Developing the Housing Bond Market

Introduction

Securing a stable living space is essential to living a decent life. Demand for housing is influenced by population, income, urbanization, and household structure (Doling, Vandenberg, and Tolentino 2013). Due to relatively rapid income growth and accelerating urbanization, housing demand is inevitably higher in Asia than in other regions.

However, housing prices are often so expensive that households cannot afford to purchase a home with only labor income earned and saved over a short period. This is especially true in urban areas, where houses are more expensive. Amid rising affordability concerns, a mortgage system enables households to purchase homes if they have a stable source of income to make future mortgage payments.

Because traditional financial intermediaries acting as mortgage lenders relied on savings to finance mortgage loans, only limited loan amounts and tenures were available to home buyers in the simplest form of a mortgage system. Providing housing opportunities to more households required a differentiated housing finance system, capable of increasing mortgage lending and managing the resultant risks.

Money raised through mortgages is used as a factor of production in real sectors such as housing construction (supply side). But even so, there may be a timing gap between the demand for large-scale funding from the construction sector and the fund inflows from mortgages. For a properly functioning housing market where supply meets demand, housing finance should play a role in reducing the time friction that may exist between the demand and supply of finance in the housing construction sector.

To that end, it is necessary to enhance the role of financial intermediaries, mainly banks. Also, it is critical to invigorate housing bond finance based on the capital market. In developed economies with active housing bond markets, housing finance sources include not only financial intermediaries but also investors, both institutional and individual, in capital markets. As a result, the smooth supply of housing finance has stimulated the construction and financial services industries, leading to job creation and income generation, and ultimately contributing to economic growth.

Housing Finance and Housing Bond Market

Definitions of Housing Finance and Housing Bonds

Within any economic system, the demand for stable housing comes not only from individuals but also from society as a whole. Thus, a system that ensures stable housing for all is indispensable for the maintenance and growth of society. Houses are long-lived durable goods; therefore, buyers need a large sum of money to purchase a house. The need for housing finance arises because many home buyers face difficulties securing sufficient funds at their desired time of purchase.

Housing finance is generally known as the operation of the mortgage market in the form of housing loans or mortgage loans that enable consumers who wish to have their own home to borrow against the value of their housing asset. It allows consumers to spread the required payments over the period of the loan to own that asset (Lunde and Whitehead 2016).

But housing finance is actually a much broader and more diverse concept. The demand for housing varies with family structure, income level, and demographic factors. Housing may be acquired through purchase or other ways (e.g., rental or long-term lease) since the users of housing finance may have varying needs in terms of amount, maturity, interest rate, and early redemption method, among others, while different types of financial institutions may meet user needs in a variety of ways.

The International Union for Housing Finance stresses that housing finance can be defined in diverse ways. It describes the nature of housing finance as follows:

"Housing finance brings together complex and multisector issues that are driven by constantly changing local features, such as a country's legal environment or culture, economic makeup, regulatory environment, or political system."[7]

However, the meaning of housing finance, which is defined based on the perspective of housing demand, tends to neglect finance for housing supply. Although the funds borrowed from the mortgage market flow into the supply side of the housing market, namely the construction sector, there may be a timing mismatch between when funds are needed and when they are available. Therefore, the concept of housing finance, in a broad sense, needs to include the funding needs of the supply side to ensure the timely delivery of housing.

In spite of the complexity and scalability of the concept, housing finance also needs to achieve the primary purpose of finance, which is to efficiently mobilize capital needed for financial consumers (Goldsmith 1969). In addition, it should be a system that can reflect the characteristics of housing in the financing process.

In earlier years, in most advanced economies, including the United States (US), housing finance was bank-based finance. Banks provided loans secured by real property (mortgage loans), and short-term deposits were their main source of funding for mortgage loans. As a result, bank mortgages had a short-term variable rate that could not fully satisfy mortgagors in need of long-term financing (McConnell and Buser 2011). Furthermore, banks had to take on various risks—such as credit risk, liquidity risk, and prepayment risk—in the process of asset transformation for housing finance.

Against this backdrop, the advent of a housing bond market brought about fundamental changes to the structure of housing finance. For banks, which were the major provider of housing finance, long-term mortgages were illiquid assets. Therefore, once a mortgage loan was made, a new mortgage could not be made until the existing loan was repaid or unless new money inflows occurred. Furthermore, fluctuations in market interest rates, alongside nonperforming loans (NPLs), could cause substantial losses to banks with large holdings of long-term, fixed-rate mortgages.

Such a situation necessitates a financial system that provides protection against losses from mortgages held by banks and ensures the liquidity of mortgage assets. A mortgage guarantee or mortgage payment insurance scheme could be introduced to protect lenders against mortgage losses. A mortgage refinance agency funded by the public sector could also be established to facilitate asset liquidity.

Mortgage refinance agencies or entities, however, have funding constraints. Therefore, they have to raise funds on their own by issuing bonds and notes. Also, they need an effective funding vehicle to meet mortgage refinancing needs above and beyond the amount of funds raised. The most popular instrument are mortgage-backed securities (MBS), which give investors the right to receive cash flows from mortgages and are tradable in capital markets. MBS are the core product in the housing bond market. Covered bonds, which are also known as mortgage-backed bonds, are also housing bonds that are structurally similar to MBS in terms of the underlying asset pool, except that covered bonds are issued by different types of entities.

These are the financial instruments created through the process of securitization so that they can be traded in the capital markets. Investors trading in MBS or covered bonds can be institutions or individuals. Thus, the securities can be used to expand the base of funding for housing finance to include domestic and foreign investors.

The housing bond market refers to a capital market in which debt class instruments are issued and sold to raise funds for housing. Housing bonds are a type of bond classified by the purpose of issue, like social bonds and green bonds, rather than traditional standards such as the type of issuer or method of repayment.

In addition to MBS and covered bonds, there are various types of housing bonds. Government corporations issue debt securities to finance their operations: for example, refinancing existing mortgages, buying mortgages and issuing MBS, and providing guarantees or insurance for mortgages and MBS. These agency bonds are housing bonds as well.

[7] International Union for Housing Finance. Housing Finance. http://www.housingfinance.org/what-is-housing-finance; and Chiquier and Lea (2009).

Both central and local governments may use proceeds from the issuance of government bonds to provide housing finance for housing stability. However, it is difficult to consider these bonds as housing bonds because government bond proceeds are used for various purposes. If the government issues bonds solely for the purpose of implementing housing finance policy, then the bonds can be regarded as housing bonds.

Products and Investor Profile

MBS are generally considered debt securities (or bonds) in the capital market, though they can take different forms other than traditional debt securities (Fabozzi 2016a). The simplest form of MBS are pass-through securities whose structure involves borrowers, a bank (originator), a mortgage servicer, and a special purpose vehicle (issuer of MBS). Investors are entitled to receive cash flows from a pool of mortgages in proportion to the face value of the MBS they own.

But the pass-through MBS may be different from plain vanilla bonds that produce constant cash flows until maturity. This is because the cash flows of MBS vary depending on the method of determining the interest rates of the underlying mortgages and principal payment per period. Furthermore, MBS are subject to high cash flow uncertainty as mortgages are often paid off before maturity or sometimes default.

There are a wide range of MBS products in which different techniques are employed to reduce the uncertainty of cash flows. The most popular are collateralized mortgage obligations and stripped MBS.

Backed by a pool of mortgage loans, collateralized mortgage obligations are structured with multiple tranches separated by credit quality and maturity. Stripped MBS are favored by investors who do not wish to face reinvestment risk arising from multiple cash flow streams from the securities.

MBS use guarantees from guarantee institutions to mitigate credit risk. In this case, guarantees provide protection from investment risk but the guarantee fees charged reduce the rate of return on the investment.

Unlike MBS, which allow the originator to move the underlying mortgages off its books by selling them to the special purpose company, covered bonds are securities backed by a pool of mortgages that remain on the books of the originator. Accordingly, in contrast to MBS whose cash flow stability is determined by the quality of the underlying assets or external credit enhancement, covered bonds are an investment whose creditworthiness is based primarily on the issuer's credit quality and secondarily on the nature of collateral (that is, the underlying assets).

In other words, the issuer of covered bonds pays principal and interest as in the case of nonguaranteed, uncollateralized corporate bonds. When the issuer goes bankrupt, cash flows from the designated ring-fenced pool of assets, on which the bondholders have a priority claim, are used to pay the principal and interest on the covered bonds. While MBS have evolved mainly in the US, covered bonds have developed primarily in Europe.

Another investment product in the housing bond market are agency bonds issued by public corporations established to support MBS issuance. Most of these enterprises are explicitly government-funded, but some are privatized. Nevertheless, a dominant view in the capital markets is that housing agency bonds are guaranteed by the government. At the same time, agency bond yields tend to be a little bit higher than government bond yields.

The government (both central and local) usually covers housing-related expenditure, especially for low- and middle-income households, by means of taxation or government bond issuance because a stable housing market is the backbone of the economy.

In general, the proceeds of government bonds are used to fund not only housing projects but also other public projects. For some economies, however, governments issue bonds to fund housing projects only. These bonds are also government bonds, and thus they receive the same credit rating as the sovereign. If the bonds are different in liquidity from other government bonds, their market price may differ as well.

Also, bonds may be issued by local governments to finance housing projects. Among them, obligation bonds can hardly be classified as housing bonds in that local governments use tax revenues to repay the municipal bonds. On the other hand, revenue bonds whose interest and principal payments are funded by cash flows generated from housing projects can be regarded as housing bonds (Fabozzi 2016b).

