



Letting Insurance Asset Data Speak for Itself

Asset Allocations of Life Insurers in Asia





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SPONSOR

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Letting Insurance Asset Data Speak for Itself

Executive Summary

This paper seeks to explain high-level trends in asset allocation of major life insurers across eight Asian markets (China, Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Taiwan, Thailand) over the last four years to 2015, using data collected from various regulatory and audited sources, enriched with subjective commentaries from market participants.

This research aims to compare and contrast some aspects of these Asian markets with the United States. Unsurprisingly, the growth rates, product mixes and investment markets vary across geographies, but one global theme is the current low level of interest rates. This leads to a fundamental challenge in sourcing long-term assets with decent yields and acceptable risks to back life insurance liabilities. Asian insurers can be heavily constrained in what and how much assets they can buy and by the lack of depth and breadth in their respective asset markets. As an example, in Taiwan, the entire government bond market is less than half the size of life insurance industry assets, which is usually not the case for developed markets such as the United States.¹

With an impressive annualized growth of 14% from 2012 to 2015, the assets under management (AUM) for the covered markets reached a recorded \$2.4 trillion (in U.S. dollars). Within the same period, China recorded the highest annualized growth of 17%, while Taiwan and Korea managed to grow AUM at broadly the same speed as developing/emerging markets in the Association of Southeast Asia Nations (ASEAN).

Our data shows signs of decreasing relative exposures to low-risk government bonds, and a shift to riskier asset classes to generate sufficient returns to meet policyholders' reasonable expectations. Over the three years to 2015, the annualized AUM growth for equities and real estate allocations were 28% and 19%, respectively, much faster than that of government bonds at 8%. Yet the demand for government bonds remains strong, given the regulatory advantages and the role of government bonds in interest rate risk management.

Another theme that has affected the asset allocations is the demand for alternatives domestically and internationally—for example, infrastructure debt and foreign investments. We see potential for growth in real estate, given the relatively low allocation into this asset class (2.7% in 2015). The recent wave of deregulation in several Asian markets and the growing size of insurance portfolios allow insurers to invest in large illiquid assets. These emerging topics will be discussed in the case studies of this report, featuring local stories in Taiwan and Korea markets.

Lastly, regulatory frameworks have converged toward risk-based regimes and have strengthened the capital positions of various markets along the way. Duration mismatches continue to expose insurers to interest rate risk and higher-risk capital, particularly in the environment of low absolute levels of interest rates, which may continue for longer than expected.

¹ Data on the size of the Taiwanese government bond market from *Central Government Bonds Issued, Repayable and Outstanding Balance Sheet*, Central Bank of the Taiwan, 4th December 2017, <https://www.cbc.gov.tw/public/data/71251548871.pdf>. Data on Taiwanese insurer AUM from *Table14: The Balance Sheet of Insurance Industry*, Taiwan Insurance Institute, 9th February 2018, <https://www.tii.org.tw/opencms/information/information1/000001.html>.

Acknowledgments

We would like to acknowledge and extend our gratitude to several individuals who have contributed the success of this research.

Steve Siegel and Barbara Scott from the Society of Actuaries provided coordination of this research study.

The Project Oversight Committee provided guidance on the overall objectives of the survey and contributed significantly to the design of the research and the underlying analyses. We thank the committee members:

- Enoch Chow
- Nate DeBoer
- Jenny Jin
- Joseph Kim
- Jessie Li
- David Liu
- Patrick Liu
- Steve Marco
- Ken Seng Tan
- Henry Yim

Industry practitioners provided subjective comments and market feedback via interviews. We would like to thank the following contributors, as well as those who chose to contribute anonymously, for their time and insights:

- Paul Carrett, Group Chief Investment Officer, FWD Group
- Chris Howells, Head of Insurance Solutions, Schroder Investment Management (Hong Kong) Ltd.
- Nancy Kong, Assistant Vice President, Pinebridge Investments
- Yongho Lee, Vice President, Pinebridge Investments
- Helen Leung, Head of North Asia Insurance, Investec Asset Management Hong Kong Ltd.
- Axel Maier, Managing Director–Head of Asia, Macquarie Investment Management
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- Rick Wei, Portfolio Management, MetLife Investments Asia Ltd.
- Guy Yeung, Head of Financial Risk Management, AEGON Asia,

Section 1: Introduction

1.1 Background

In closing the protection and savings gaps from the underserved middle class in Asia, insurance assets have been enjoying significant growth from 2012 to 2015. During these times of low interest rates, fast growth coupled with shifts in product demand, the modernization of capital markets and constant regulatory changes, there has been a general sense that the industry has reallocated toward riskier assets to meet policyholders' return expectations.

