4.226)	(3.510)
ABMI(2003)	−1.879	1.091	−1.190
	(6.710)	(3.987)	(2.606)
Constant	−429.834***	−124.903***	−250.799***
	(27.413)	(20.437)	(17.095)
χ^2(df)−test	653.350 (14)	228.120 (14)	542.320 (14)
[p−value]	[0.000]	[0.000]	[0.000]
Observations		389	

ABMI = Asian Bonds Market Initiative, ASEAN = Association of Southeast Asian Nations, df = degrees of freedom, GDP = gross domestic product.
Notes:
1. All models are estimated using panel FGLS with corrections for heteroskedasticity and autoregression of order 1 [AR(1)].
2. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.
3. ( ) signifies standard error, ( ) in χ^2 statistics signifies the degree of freedom.
4. Viet Nam and Honduras are excluded from this estimation.
5. ASEAN comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.
6. ASEAN+3 comprises ASEAN plus the People's Republic of China, Japan, and the Republic of Korea.
7. Latin America comprises Argentina, Bolivia, Brazil, Ecuador, El Salvador, Chile, Colombia, Costa Rica, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela.

Source: Authors' estimates.

has not yet mitigated currency mismatch because of the strict regulations in Asian economies on transactions in domestic currencies with and between nonresidents, and the noninternationalization policies of the region's authorities with regard to domestic currencies. Therefore, most Asian economies are still exposed to original sin, which is not being able to borrow abroad in their domestic currency even though their domestic bond market has grown in size.

To effectively utilize the glut of savings within Asia and to mitigate currency mismatch, ASEAN+3 economies should pursue at least partial currency internationalization and the internationalization of their bond markets so that nonresident issuers and investors can freely access regional bond markets by utilizing AMBIF.

Table 30: DID Analysis for Impact of ABMI: Original Sin

Variable	ASEAN+3		ASEAN	
	Model I	Model II	Model I	Model II
ASEAN+3 (ASEAN)	−0.728 (1.558)	−3.315 (1.007)	1.144 (1.643)	−0.407 (1.147)
ASEAN+3×ABMI (ASEAN×ABMI)	−1.842*** (0.605)	−0.128 (0.746)	−1.956*** (0.579)	−0.816 (0.659)
ABMI(2003)	−0.605 (0.541)	−3.315*** (1.007)	0.749 (0.513)	−0.465 (0.505)
Constant	91.901*** (1.371)	115.778*** (5.877)	91.281*** (1.025)	113.351*** (6.141)
Control Variable		✓		✓
χ^2(df)-test	23.520 (3)	67.480 (13)	21.620 (13)	49.630 (3)
[p-value]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	358		286	

ABMI = Asian Bonds Market Initiative, ASEAN = Association of Southeast Asian Nations, df = degrees of freedom.
Notes:
1. All models are estimated using panel FGLS with corrections for heteroskedasticity and autoregression of order 1 [AR(1)].
2. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.
3. ( ) signifies standard error, ( ) in χ2 statistics signifies the degree of freedom.
4. Viet Nam and Honduras are excluded from this estimation.
5. ASEAN comprises Hong Kong, China; Indonesia; Malaysia; the Philippines; Singapore; Thailand.
6. ASEAN+3 comprises ASEAN plus the People's Republic of China, Japan, and the Republic of Korea.
7. Latin America comprises Argentina, Bolivia, Brazil, Ecuador, El Salvador, Chile, Colombia, Costa Rica, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela.
Source: Authors' estimates.

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Appendix: Definition of Variables

Name of Variable	Definition	Source
Dependent Variables		
Bonds/GDP	(Bonds/GDP)×100	Bank for International Settlements
Government Bonds/GDP	(Government Bonds/GDP)×100	
Corporate Bonds/GDP	(Corporate Bonds/GDP)×100	
Original Index×100	max{0, OSINi}×100	
Economic Factors		
GDP (log)	ln(GDP at PPP)	International Monetary Fund
GDP per Capita (log)	ln(GDP per Capita at PPP)	
Budget Balance/GDP	([Gov revenue – Gov expenditure]/ GDP)×100	
Financial Factors		
Bank Credit/GDP	(Bank Credit/GDP)×100	World Bank
Stock Market Size/GDP	(Stock Market Size/GDP)×100	
Volatility		
Inflation	3-year moving average of inflation	International Monetary Fund
Exchange Rate	Standard deviation of monthly volatility of exchange rate (ΔlnEXRi,m)	Bruegel
Institutional Factors		
Investment Freedom Index	100 = no restrictions, 0 = full restrictions	Heritage Foundation
Dummy Variable		
Dummy Variable for Crisis	Latin America banking crisis, 1997/98 Asian financial crisis, global financial crisis	Reinhart (2010)

GDP = gross domestic product, PPP = purchasing power parity.
Notes:
1. Bonds = government bonds + corporate bonds + international bonds (corporate bonds include financial bonds)
2. OSINi = 1 – (securities issued by country i in currency i/securities issued by country i)
3. Total bonds = international bonds + domestic bonds

Source: Authors' compilation.