Housing bonds, which comprise one class of bonds, are financial products that are issued and traded in the capital markets. This means that these can be an investment alternative for investors pursuing returns. As with other major bonds, housing bonds tend to be traded in large volumes by institutional investors.

Noninstitutional investors with sufficient capital above a minimum investment threshold are allowed to directly buy and sell housing bonds in the wholesale market. Because MBS provide higher divisibility than mortgages thanks to securitization, investors can make small investments through institutional investors acting as housing bond dealers. Moreover, investors can invest indirectly in housing bonds by purchasing beneficiary certificates of investment trusts or mutual funds that include housing bonds in their portfolios.

The main investors in MBS and covered bonds are pension funds and insurance companies. This is because mortgages themselves are basically long-term loans, and structured securities backed by underlying mortgage pools are also issued for longer maturities. Also, pension funds and insurers with long-term debt obligations have strong demand for long-term bonds because of asset liability management.

Hedge funds and asset management firms generally invest in financial instruments with relatively high expected returns (Berliner, Quinones, and Bhattacharya 2016). These institutional investors tend to invest primarily in nonagency MBS.

Investors in housing agency bonds are not much different from those in other agency bonds. Agency bond investors are nearly the same as government bond investors. Given that most investors who want to hold risk-free assets invest in government bonds, investors in housing agency bonds, in practice, include both institutional and individual investors.

Apart from the institutional investors mentioned earlier, commercial banks, asset management companies, and securities companies (investment banks) also invest in housing bonds. Meanwhile, housing bond investment can also be undertaken as part of socially responsible or social impact investing, which has received increased attention in recent years.

Rationale for Developing the Housing Bond Market

Housing finance increases access to home ownership, thereby contributing to the well-being of people through residential stability. Not only that, it enables households to acquire properties that can generate long-term rental income. Housing construction is also known to affect employment, savings, investment, and productivity (Harris and Arku 2006). Funds raised through housing finance system generate demand in the real economy, including the housing construction sector, thereby becoming an important driver of economic growth. Therefore, housing finance development helps facilitate the growth of the economy.

The government may play a leading role in housing finance, in which case funding is mainly made through taxation and bond issuance. Financing via bond issuance can be challenging without a developed bond market. The same is true for funding through housing bond issuance.

From a historical point of view, however, housing finance has relied primarily on private sector capital, mostly bank loans. Such a phenomenon tends to be more pronounced in developing economies, especially those with bank-based financial system. Even in the US, where the housing finance system is most developed, the early stage of the housing finance was bank financing. Currently, however, the US has the world's most developed housing bond market.

We can draw out implications for the housing bond market with respect to the necessity and direction of development from the historical experiences of the US and other developed economies, which have overcome many obstacles.

In the US, mortgage lending was funded by short-term deposits in the early 1900s. Early mortgages were short-term, renewable loans that were secured by collateral. The availability and pricing of mortgages varied across regions, making them insufficient to satisfy the financing needs of potential home buyers. Meanwhile, the default rate for home mortgages originated by banks soared in the aftermath of the Great Depression. During the financial catastrophe that accompanied the Great Depression, bank-based housing finance revealed its limitations in terms of scalability and risk management.

To resolve these issues, the Federal Home Loan Bank (FHLB) was founded in 1932, and the Home Owners' Loan Corporation was established in 1933 pursuant to the Home Owners' Loan Act. The FHLB system, originally comprising 12 local FHLBs, is a government-sponsored enterprise that provides capital for member financial institutions to fund mortgages. Today, it is collectively owned by 11 federal FHLBs, which are each separate, government-chartered, member-owned corporations; members include several kinds of financial institutions in the mortgage-lending business. The Home Owners' Loan Corporation was directed to help home owners refinance existing mortgages to reduce the rate of foreclosure. In response, it introduced long-term, fixed-rate, self-amortizing mortgages. Although these two government agencies assisted the US in overcoming the crisis posed by the Great Depression, they played only a limited role in improving the intended functions of the housing finance system.

Major milestones that reshaped the housing finance system include the enactment of the National Housing Act in 1934, which launched Financial Housing Administration (FHA) insurance to protect approved lenders against losses from mortgage defaults. By enhancing the stability of mortgage loans, these steps paved the way for widening the mortgage supply base.

The creation of the Federal National Mortgage Association (Fannie Mae) in 1938 resulted in an epoch-making expansion of sources of mortgage funding in the US. Fannie Mae was established as a federal government agency to provide a liquidity facility for mortgage lenders in the secondary mortgage market by buying, holding, and selling mortgages.

In 1952, Fannie Mae became a public–private mixed ownership corporation. In 1968, the Housing and Urban Development Act split the old Fannie Mae into a private, shareholder-owned company known as Fannie Mae, and a government-owned corporation, the Government National Mortgage Association, or Ginnie Mae (Weiss and Jones 2017).

Ginnie Mae was created to guarantee the timely payment of principal and interest on privately issued MBS backed by government-insured or guaranteed mortgages. In 1968, the very first MBS were issued and guaranteed by Ginnie Mae (McConnell and Buser 2011).

Fannie Mae, together with the Federal Home Loan Mortage Corporation (Freddie Mac), which was founded in 1970 to support thrift institutions, came to play a major role in the purchase of mortgages that are not guaranteed by the government but meet certain creditworthiness thresholds. (These loans are called conventional conforming mortgages.)

In addition, Fannie Mae and Freddie Mac either hold mortgages from lenders or package them into MBS that may be sold, and then guarantee the MBS they issue. In 1971, Freddie Mac issued its first MBS. For the early MBS, the underlying assets were mostly single-family mortgages before gradually diversifying into multifamily mortgages.

The issuance of MBS by Fannie Mae and Freddie Mac led to the issuance of private-label MBS (also called nonagency MBS). Private-label MBS refer to securities backed by nonconforming mortgages that do not meet Fannie Mae's or Freddie Mac's creditworthiness standards.

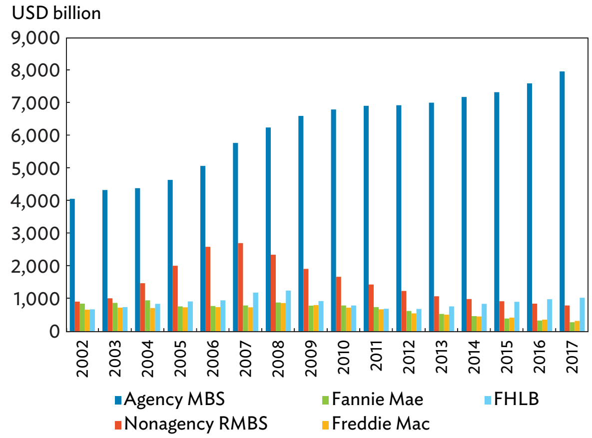
Private-label (or nonagency) MBS were credit-enhanced mainly in two ways. First, external credit enhancement was provided for the MBS in the form of third-party guarantees such as policies provided by insurance companies. Second, internal credit enhancement could be achieved by subordination or credit-tranching. This structure uses a financial engineering technique to divide securities into senior and subordinated (junior) tranches depending on the priority of payment over cash flows of the underlying assets. Overcollateralization was another form of internal credit enhancement.

The emergence of MBS was a breakthrough event that not only expanded the supply side of housing finance from various institutional investors to include the investing public, but also provided risk management tools to mortgage originators.

Promoting housing finance by developing the structured finance market requires the involvement of various capital market entities that carry out a mortgage valuation, provide credit enhancements, undertake MBS issuance activities (including multitranche structuring), collect mortgage principal payments and transfer cash flows to investors, and provide marketing services. For the entities to perform their respective roles properly, it is imperative that a well-developed housing bond market exists.

The level of capital market development may vary from one economy to another. In the US, huge amounts of agency bonds are issued by government agencies to finance their operations. In many economies, housing finance agencies are increasing the share of funding through bond issuance in total funding. Given this, housing bond markets are becoming increasingly important across the world. Finally, the development of a housing bond market, which should be preceded by the adoption of advanced financial products and techniques, is very important for the growth of the real economy as well as the financial sector, including housing finance.

Figure 14: Housing Bonds Outstanding in the United States



Fannie Mae = The Federal Mortgage Association, FHLB = Federal Home Loan Bank, Freddie Mac = The Federal Home Loan Mortgage Corporation, MBS = mortgage-backed securities, RMBS = residential mortgage-backed securities, USD = United States dollar.
Source: United States Securities Industry and Financial Markets Association.

Housing Bond Markets in Advanced Economies

Despite differences in the development process, housing bond markets in most developed economies were created with the securitization of cash flows from loans extended by mortgage originators. The roles of the housing bond market are to expand the supply side of housing finance by providing a wide range of investors with access to the market and to provide risk management tools to mortgage originators. Notably, MBS have grown to become a substantial part of the US housing bond market, whereas covered bonds have driven growth in the European market.

In the US, which is home to the world's most developed MBS market, the volume of agency MBS outstanding grew steadily for decades, reaching nearly USD4.1 trillion in 2002 before slowing in subsequent years in the wake of the subprime mortgage woes and the global financial crisis (**Figure 14**). As the US rode out the crisis through the mid-2010s, agency MBS outstanding volume rebounded to reach USD8.0 trillion at the end of 2017.

In contrast, nonagency residential mortgage-backed securities (nonagency RMBS) grew faster than agency MBS in the pre-crisis period and peaked at USD2.7 trillion in 2007 just before the onset of the global financial crisis. Nonagency RMBS outstanding have since declined sharply, falling to USD0.8 trillion at the end of 2017, reflecting the fact that the increase in securitization of nonagency RMBS was a major triggering factor that led to the crisis.