While interesting themes and trends are emerging, few have managed to qualify, verify or explain them on the basis of data-driven research. This paper provides a high-level overview of the topic, rather than an in-depth study, to introduce the topic. The purpose of this study is to offer a better understanding of the asset allocations of life insurers across eight of the largest and fastest-growing insurance markets in Asia, as well as the underlying drivers of the observed trends, considering the enhancements in regulatory regimes and asset-liability management (ALM) practices. The overall goal of this study is to attempt to answer the following questions:

- What are the market trends of the major insurance asset classes?
- Are there meaningful differences in the trends across markets, product types and company sizes?
- How significant is any “reaching for yield” activity? How much have companies invested in nontraditional asset classes such as alternatives and overseas investments? How do allocations compare against regulatory limits?

The research will help readers gain a better understanding of the insurance asset management practices in both developed and emerging markets in Asia. It should also provide greater transparency to investment actuaries and to risk and ALM professionals who are either domiciled in Asia or working in an international office with a strategic focus on Asia.

1.2 Scope

This research is a joint effort by research staff of the Society of Actuaries, the project oversight group and the research team. The research primarily consists of two parts:

- A desktop analysis of the asset data of life insurers across eight markets in Asia, including China, Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Taiwan, Thailand
- A series of interviews conducted with industry practitioners to gain a better understanding of the emerging trends seen in the data and to gather potential insights on trends that are not apparent in the data

Following a background section about the selected Asian markets, this report summarizes key findings and observations categorized by five asset types: government bonds, corporate bonds, equities, alternatives and foreign investments.

1.3 About the Data

1.3.1 Database Methodology

At the time of writing, the Insurance Asset Database (hereafter the Asset Database) developed by Coherent Capital Advisors contains the asset data of more than 170 life insurers for the four years ending December 31, 2015, across eight markets in Asia. The Asset Database provides a summary of life insurance asset statistics and regulations based on publicly available information, including (but not limited to) regulatory websites, local insurance bodies and published annual reports. Asset data is presented at three levels of granularity: regional level, market level and company level. Some judgments were required regarding the classifications and hierarchy of assets due to data limitations and/or inconsistencies, as well as to facilitate comparability across companies and markets.

The Asset Database focuses on the invested assets of life insurers, specifically excluding other balance sheet items, such as receivables and intangibles. Investment-linked assets are excluded where the source data is presented separately. Notably, we were unable to separate the data from Indonesia, which combines both general-account and separate-account assets.

All amounts shown in this document have been converted from local currencies into U.S. dollars, at the applicable exchange rates. Unless stated otherwise, “region” refers to the eight markets studied. **Note:** The Asset Database covers the major life insurers (rather than all insurers) in each market. Therefore, the sum of their assets should differ from the market aggregates reported from the public sources.

1.3.2 Interview Approach

To make the research more helpful, we incorporated views from industry practitioners. These views not only offer a more balanced perspective but also assist the understanding of apparent and emerging trends observed in the data. The interviews were stratified across different company sizes, functions and regional focuses.

Participating practitioners were invited to comment particularly on the following topics:

- Investment themes for 2016 and onward
- Overseas versus domestic assets
- China and its demand for assets
- Alternative assets
- Currency and other hedging activities

Section 2: Challenges and Strategies in the Asian Insurance Market

2.1 Overview

This section aims to provide an overview of the region in contrast to the U.S. market, highlighting the regulatory and economic challenges faced by Asian insurers and how they drive the strategic asset allocation backing the liabilities of these insurers.

The U.S. insurance industry has been the largest in the world in terms of premiums and assets under management (AUM). As of the end of 2015, the life and health sector had approximately \$6.3 trillion of assets under management (including \$2.4 trillion held in separate accounts).² Within the \$3.7 trillion of invested assets in general accounts, 74% of this sector is invested in bonds, and another 11% in mortgage loans.³

Compared with Asia, the U.S. fixed-income market is much deeper and wider for debt and credit instruments. While the size of the Asian bond market has been growing, the local markets lack the depth and liquidity for such long-term investors as insurers to effectively manage their interest rate risks. This report aims to highlight how some of the unique challenges faced by insurers operating in Asia may be fundamentally different from those faced by U.S. insurers.

2.2 Challenges

Persistent low yields have been a challenge for Asian insurers. Many traditional long-term insurance products were priced at a time when interest rates were 6% or higher. This was the case in Taiwan, Japan and South Korea, where fierce competition for market share had led to high guaranteed rates offered on some legacy products.

Low reinvestment rates for new money present a headache for Asian insurers that are experiencing tremendous new business growth. Accelerated growth makes asset-liability management (ALM) even more difficult, given the limited investment opportunities.

According to a 2016 BlackRock report, 59% of global investors expect interest rates to remain persistently low over the next 12 to 24 months,⁴ while some investors are tactically investing new cash flows into shorter-duration assets in response to rising interest rates. As shown in Fig. 1, interest rates in the United States and the Asian markets with large life insurance AUM have declined over the 13-year period to end of 2016 by 1% to 2.5%. This occurred particularly since 2008. Yields in Japan turning negative in recent times are well publicized.

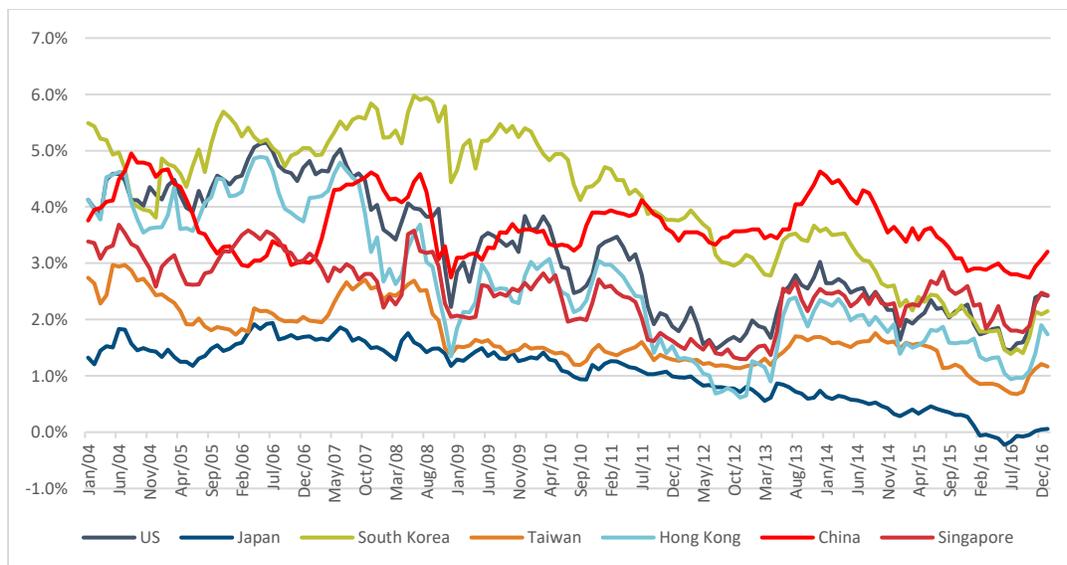
Fig. 1

10-Year Government Bond Yields: Six Selected Asian Markets in Comparison with the United States, January 2004–January 2017

² *Annual Report on the Insurance Industry*. Federal Insurance Office, U.S. Department of the Treasury, 2016, p. 12, www.treasury.gov/initiatives/fio/reports-and-notices/Documents/2016_Annual_Report.pdf.

³ *Ibid.*, p. 22.