Among housing agency bonds, the outstanding volumes issued by Fannie Mae and Freddie Mac reached their peaks during the global financial crisis. Since then, they have declined steadily. On the other hand, FHLB bonds outstanding decreased from 2008 until 2012 before rising again. In 2018, FHLB bonds comprised the largest proportion of total housing agency bonds. As a result, the proportion of FHLB bonds traded in the secondary market has been on the rise as well.

In Europe, the role and proportion of covered bonds in the housing bond market has been significant. Twenty-six out of 28 European Union economies had covered bond legislation as of 2014 (Lunde and Whitehead 2016). The total volume of covered bonds outstanding in Europe even increased during the global financial crisis, but subsequently dropped after reaching a peak in 2012. Nevertheless, the outstanding volume of covered bonds backed by mortgages has rebounded since 2015.

Among European economies, Germany has the covered bond market with the longest history and it uses a variety of asset classes as underlying collateral. The German financial market produces covered bonds backed not only by mortgages, but also by underlying assets such as ships and assets in the public sector, among others.

Recently, Denmark became the largest market in Europe for covered bonds backed by mortgages; outstanding covered bonds backed by mortgages accounted for 98.8% of the total covered bond market in Denmark in 2016 (**Figure 15**).

The main issuers of covered bonds in Europe are financial institutions acting as mortgage originators. Since bonds issued by financial institutions are generally classified as corporate bonds, it would be difficult to segment the European housing bond market into agency bonds and nonagency bonds in the same way that the US housing bond market is divided.

In Europe, MBS were introduced in the mid-1980s and have become an important source of funding, especially in Ireland and the United Kingdom. The growth in the use of MBS was supported by the subsidiaries of US financial institutions. The market almost collapsed after the global financial crisis because of the problems experienced in the US, only beginning to recover in 2014 (Scanlon and Whitehead 2011, Lunde and Whitehead 2016).

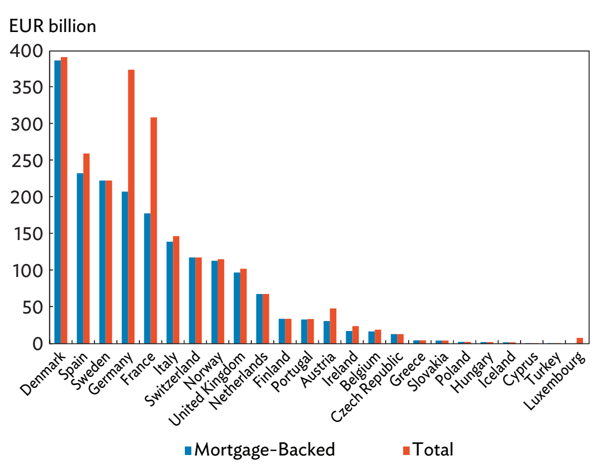
Japan was the first economy in Asia to establish a government housing finance agency, the Government Housing Loan Corporation (GHLC), in 1950. The GHLC provided long-term, fixed-rate mortgages to households through loan originators. Its sources of funding were borrowings from the Fiscal Investment and Loan Program and proceeds from the issuance of agency bonds. The GHLC also provided mortgage insurance to households.

In 2003, the GHLC began to participate directly in the housing bond market with a shift in its business focus to the issuance of MBS backed by mortgages from private mortgage originators. In addition, the GHLC started to guarantee the timely payment of principal and interest on MBS issued by financial institutions. It was renamed the Japan Housing Finance Agency (JHF) in 2007.

The MBS issuance of JHF has steadily increased over the past decade. The outstanding amount of MBS doubled from about JPY6.8 trillion at the end of 2007 to JPY12.7 trillion at the end of 2017 (**Figure 16**), accounting for 10.1% of the total value of mortgages in Japan (JPY125.9 trillion).

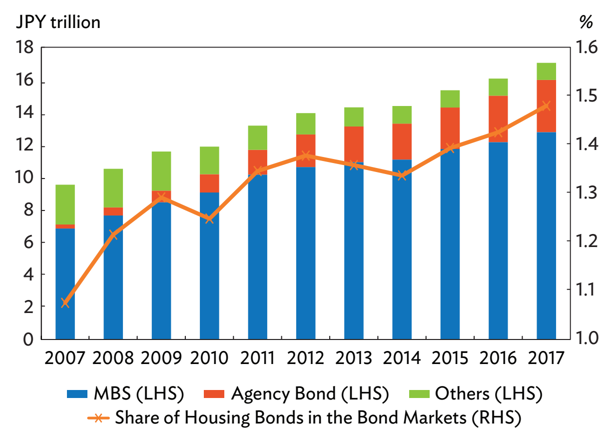
The increase in the amount of agency bonds outstanding has been remarkable. In terms of total bonds outstanding, agency bonds are smaller than MBS but their average annual growth rate between 2007 and 2017 was about 31%, expanding from only JPY0.3 trillion in 2007 to JPY3.2 trillion in 2017. However, this impressive growth rate gradually decreased during the review period. The proportion of other bonds issued by JHF, property accumulation saving scheme-tied housing bonds, and housing land bonds has also gradually decreased.

Figure 15: Outstanding Covered Bonds in the European Union, 2016



EUR = euro.
Source: European Mortgage Federation–European Covered Bond Council. 2017. *ECBC Covered Bond Fact Book 2017*. Brussels.

Figure 16: Growth of the Housing Bond Market in Japan



JPY = Japanese yen, LHS = left-hand side, MBS = mortgage-backed securities, RHS = right-hand side.
Sources: Japan Housing Finance Agency, Japan Securities Dealers Association.

The share of housing bonds in the Japanese bond market, which is dominated by government bonds, is very small. However, the share, which was about 1.1% at the end of 2007, rose to 1.5% at the end of 2017, as the importance of housing bonds in the overall bond market is gradually increasing.

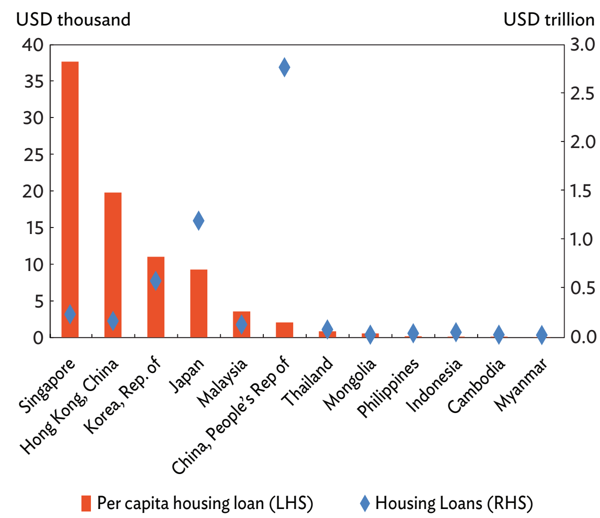
Asian Housing Bond Markets

While per capita incomes in Asian economies are growing faster than those of other parts of the world, the urban population as a percentage of the total population in Asia is lower than on other continents, suggesting that the future rate of urbanization in Asia is expected to be relatively high, along with that of Africa (World Bank 2019, United Nations 2014). Accordingly, such a phenomenon is likely to accelerate housing demand in Asia.

However, in the Asian economies where capital market development is relatively low, housing finance is indirectly channeled by way of commercial bank loans. Such a system is structurally limited in meeting the housing finance needs of home buyers.

The amount of total housing loans tends to be proportional to the gross domestic product (GDP) of each economy, but the amount of individual housing loans actually available to meet housing demand is affected by the level of development of the financial market, especially the capital market. In East Asian economies, as shown in **Figure 17**, relatively higher levels of capital market development lead to higher per capita housing loans.

Figure 17: Per Capita Housing Loans in East Asia



LHS = left-hand side, RHS = right-hand side, USD = United States dollar.
Sources: Total housing loan data from the central bank of each economy; population data from International Monetary Fund. 2015. *World Economic Outlook 2015*. Washington, DC.

Benefits of Housing Bond Market Development in Asian Economies

Capital markets are the mechanisms in which large amounts of long-term funds are raised from a large number of unspecified investors, thereby diversifying investment risks. The development of a housing bonding market enables financial intermediaries to attract more sources of funding and to transfer and diversify relevant risks through securitization and sales of mortgages to investors. In particular, long-term mortgages could satisfy investment demand from pension funds and insurance companies, which mainly invest in long-term instruments. In the case of MBS, mortgage assets are moved from the originator's books, which can help the financial institution better manage its liquidity and risks.

Thus, the development of the housing bond market will lead many Asian economies with bank-oriented housing finance to have a balanced and improved housing financial system. The development of the housing bond market can have several effects on the economy. First, it creates more funding sources for mortgages in Asian economies, which are currently limited to short-term bank savings. The scope of financing sources can be broadened to include domestic and foreign investors, thereby meeting the funding needs of more home buyers.

Second, the funds raised through the housing bond market are also used to finance the supply of housing, leading to expansion in housing construction and an increase in labor demand and income. This ultimately contributes to economic growth. Among academics, for several decades, housing has been regarded as an important contributor to economic growth (Harisa and Arku 2006, Tibaijuka 2009).

Third, the housing bond market, along with its contribution to the growth of the real economy, can contribute to overall financial development by enabling economies with less developed capital markets to experience the benefits of a capital market as a good place to raise large-scale, long-term funds over a relatively short period.

Fourth, with the development of the housing bond market, investors are provided with financial instruments with predictable cash flows and high credit quality. This allows investors to have relatively high expected rates of return and provides risk diversification.