⁴ *In the Eye of the Storm: Global Insurers' Investment Strategies 2016*, BlackRock, 2016, p. 9, www.blackrock.com/institutions/en-us/literature/whitepaper/blk-global-insurance-research-sept-2016.pdf.



Source: "Government Bonds," Investing.com, www.investing.com/rates-bonds.

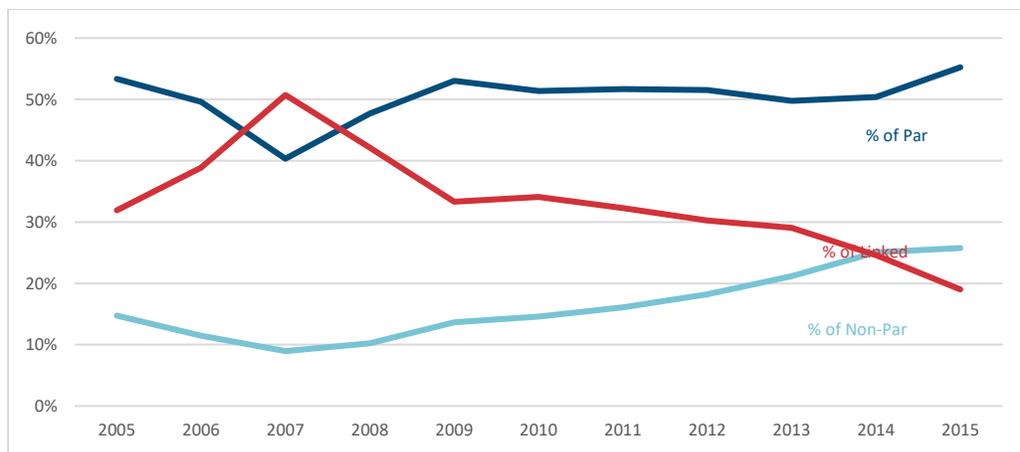
2.3 Product Trends

In developing markets, savings-oriented and participating products have proven popular relative to "pure protection" products. Compared with the United States, most Asian customers are well versed in saving for their retirement and other needs using endowment products, while the idea of drawing down an income stream from their savings is foreign to them. Retirement income solutions such as fixed and variable annuity products are uncommon in the region, except in Japan and South Korea. This may change in the future as the phenomenon of an aging population works its way through the region. In particular, South Korea, Japan and China are aging rather more rapidly than other markets in the region (for example, Indonesia).

The recent rapid accumulation of wealth in Asia has led to strong demand for savings and investment-related products with a protection wrapper. Customers have expectations of attractive returns from life insurance products, based on the high yields shown in policy illustrations.

Participating business has been a significant portion of business for Hong Kong life insurers, contributing to almost half of in-force premiums (see Fig. 2). Investment-linked business has declined for a few reasons. First, since the global financial crisis in 2008, consumers prefer products with guarantees. Second, regulatory measures have been tightened to minimize the potential of mis-selling investment-linked products, particularly via the bancassurance channels. Finally, there has been increasing awareness of the higher fee structures within investment-linked life products, compared with exchange-traded funds.

Fig. 2
Hong Kong In-Force Business: Product Type by Annual Premium Equivalent (APE), 2005–2015



Source: "Annual Long Term Business Statistics," Insurance Authority: Annual Long Term Business Statistics, www.ia.org.hk/en/infocenter/statistics/annual_long_term_business_statistics.html.

In times of high interest rates, insurers could offer high guaranteed returns and consequently provided high long-term returns in policy value illustrations to customers. In recent times, insurers have been pulling levers to maintain profitability amid low interest rates while meeting their obligations to in-force policyholders. Profitability is being squeezed, as investment margin is a key source of earnings for insurers in Asia.

2.4 Strategies

In response to the continued low-interest-rate environment, insurers are moving away from stable, low-yielding fixed income to riskier securities to maintain pricing competitiveness for new business. Diversifying into alternative and illiquid assets is becoming more common. The consensus is that there are few levers left for insurers to pull if yields do not turn around.

Interview Comments

Market practitioners are observing a move into the fringes of various types of assets in this chase for yields. In interviews, they mentioned examples such as the following:

- **U.S. private placement debt.** Insurers in Taiwan, Hong Kong and Thailand are attracted by the higher yields from illiquidity premiums offered by these instruments, which are of high credit quality and are usually recognized as investment grade.
- **U.S. municipal bonds.** The risk/return trade-offs are interesting to some insurers and may be regarded as a proxy for private infrastructure debt.
- **European infrastructure debt.** This asset type carries preferential capital treatment under Solvency II, and the credit ratings are generally in the BBB range.
- **Agency Mortgage-Backed Securities (MBS).** Asset-Backed Securities (ABS) are financial securities backed by a loan, lease, credit card debt or a company's receivables or royalties. A subset of these consists of the agency mortgage-backed securities issued by the three U.S. quasi-government agencies: Fannie Mae (FNMA or Federal National Mortgage Association), Freddie Mac (Federal Home Loan Mortgage Corporation) and Ginnie Mae (GNMA or Government National Mortgage Association). GNMA bonds are backed by the full faith and credit of the U.S. government. The others lack the same backing, but the risk of default is relatively low.

Other themes also emerged:

- *Inflation hedging*

- *Greater use in Hong Kong of repurchase agreements or reverse-repurchase agreements—i.e., effectively borrowing or lending money by using (usually large) U.S. Treasury bond portfolios for short periods, either to enhance yields or to manage liquidity*
- *Implications of further changes in accounting rules, which are likely to reduce demand for equity assets*

Regulatory revisions and ALM modernization across the region constrain what insurers can invest in. This is further fueled by regulatory concerns over the lack of product transparency and mis-selling, coupled with a stronger focus on capital adequacy and efficiency.

Regulatory constraints can limit investment choices directly and indirectly. Direct constraints limit the exposure to certain asset classes or individual counterparties, typically as a ratio of total assets. Indirect constraints can also fundamentally alter the risk-reward trade-off of individual asset classes. Minimum capital requirements apply under certain regimes, as identified in Table 1 (e.g., China Risk Oriented Solvency System (C-ROSS) and risk-based capital (RBC) in Singapore). For a given level of financial resources available, an insurer may need to realign their asset allocations away from more capital-intensive assets for the sake of capital efficiency and compliance. The latest capital regimes in the region in general tend to encourage better asset-liability matching (which can be challenging in Asia) and impose higher capital charges to penalize investments in assets with higher potential volatilities, lower liquidity (e.g., equities and real estate) or lower-quality assets (e.g., debt instruments with lower credit ratings).

Table 1
Solvency Regulation Summary for the Region

Market	Type*	Effective
China	C-ROSS	January 1, 2016
Hong Kong	Solvency margin	June 30, 1997
Indonesia	RBC	January 21, 2009
Malaysia	RBC	January 1, 2009
Singapore	RBC	August 23, 2004
South Korea	RBC	April 1, 2011
Taiwan	RBC	January 1, 2008
Thailand	RBC	September 1, 2011

*RBC refers to risk-based capital.

Source: *Asia Pacific Solvency Regulation: Non-Life Solvency Calculations for Selected Countries/Regions*, Aon Benfield, March 2015, thoughtleadership.aonbenfield.com/documents/201503_apac_solvency_regulation.pdf.

Insurers can take a long time to change their asset portfolios as they operate with complex stakeholder and regulatory considerations. Investment decisions by life insurers are driven by a combination of the assets, liabilities, capital requirements and regulations. Multinational insurers need to manage their capital to multiple sets of requirements: first to meet local requirements and second to satisfy the requirements and meet the expectations of the parent or subsidiaries. There is an increasing shift to focus on metrics reflecting ALM, away from traditional metrics, which focus only on investment performance.

Section 3: Key Findings and Observations

In this section, we share our observations from the information in the Asset Database and offer our findings behind the data. We focus on the information gathered from year-end (YE) 2012 to YE 2015 (inclusive). Beginning with the AUM growth, this section covers the regional asset allocations specifically for each asset class, including government bonds, corporate bonds, equities, real estate, alternatives (infrastructure debt) and foreign investments.