Housing Bond Markets in Asia

Asian economies with relatively developed capital markets, such as Japan, have well-functioning housing bond markets. In contrast, the People's Republic of China (PRC) is an economy whose housing bond market began developing only recently. Thus, its housing bond market is a relatively pioneering and small market compared to the size of the PRC's overall capital market. In some members of the Association of Southeast Asian Nations, the housing bond market exists but does not function properly yet. In other words, housing finance is still provided only through financial intermediaries, primarily banks.

The mortgage market is divided into primary and secondary markets. In the primary mortgage market, a lender extends a loan to a borrower to purchase a house. In the secondary mortgage market, mortgage loans are held or sold (Weiss and Jones 2017).[8] The housing bond market is where housing bonds are issued and traded. Housing bonds include structured securities such as MBS and mortgaged-backed bonds whose underlying assets are mortgages in the secondary market and other securities issued by housing finance entities. The existence of a market for securities backed by mortgages in an economy means that the secondary mortgage market is functioning.

Among East Asian economies, Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; Mongolia; the Philippines; and Thailand have such secondary mortgage markets. These markets are operated mainly by government agencies tasked with securitizing mortgages. Therefore, the analysis of the roles of these agencies is not much different from that of the housing bond market. In the PRC, however, RMBS are issued by multiple financial institutions rather than a government agency. This implies that the structure of the housing bond market in the PRC is different from that of housing bond markets in other economies.

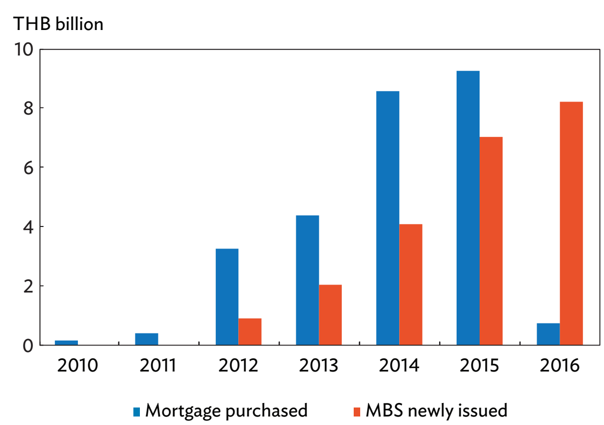
Thailand was first among all Asian economies, except for Japan, in establishing a housing finance agency when it created the Government Housing Bank in 1953. The agency's main focus has been providing housing finance to low- and middle-income households.

It was the establishment of the Second Mortgage Corporation (SMC) in 1997 by the Ministry of Finance that led to the formation of the housing bond market in Thailand. The agency aims to develop a secondary securitization for fund-raising to ensure the adequate and consistent expansion of housing mortgage financing.

In 2012, the SMC began actively buying mortgages from the National Housing Authority and raising its MBS issuance volume to provide opportunities for lower-income people to own homes.

In 2014, the SMC conducted its first public offer of MBS in Thailand, and mortgage purchases and MBS issues increased simultaneously (**Figure 18**). In 2016, mortgage purchases fell sharply due to credit problems in Thailand, but MBS issuances continued to increase. This was in line with the upward trend of local currency nongovernment bonds outstanding despite the overall stagnation of the Thai bond market since 2013 (Asian Development Bank 2016). Nonetheless, the ratio of MBS issuance to Thailand's GDP and the ratio of MBS issuance to housing loans were about 0.1% and 0.4%, respectively, in 2016.

Figure 18: Thailand's Housing Bond Market



MBS = mortgage-backed securities, THB = Thai baht.
Source: Second Mortgage Corporation.

[8] It is distinguished from the terminology in securities markets where the structure in which the securities are newly issued is the primary market and the structure the issued securities are transacted in is the secondary market.

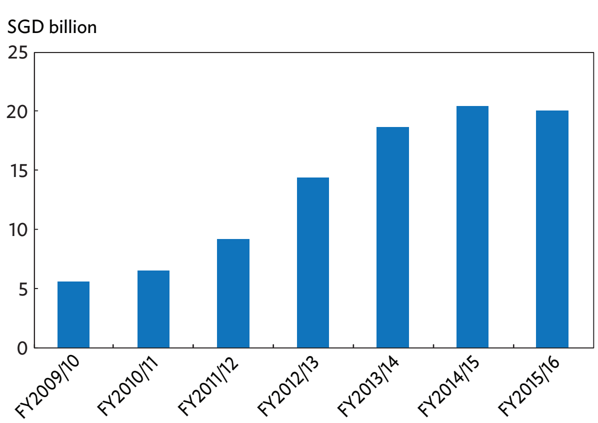
Housing finance in Singapore is implemented by the Housing and Development Board (HDB), which was founded in 1969. As a government-owned entity, HDB offers housing loans at concessionary interest rates to help eligible Singaporeans purchase homes. In addition, HDB provides funds for residential and urban improvements as well as for the development and management of commerce and industry.

Compared to the relatively high development level of the capital market, the growth of the MBS market in Singapore has been poor (**Figure 19**). In spite of its securitization experience and policy support since 1986, Singapore has not been active in the securitization of mortgages due to a high proportion of floating-rate mortgages and high liquidity in the market (Sing and Ong 2004). As a result, the proportion of funding for housing finance through the MBS market remains small.

Accordingly, HDB depends largely on borrowings from the government to finance its operations, but it also raises funds through the issuance of agency bonds. The volume of agency bonds issued under HDB's medium-term note program has increased steadily since the global financial crisis, as opposed to government borrowings, which have declined.

In the Philippines, the secondary mortgage market began in 1979 when the National Home Mortgage Finance Corporation (NHMFC) was established as an operating agency of the then Ministry for Human Settlements. Modeled after Freddie Mac in the US, the agency issued its own Bahayan Certificates and Bahayan Mortgage Participation Certificates with purchased mortgages as underlying assets (Boleat 1985).

Figure 19: Housing Bonds Outstanding in Singapore



FY = fiscal year, SGD = Singapore dollar.
Source: Housing and Development Board.

However, the role of NHMFC as a secondary mortgage institution has been negligible for more than 30 years ever since NHMFC transformed into a mortgage originator in response to a financial crisis in the Philippines in the 1980s. In 2004, the Securitization Act was enacted to develop capital markets through the creation of an asset-backed securities (ABS) market, paving the way for the institutionalization of securitization.

In 2009, NHMFC launched its securitization issue of a PHP2.06 billion Bahay Bond, the first RMBS issued by a government agency in the Philippines. In addition, NHMFC was allowed to purchase housing loans under the Housing Loan Receivable Purchase Program and pool them together to issue MBS. In 2012, NHMFC issued its second Bahay Bond, the first retail MBS in the Philippines.

Compared to NHMFC, which focuses on mortgage purchases and securitization, the Home Guaranty Corporation, a government-owned corporation established in 1950, provides cash flow guarantees for mortgages. The role of the Home Guaranty Corporation in the development of the secondary mortgage market was clarified through the Home Guaranty Corporation Act enacted in 2000.

NHMFC stopped issuing MBS in 2017. To make MBS issuance more active in the Philippines, constraints on MBS issuance need to be addressed, including the high cost of securitization, inadequate credit information on mortgage borrowers, and the lack of institutional arrangements (Ballesteros and Dulay 2013).

Cagamas Berhad, the National Mortgage Corporation of Malaysia, was created in 1986 to promote home ownership and growth of the secondary mortgage market. At the end of 2016, its shareholders were Bank Negara Malaysia (20.0%), commercial banks (72.8%), and investment banks (7.2%).

Cagamas issues agency bonds and MBS—corporate bonds and *sukuk* (Islamic bonds)—to finance the purchase of housing loans (conventional and Islamic) from financial institutions. It is the largest issuer of debt instruments in the domestic capital market.

Two noteworthy features are seen in the issuance of Cagamas debt securities (**Figure 20**). First, the outstanding volume of agency bonds exceeds that of MBS. Second, the difference between the outstanding volumes of agency bonds and MBS has been gradually increasing. Following the global financial crisis, the total volume of debt instruments issued by Cagamas declined until 2012.

However, with a rapid increase in the issuance of conventional agency bonds since then, the proportion of agency bonds that are outstanding Cagamas debt securities, which remained at slightly higher than 70% for years, increased to 88.4% in 2016.

As a result, the portion of Islamic securities (agency bonds and MBS) in the outstanding debt securities declined gradually from 54.0% in 2012 to 36.5% at the end of 2016. Cagamas housing bonds outstanding totaled MYR36.4 billion in 2016, accounting for 7.6% of total housing debt and 2.9% of GDP.

Hong Kong, China's housing finance government agency is the Hong Kong Mortgage Corporation (HKMC), which was established in 1997. The HKMC purchases mortgages from loan originators, such as commercial banks, and provides mortgage insurance. Its businesses are funded through the issuance of agency bonds and MBS, as well as equity capital and credit from the Exchange Fund, which is made up of the government's fiscal reserves.

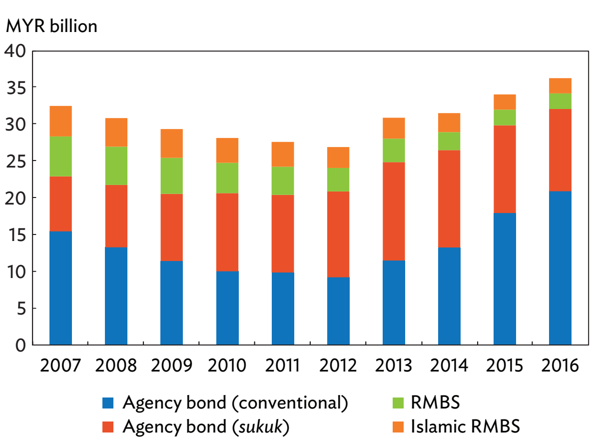
Since 1998, the HKMC has been implementing the Debt Issuance Programme under which it issues HKD-denominated agency bonds, targeting domestic institutional investors. As mortgages, which were on a steady growth path, soared after the global financial crisis, the HKMC launched the multicurrency Medium-Term Note Programme in 2007 to issue agency bonds to foreign investors. In 2001, the Retail Bond Issuance Programme was introduced to attract small domestic investors (HKMC 2017).

The HKMC began issuing MBS in 1999 and launched the Bauhinia Mortgage-Backed Securitization Programme in 2001 (HKMC 2017). However, its MBS outstanding decreased gradually from 2006 until 2013 when it reached zero (**Figure 21**).

The main driver of Hong Kong, China's housing bond market in recent years has been the multicurrency medium-term note, which reflects the globalization of Hong Kong, China's overall bond market. At the end of 2017, the housing bond market represented only about 2.8% of total mortgages in Hong Kong, China.

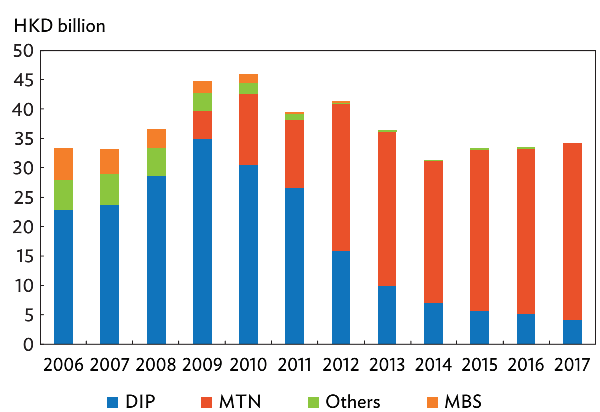
Since its recovery from the 1997/98 Asian financial crisis, which began in the early 2000s, Indonesia has tried to secure sources of funding that match the duration of mortgages, which are long-term loans, amid rapidly increasing housing and mortgage demand. In the wake of the global financial crisis, Indonesia strived to introduce

Figure 20: Cagamas Housing Bonds Outstanding in Malaysia



MYR = Malaysian ringgit, RMBS = residential mortgage-backed securities.
Source: Cagamas Holdings Berhard *Annual Report 2016*.

Figure 21: Hong Kong Mortgage Corporation Housing Bonds Outstanding



DIP = Debt Issuance Programme, HKD = Hong Kong dollar, MBS = mortgage-backed securities, MTN = medium-term notes.
Source: Hong Kong Mortgage Corporation. 2017. *HKMC Annual Report 2017*. Hong Kong, China.

the securitization of assets, including loans, as the way to develop the capital market and solve liquidity problems. However, there were several institutional weaknesses (Ahmed 1998). As a result, the development of the MBS market has been slow.

Established as a wholly owned government corporation in 2005, Sarana Multigriya Finansial (SMF) addressed the need to resolve duration mismatch problems caused by the traditional mortgage supply and demand mechanism, which was dependent on bank-oriented, short-term deposits. SMF was allowed to issue long-term and short-term MBS and/or promissory notes to raise funds from the public to provide housing finance, and to purchase mortgages from financial institutions such as banks. SMF securitized mortgages that it purchased from Bank Tabungan Negara in 2008 and issued its first MBS in January 2009.

Furthermore, SMF was allowed to offer credit enhancement service for MBS. However, the major business of SMF is to provide funds for mortgage originators. A significant portion of the funding is raised through agency bond issuance. SMF agency bonds outstanding in 2016 were about IDR6.5 trillion (**Figure 22**).

As at the end of 2016, the cumulative amount of SMF lending to mortgage originators was about three times the cumulative amount of its MBS issuance. Thus, agency bond issuance, the mainstay of SMF's funding sources, was larger than MBS issuance. Nevertheless, its agency bonds outstanding accounted for less than 0.1% of GDP and 1.8% of total housing loans at the end of 2016.

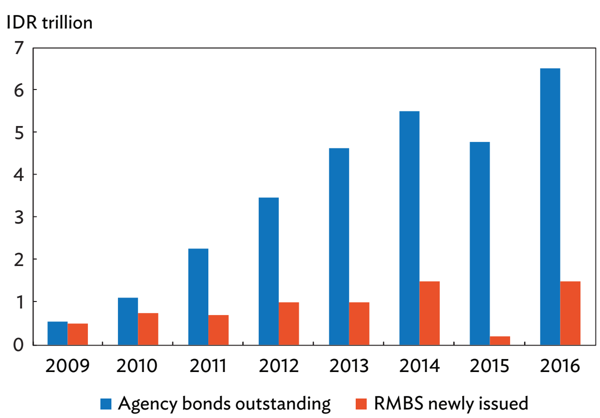
In 2006, the Government of Mongolia established the National Housing Center and the Mongolian Housing Finance Corporation to implement policy on providing low- and middle-income citizens with affordable housing. In the same year, the Mongolian Mortgage Corporation (Mongolyn Ipotekiin Korporatsi [MIK]) was established jointly by the Bank of Mongolia and 10 commercial banks.

MIK issued its own bonds for the first time in 2009. Based on the Procedure on Issuance of Asset-Backed Securities Financial Regulatory Commission enacted in 2011, MIK obtained a license for the issuance of asset-backed securities in 2012 and issued an initial RMBS of MNT322.9 billion in December 2013.

MIK's mortgage securitization has been used as a channel to supply low-interest policy mortgages since 2013. The issuance volume of securitized bonds in Mongolia has increased rapidly since 2015 and is relatively large compared to the Mongolian economy and the development level of the primary housing finance market. In 2015, MIK's RMBS issuance was MNT1.30 trillion, the equivalent of 5.6% of GDP in the same year. On the other hand, the outstanding amount of the MBS was MNT2.12 trillion in 2016, or 8.9% of the same year's GDP (**Figure 23**).

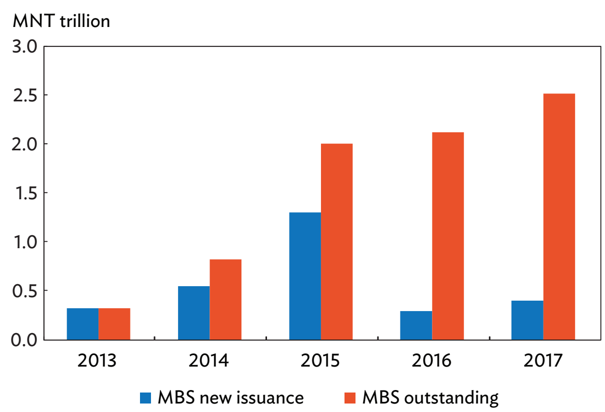
MBS issued by MIK are basically purchased by central banks and commercial banks in Mongolia. Such a structure may contribute to meeting long-term housing

Figure 22: Sarana Multigriya Finansial Housing Bonds Outstanding



IDR = Indonesian rupiah, RMBS = residential mortgage-backed securities.
Source: Sarana Multigriya Finansial (SMF). *Annual Report*. Jakarta (8 years: 2010–2017).

Figure 23: Housing Bond Market in Mongolia



MBS = mortgage-backed securities, MNT = Mongolian tögrög.
Sources: Mongolyn Ipotekiin Korporatsi and Central Bank of Mongolia.

finance demand, but it constrains the expansion of the base for housing finance in Mongolia by diversifying investors in the capital market.

MIK is a member of the Asian Secondary Mortgage Market Association, which was established in September 2014. Along with MIK, the members of the organization are Cagamas Berhad (Malaysia), JHP (Japan), Korea Housing Finance Corporation (Republic of Korea), NHMFC (Philippines), SMF (Indonesia), SMC (Thailand), and the Kazakhstan Mortgage Company (Kazakhstan).

The association aims to provide a platform for the exchange of ideas, opinions, and experiences to improve the conditions for obtaining housing loans and to provide a better quality of life. The association is expected to play an active role in invigorating the housing bond market and in improving housing finance through regional corporation among members.

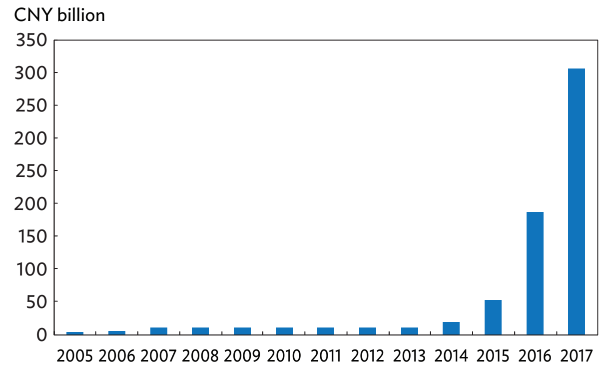
In the PRC, where most housing purchases before the mid-1990s resulted from the sales of welfare housing to sitting tenants by their employers (state-owned enterprises) at low prices, there has generally been little need for a mortgage (Zhihua 2015). Around 1990, housing savings banks and the Housing Provident Fund were established. When mortgages grew rapidly as a result, demand for mortgage securitization also increased, especially among commercial banks.

The PRC's housing bond market began with the issuance of CNY3.0 billion of MBS by the China Construction Bank in 2005 (**Figure 24**). An additional CNY4.2 billion of MBS was issued in 2007. These securitization deals were arranged through trust companies. After the pilot issues, the issuance of MBS was suspended due to the global financial crisis until the Government of the PRC decided to restart the securitization of credit assets in 2012 (Shaoze 2015), which laid the basis for the re-issuance of MBS.

Notably, CNY6.8 billion worth of MBS was issued in 2014 to revitalize the housing market that had started to slow down in 2013. MBS issuance rose sharply in 2016 and reached CNY170.8 billion in 2017, accounting for 10.8% of the PRC's gross ABS issuance volume.

The striking characteristic of the secondary mortgage market in the PRC is that there is little structural difference between the process of issuing MBS and

Figure 24: RMBS Outstanding in the People's Republic of China



CNY = Chinese yuan, RMBS = residential mortgage-backed securities.
Source: China Securitization Analytics.

other ABS, in that financial institutions, such as government-owned banks and commercial banks, directly hand over their assets to special purpose entities that issue MBS and/or other ABS. Therefore, the MBS market structure in the PRC is distinguished from that in other economies in which mortgage securitization is dominated by specific government agencies.

In the PRC, the issuer of MBS who has the right to receive cash flows from underlying assets transferred from the originator is a special purpose trust. This type of securitization is used not only because it is effective in separating MBS investors from the bankruptcy of the originator by transferring assets in the form of a trust, but also because there are many restrictions on the use of a special purpose company (paper company) as an MBS issuer in the PRC under the existing Company Act. Nonetheless, MBS in the PRC are structurally distinct from European covered bonds because mortgages are actually sold to the special purpose trust and mortgages are removed from the originator's books (that is, the transfer is deemed a true sale).

Despite the recent rapid increase in MBS issuance, the housing bond market still comprises a small share of the PRC's housing finance. Considering that mortgage loans amounted to CNY21.9 trillion at the end of 2017, the share of MBS outstanding in housing finance was just 1.5%.

However, the growth potential of the MBS market in the PRC is very strong, given the upward trend in the volume of outstanding mortgages, which have grown at a quarterly average rate of nearly 25% since 2013, and the subsequent liquidity demand from originators.

Among the housing bonds issued in each of the economies mentioned above, the market yields of structured securities, including MBS, are basically determined by the characteristics of the underlying assets.

Agency bond yields may also vary depending on the creditworthiness of the bonds, which is determined by the degree of government support. The reason for the importance of the market yield is its role in determining the funding costs of the issuers and ultimately housing demanders.

MBS, or covered bonds, generally have higher credit ratings than their originators. In the capital market, the credit rating of housing agency bonds tends to be regarded as the same as that of government bonds, regardless of whether government support is explicit or not. Nevertheless, in reality, the agency bonds tend to be traded at a somewhat lower price and yield more than government bonds. For some Asian economies—including Hong Kong, China; India; Japan; the Republic of Korea; Malaysia; Singapore; and Thailand—agency bonds and agency MBS are traded at spreads of 11–57 basis points and 25–71 basis points above government bonds, respectively (Davies, Gyntelberg, and Chan 2007). This may be due to the fact that the credit quality of a government agency cannot be exactly the same as that of the government itself, so the value of agency bonds is considered to be somewhat lower than that of government bonds.

However, there is a view that the difference between yields on agency bonds and government bonds is attributable to the characteristics of the underlying assets, prepayment risk, and/or the smaller issuance volumes of agency bonds than government bonds and the resultant lower liquidity levels (Prokopczuk, Siewert, and Vonhoff 2013; Ejsing, Grothe, and Grothe 2015).

Housing Bond Market in the Republic of Korea

Market for National Housing Bonds

The creation of the housing bond market in the Republic of Korea was driven mainly by the government; that is, the supply side of housing versus the demand side.

As economic growth drove population growth and accelerated urbanization in the 1970s, the Government of the Republic of Korea concluded that the housing shortage being experienced was caused not only by the tighter home-buying budgets of households, but also by the lack of infrastructure for housing supply.

In 1972, the government enacted the Housing Construction Promotion Act. The purpose of this act was to prescribe matters concerning the supply of housing, capital-raising and management for housing supply, and the production and supply of building and construction materials, to ensure the residential stability of the population and contribute to the welfare of the society as a whole.

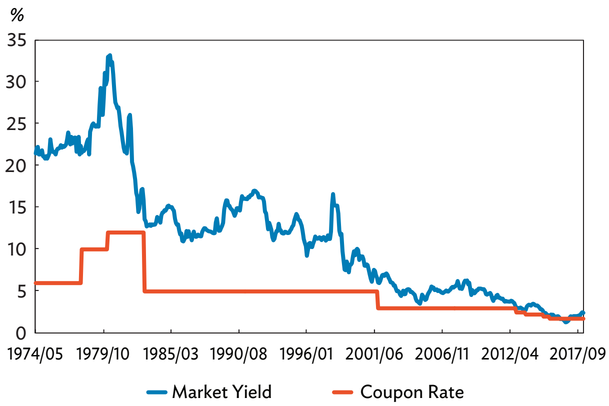
To achieve the objective of the act, various sources of financing were required to create a fund for the construction of affordable housing units (for sale or rent) targeted to nonhomeowners.

The sources of funding for housing construction included borrowings from domestic and foreign governments, and housing subscription deposits. The major source of financing was National Housing Bonds (NHBs). Type 1 NHBs were issued for the first time in 1973, with a 5-year maturity and a 6% coupon. The coupon rate was very low considering that the annual average rate of consumer price inflation for the previous 3 years was about 14%.

For that reason, the issuance of the bonds could not be made based on the price mechanism, which works through demand and supply. NHBs were issued on the basis of mandatory placement, meaning that the purchase of the bonds was required for companies who obtained a license, permission, or authorization related to the construction business from the central or local government, or individuals who applied for registration of their ownership of a property or mortgage.

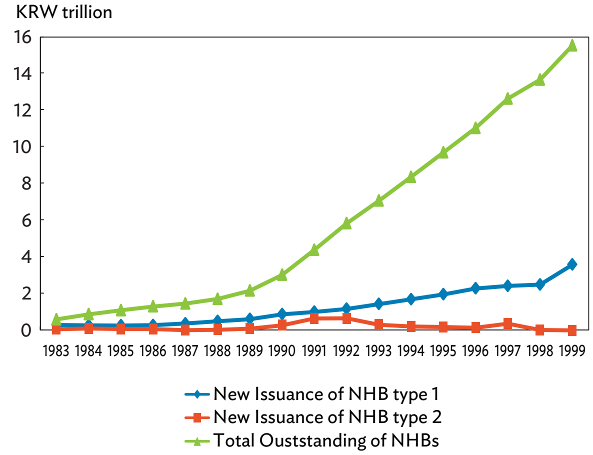
Since then, the coupon rate of Type 1 NHBs has been gradually adjusted in conformity to changes in the overall level of interest rates (**Figure 25**). However, it was always significantly lower than the market interest rate. Such a difference gradually diminished after interest rates were liberalized in the late 1990s. But the coupon rate of NHBs was still lower than that of other government bonds.

Figure 25: Historical Market Yield and Coupon Rate



Sources: Financial Supervisory Service and the Bank of Korea.

Figure 26: Trends in National Housing Bond Issuance and Volume



KRW = Korean won, NHB = National Housing Bond.
Source: Government of the Republic of Korea, Ministry of Land, Infrastructure and Transport.

By issuing bonds with such a low coupon rate, the government was able to obtain low-cost financing for the construction of affordable homes for low-and middle-income families. The issuance helped not only save costs but also redistribute resources.

Type 2 NHBs had a significantly lower coupon rate than Type 1 NHBs, consequently increasing its role in income redistribution. In the 1980s, a cap on the pricing of presale homes was introduced to prevent housing prices from rising. Unexpectedly, house buyers enjoyed large capital gains from the difference between the actual market price and the cap price. The phenomenon was more conspicuous in the case of large private apartments yielding greater capital gains. To collect such windfall gains and facilitate capital-raising for national housing projects, the government introduced a bidding system for Type 2 NHBs, selling private housing units only to bidders who bought a larger amount of the bonds. Type 2 NHBs were first issued in May 1983, having a 10-year maturity and a zero coupon rate.

With the rise in apartment prices, the volume of Type 2 NHB issuance skyrocketed owing to massive demand for the bonds from buyers of presale apartment units built under new town development plans in the Seoul metropolitan area in the late 1980s (**Figure 26**). The increase in new NHB issues further accelerated the increase in the volume of NHBs outstanding, resulting in the expansion of the housing finance market.

As such, NHBs played a key role in financing public housing construction, thereby invigorating the housing market. This, in turn, increased demand for NHBs and expanded financing for housing construction, which created a virtuous cycle as a consequence.

In addition, the housing bond market contributed to the development of the early-stage bond market in the Republic of Korea, especially the government bond market. A lot of NHB purchasers became more familiar with government bonds, and the over-the-counter bond market was also vitalized to meet purchasers' liquidity needs.

Within 2 years since their first issuance, NHBs comprised the largest proportion of new medium- to long-term government securities. In the early 1980s, NHBs accounted for more than 90% of government bonds listed on Korea Exchange. As a result, NHB trades represented the majority of government bond trades on the exchange. Not only that, NHB trading was active in the over-the-counter market too. NHBs were the most meaningful assets for investors who favored safe long-term assets, while corporate bonds dominated the domestic bond market and the majority of government bonds were short-term bonds.

Not only did the NHB market serve as a key engine to vitalize the Republic of Korea's housing finance, but it also shored up the fledgling medium- and long-term government bond market and laid the basis for a developed long-term government bond market mainly composed of Korea Treasury Bonds (KTBs) after the 1997/98 Asian financial crisis. In addition, although the share of NHB issuance in the government bond market has decreased due to an increase in KTB issuance, NHB listed on the exchange stood at KRW68 trillion at the end of 2017, representing 11.1 % of total government bonds outstanding. NHBs are also the most frequently traded debt instrument among retail investors on the exchange because the bonds can be traded in small lots.

Market for Housing Agency Bonds and Structured Bonds Backed by Mortgages

If the NHB market is the housing bond market created with the aim of funding housing supply, the housing agency and MBS market is the housing bond market formed for financing on the housing demand side.

For the Republic of Korea, the impact of 1997/98 Asian financial crisis necessitated asset securitization to efficiently resolve nonperforming assets and restructure distressed businesses. As a result, the Asset Backed Securitization Act was enacted in September 1998. Assets securitized during this time were mainly distressed debt and NPLs.

The experience of nonperforming asset securitization could be applied to the housing finance market. To get the economy out of recession, the government had to implement various policies to revive the economy, including stimulating housing demand.

The Special Purpose Companies for Mortgage-Backed Bonds Act was enacted in January 1999. In September of the same year, the Korea Mortgage Corporation (KoMoCo) was created. Its shareholders consisted of the Korean Ministry of Construction and Transportation, major domestic financial institutions, and overseas investment institutions including the International Financial Corporation.

In April 2000, KoMoCo undertook its first securitization of mortgage loans made by the National Housing Fund, with the technical support of overseas investment institutions. The total par value of MBS was KRW375.6 billion and the MBS structure comprised 10 tranches. Eight of these were senior tranches whose principal and interest payments were guaranteed, while the remaining two were subordinated tranches of KRW28.6 billion in par value whose principal and interest payments were not guaranteed.

The senior tranches were classified by maturity period; the longer the maturity period, the higher the coupon rate. The tranche with a call option attached had a higher coupon rate than the other senior tranches with the same maturity.

A total of nine MBS deals were made by KoMoCo based on mortgages from the National Housing Fund until the transfer of the securitization business to the Korea Housing Finance Corporation (KHFC) was completed in March 2004. Meanwhile, most ABS issues were intended for nonperforming loans (NPL) resolution and corporate restructuring before and after 2000, and nonmortgage assets including primary collateralized bond obligation, secondary collateralized bond obligation, and NPLs were primarily used as underlying assets. Subsequently, the proportion of MBS issuance in total ABS issuance was insignificant before 2004, accounting for only 0.8% of total ABS in 2003 (**Table 5**).

It showed a sharp contrast to developed economies in which mortgages were the main underlying assets. Accordingly, as part of the restructuring of the MBS market, KHFC was founded as a public entity, wholly owned by the government and the Bank of Korea in accordance with the Korea Housing Finance Corporation Act, 2003. KHFC's core activities are to securitize mortgage loans and issue MBS, and to provide credit guarantees for housing finance.

Table 5: Asset-Backed Securitization Issuance by Asset Type
(KRW trillion)

Asset	1999	2000	2001	2002	2003
Securities	0.53 (7.9)	28.64 (58.0)	8.65 (17.0)	1.94 (4.9)	6.88 (17.2)
Mortgage	0.0 (0.0)	1.38 (2.8)	0.84 (1.6)	0.95 (2.4)	0.33 (0.8)
Other Loans (including NPLs)	5.68 (84.0)	18.18 (36.8)	40.56 (79.6)	36.33 (91.2)	31.82 (79.8)
Real Estate	0.56 (8.2)	1.19 (2.4)	0.88 (1.7)	0.61 (1.5)	0.86 (2.2)
Total	**6.77 (100.0)**	**49.38 (100.0)**	**50.93 (100.0)**	**39.83 (100.0)**	**39.88 (100.0)**

KRW = Korean won, NPLs = nonperforming loans.
Note: Percentages are in parentheses.
Source: Financial Supervisory Service.

As a government-owned entity, KHFC was able to raise funds at a lower cost than KoMoCo and provide more credit support for MBS. As a consequence, MBS issuance by KHFC increased sharply.

In 2004, the first year of KHFC's establishment, MBS issuance amounted to just KRW3.0 trillion, but rose to KRW21.7 trillion in 2010 and KRW113 trillion in 2017. In 2009, 2012, and 2015, issuance jumped by more than 50% year-on-year. Such increases were attributed to the selective purchase of mortgages from financial institutions, and the active development of its own mortgage products, which could be used as underlying assets for MBS issued by KHFC.

KHFC launched a new Bogeumjari Loan, its flagship mortgage product, in 2004. It raised loan limits, broadened the scope of eligible houses, and increased participating banks offering Bogeumjari loans over the internet as the demand for housing finance grew in response to the global financial crisis. These contributed to the sharp increase in mortgage loans and the rise in assets that MBS would be based on.

The main driver of the uptick in mortgage loans in 2012 was the release of a Preferential Rate Bogeumjari Loan. Under the loan program, first-time small home buyers were offered preferential rates with the government providing interest subsidies for mortgages. In 2015, however, the surge of Relief Loans launched as part of the government-led mortgage refinancing program was the main contributor to the increase in MBS issuance. A Relief Loan is an amortized fixed-rate mortgage product targeting existing mortgage borrowers who want to switch out their variable rate bullet mortgages. The introduction of this mortgage product was aimed at reducing macroeconomic instability arising from household debt, a large portion of which was comprised of variable rate bullet mortgages.

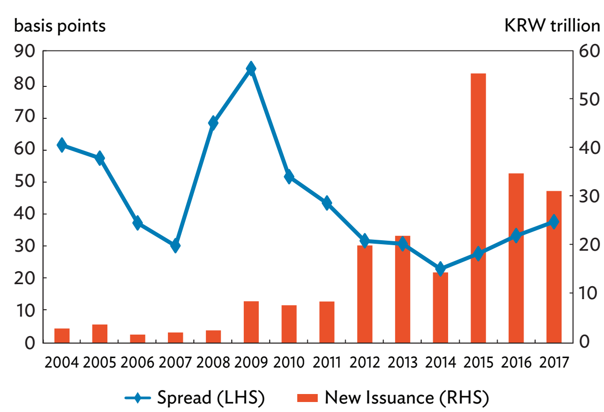
As a result, the proportion of MBS, of which the underlying assets are only the mortgages selected and purchased from financial institutions, reached 33.8% at the end of March 2014 and fell to 23.0% at the end of 2017. On the other hand, the proportion of MBS, of which the underlying assets mainly comprise its own mortgage products, increased to 71.2%.

Unlike NHBs for which the coupon rate—the reflection of the financing cost of bond issuer—is determined by government, coupon interests of the other housing bonds in the Republic of Korea are determined by the market depending on the supply and demand of the bonds. The interest rates of MBS and government agency bonds are determined by the addition of premium to KTB market yields (**Figure 27**).

Meanwhile, KHFC began to issue covered bonds in 2010, with covered bond issuance rising from KRW0.64 trillion in 2010 to KRW0.79 trillion in 2011. With a gradual decline in new issuance, however, only covered bonds denominated in foreign currencies were issued from 2015 onward. In contrast to MBS, which tend to be issued in terms of risk management and agency problems, the issuance demand for covered bonds tends to come from the liquidity problems of financial institutions (Carbo-Valverde, Rosen, and Rodriguez-Fernandezs 2017). In view of the current business structure of KHFC, its own domestic liquidity demand does not seem to be large.

The role of housing agency bonds in the Korean housing bond market, unlike those in many other Asian economies, is small and insignificant because KHFC has rarely issued its own agency bonds since 2012. KHFC has been able to adequately meet demand for housing finance by issuing structured bonds, MBS, and covered bonds in the housing bond market, and also has covered costs and expenses related to the guarantee business through guarantee fee income. For these reasons, there has been little need for KHFC to raise long-term debt.

Figure 27: MBS New Issuance and Weighted Average Spread over KTBs



KTBs = Korea Treasury Bonds, KRW = Korean won, LHS = left-hand side, MBS = mortgage-backed securities, RHS = right-hand side.
Source: Korea Housing Finance Corporation.

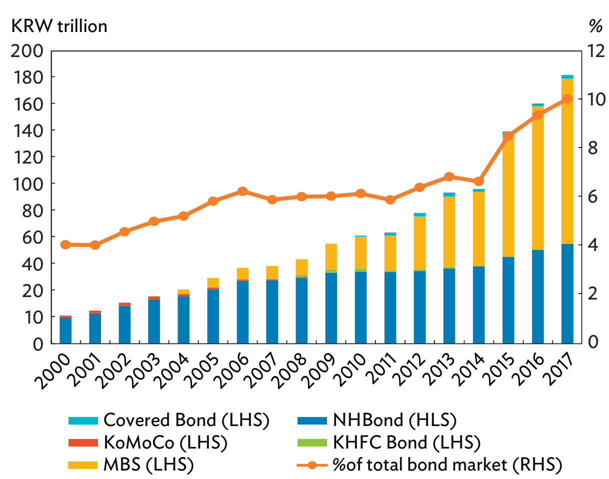
Nonetheless, MBS and covered bonds issues, together with NHB issues, have continued to drive higher the total volume of housing bonds outstanding. Housing bonds outstanding, which totaled KRW18.7 trillion in 2000, soared to KRW183.5 trillion at the end of 2017, representing about 25.5% of the Republic of Korea's aggregate mortgage loans of KRW719.7 trillion and accounting for 10.6% of GDP (**Figure 28**).

As a result, housing bonds are playing an increasing role in the overall bond market as their share of total bonds outstanding rises. Although the share of NHBs in total bond issuance stayed between 3.0% and 5.0% during the review period, the share of housing bonds reached 10.0%. This implies that the housing bond market is playing a growing role in the Korean bond market. It has also contributed to the development of the capital market through the sophistication of structuring securities. Furthermore, the development of the housing bond market has had a positive impact on housing construction in the Republic of Korea.

Conclusion and Policy Implications

Housing demand in Asia is inevitably growing because Asia is experiencing faster income growth and urbanization than any other region. However, there have been limits on the size and tenor of mortgage loans financed by the short-term savings of banks that have provided mortgage systems. To overcome such problems, it is necessary to activate the housing bond market as well as the role of financial intermediaries.

Figure 28: Housing Bonds Outstanding in the Republic of Korea



KHFC = Korea Housing Finance Corporation, KOMOCO = Korea Mortgage Corporation, KRW = Korean won, LHS = left-hand side, MBS = mortgage-backed securities, NHBs = National Housing Bonds, RHS = right-hand side.
Sources: The Bank of Korea; Korea Housing Finance Corporation; Korea Financial Investment Association; and Ministry of Land, Infrastructure and Transport.

The housing bond markets in developed economies mainly comprise MBS issued by government housing finance agencies and covered bonds issued by banks acting as mortgage originators. The former approach began in the US and the latter in Europe. Both markets have developed robustly.

In the US, the housing bond market is overwhelmingly large in terms of size and in the proportion of housing finance. This is attributable to the high demand for housing finance and because the demand is effectively linked to the supply side through a well-established bond market.

The US housing bond market has evolved through trial and error as it has moved from a bank-based housing finance system, in which bank deposits, a short-term funding source, were used to finance mortgages, toward the present form of the market in which long-term mortgages are available and lending sources are diverse thanks to the role of government housing finance agencies.

The US experience provides various policy implications for economies seeking to develop a well-functioning housing bond market. This is because its experience reflects a logical process that has formed the core structure of the housing bond market, including the functions to address various risks—such as credit risk, liquidity risk, and prepayment risk—in traditional bank-based housing finance.

Fixed-rate mortgages and mortgage refinancing were introduced in the early 1930s to manage the default rate for short-term, floating-rate mortgages. These can be used as policy options to manage financial risk in times of economic crisis. On the other hand, the introduction of mortgage insurance schemes to protect mortgage lenders against losses would help reduce credit risk inherent in mortgage lending, thereby curbing the burden of managing risks arising from the asset transformation of mortgage lenders. This policy tool may be used to increase the stability of the mortgage supply.

Thematic Box: Empirical Evidence of the Impact of the Housing Bond Market on Housing Construction in the Republic of Korea

This box provides empirical evidence of the effects of housing bonds on the construction of new housing in the Republic of Korea. Using annual data from 1981 to 2017, the basic association between new housing construction and outstanding housing bonds is estimated by regressing the annual growth rate of new housing construction ($RNHC_t$) on the contemporary and 1-year lag terms for the annual growth rate of outstanding housing bonds (HBO_t and HBO_{t-1}), which include National Housing Bonds, agent bonds, and structured housing bonds such as mortgage-backed securities and covered bonds, among others. The lagged term of housing bonds is included to account for the time lag between securing the funding for housing construction in the bond market and actual construction.

To further explore the impact of the housing bond market in the Republic of Korea, the total number of houses constructed is further divided into housing constructed by the public sector and by the private sector.[a] Public sector housing construction is more consistent with the goal of developing a housing bond market, which seeks to offer low- and middle-income households more opportunities to buy a home.

The estimated results in the table offer a preliminary assessment of the effects of the housing bond market in the Republic of Korea. The estimate of the coefficient of size of contemporary housing bonds outstanding on total housing construction is 0.933, which means that a 1.0% increase in the current year's housing bond market growth is associated with 0.933% growth in new housing construction volume that same year. This estimate is statistically significant at the 5% level. Moreover, consistent with the purpose of setting up a housing bond market, there is clear evidence that the expansion of the housing bond market in the Republic of Korea is associated with growth in public sector housing construction: a 1.0% increase in outstanding housing bonds is associated with a 0.859% increase in public sector housing construction, which is also significant at the 5% level. This impact is not significant in terms of increased private sector housing construction. On the other hand, the effect of the lagged term of outstanding housing bonds does not have a statistically significant impact on total and public sector housing construction; however, it reduces private sector housing construction (significant at the 10% level). This result implies that the expansion of the housing bond market may have a less significant crowding-out effect on future private sector housing construction given the increased public sector housing supply.

Table: Impact of the Housing Bond Market on Housing Construction

	$CRNHC_t$–Total	$CRNHC_t$–Public	$CRNHC_t$–Private
HBO_t	0.933** (2.090)	0.859** (2.122)	1.098 (1.519)
HBO_{t-1}	–7.22 (–1.687)	0.062 (0.161)	–1.257* (–1.814)

Notes: ** is significant at the 5% level and * is significant at the 10% level. Figures in parentheses are t-values.
Source: Author's calculations.

Overall, the empirical evidence shows the direct effects of the housing bond market on the real sector via housing construction. In particular, increased financing through the housing bond market in a period leads to an increase in contemporary total and public sector new housing construction, while also having a crowding-out effect on private sector housing in the next period. This potential crowding-out impact of the housing bond market on private sector housing merits further consideration when assessing the impact of financing housing construction through the bond market, with a focus on providing homes for low- and middle-income households. Further investigation is needed to deepen our understanding of the role of the housing bond market in the real sector of the economy.

[a] The growth of housing bonds outstanding is based on nominal values. The reason for using the number, rather than the value, of newly constructed housing is because the total value of houses is also driven by changing housing prices as well as by housing supply.
Source: Jeong, H. Forthcoming.

It was the role of secondary mortgage agencies established by the government that brought about dramatic changes in the housing finance structure. Nurturing housing finance agencies, such as Fannie Mae and Freddie Mac (MBS issuers) and Ginnie Mae (MBS credit guarantor), can be an effective policy measure to diversify funding sources and lengthen the duration of funding for housing finance. In addition, agency bonds issued to finance their business operations, together with MBS, can be used as a driving force for the advancement of the financial system as well as capital markets through the development of primary and secondary markets.

However, the US experience cannot be applied to all economies because the distorted evolution of the housing bond market—resulting from, among other causes, government intervention, a lack of transparency in the market, and the complexity of financial products—can cause totally unexpected results. The most representative example is the global financial crisis, which was triggered by expansion and derivatization of nonagency RMBS.

MBS are not the only alternative that will lead to the development of the housing bond market. European economies have developed their housing bond markets without the role of a housing finance agency. In some Asian economies, the MBS market has been a major force behind the development of the housing bond market, as is the case in the US. But other economies have achieved the goals of housing finance—including the expansion of mortgage lending, liquidity management, and credit risk diversification—through the issuance of housing agency bonds rather than the expansion of the MBS market. In contrast, the PRC is an economy that strives to facilitate housing finance without specific government housing finance agencies by fostering the growth of the housing bond market underpinned by ABS issuance.

Despite having a large volume of MBS issuance relative to the size of the economy, a country may not be able to accomplish the purpose of housing finance to diversify lending sources. The reason is that MBS issues are highly likely to be repurchased by mortgage originators in the absence of a well-functioning bond market where institutional investors such as pension funds and insurance companies can play an active role.

In addition, demand-side instruments such as MBS are not the only component in the housing bond market. Instruments that enable financing for housing supply can also be an important part of the housing bond market. The positive impact of the housing bond market on housing finance and the real economy has also been proven through the Korean experience.

NHBs have been issued in the Republic of Korea since 1973 under the Housing Construction Promotion Act, which aimed at building affordable housing for nonhomeowners. NHBs not only have contributed to the fund-raising needed to achieve the purpose of the law, but have also remained a major segment of the Korean housing bond market for a long time. This is because the government has adjusted the issuance method and terms and conditions based on the Republic of Korea's evolving economic and financial situations, and it has continued to issue NHBs. The trading of the bonds enabled various market participants to gain and accumulate experiences in the early stages of capital market development. In addition, funds raised via bond issuance at lower than market interest rates perform the function of redistributing wealth through an increased housing supply.

The Republic of Korea's MBS market that started with NPL securitization after the 1997/98 Asian financial crisis has greatly contributed to the higher liquidity of mortgage assets, improved liquidity and credit risk management of mortgage originators, and expansion and diversification of mortgage funding sources through capital markets. This is not much different from the experiences of advanced economies that developed their housing bond markets earlier.

MBS issuance and credit risk management are carried out by KHFC, the government agency. The agency develops mortgage loan products, thereby playing a part in the development of the MBS market.

In addition to MBS, KHFC issues covered bonds, which in turn diversifies housing bonds and contributes to housing finance. The results of the analysis on the effects of housing bond market growth on housing construction in the Republic of Korea are empirical evidence of why developing economies should nurture their housing bond markets.

Conclusively, the housing bond market is not only a means to increase the amount and diversity of housing finance, but also is a pillar of the bond market that plays a role in financial deepening and economic growth. Although the policy direction for developing the housing bond market may be different depending on economy-specific conditions and constraints, the experiences of the Republic of Korea as well as those of developed economies—from which key elements driving the creation of a housing bond market can be identified—provide important policy implications for economies that want to develop their housing bond markets and thus housing finance.

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