3.1 AUM Growth

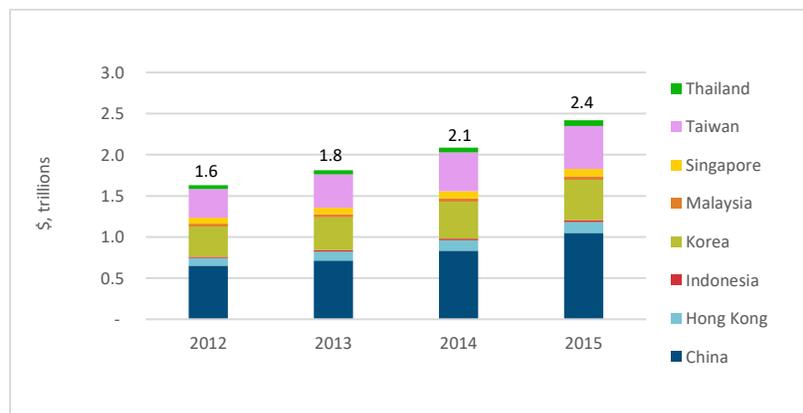
Asian insurers have been experiencing strong AUM growth, primarily driven by swelling middle-class wealth, higher insurance penetration, and stronger and wider distribution channels, particularly traditional agency and bancassurance. The drivers for growth are evident as demographics shift and consumers’ appetite for insurance products increases, especially in savings products. The market with the highest premium growth is China, which between 2013 and 2015 experienced 43% growth in life insurance gross written premiums.⁵

AUM by insurers. As of YE 2015, there were 56 insurers with over \$5 billion in AUM, while another 46 had AUM exceeding \$1 billion. The largest life insurers are mostly in China (China Life and Ping An), Taiwan (Cathay Life), South Korea (Samsung) and the regional hubs in Hong Kong (AIA International). China Life alone has \$321 billion in AUM—exceeding the combined AUM of the insurers in Indonesia, Malaysia, Singapore and Thailand in the Asset Database.

Domestication of markets. The landscape has changed dramatically since the beginning of this century, when multinational insurance groups used to dominate the league table and none of the Asian players figured in the top 20.⁶ After several multinational insurers such as AIG and ING exited the region, domestic insurers have taken over some of the home markets and expanded their footprint in the region.

AUM by market. The combined AUM of the region achieved an impressive cumulative growth of 48.5%, from \$1.6 trillion as of YE 2012 to \$2.4 trillion as of YE 2015 (see Fig. 3). China recorded the highest AUM growth among Asian markets—61.2%, up from \$650 billion as of YE 2012 to \$1 trillion as of YE 2015 (Table 2). During the same time period, relatively developed markets such as Taiwan and South Korea managed to grow AUM at broadly the same speed as “developing/emerging” markets in ASEAN.

Fig. 3
AUM of the Region, by Market, YE 2012—YE 2015



⁵ 2015 Embedded Value Results: Asia (Excl. Japan), Milliman, 2016, p. 11, Figure 10, www.milliman.com/insight/2016/2015-Embedded-Value-Results-Asia-excl_-Japan/.

⁶ Stephan Binder and Joseph Luc Ngai, “South Korea and Taiwan.” in *Life Insurance in Asia: Sustaining Growth in the Next Decade*, John Wiley & Sons Singapore Pte. Ltd., 2013), p. 140.

Table 2

AUM Growth of the Region, by Market, YE 2012–YE 2015

Market	Cumulative Growth over 3 Years to 2015	Annualized Growth over 3 Years to 2015
China	61.2%	17.3%
Taiwan	50.1%	14.5%
Thailand	45.9%	13.4%
Hong Kong	40.2%	11.9%
Indonesia	35.3%	10.6%
Malaysia	34.9%	10.5%
South Korea	33.6%	10.2%
Singapore	23.1%	7.2%
Total (region)	48.5%	14.1%

AUM by asset class. Between YE 2012 and YE 2015, cash and deposits remained relatively flat while government and corporate bonds increased moderately (see Fig. 4). In contrast, equity and loans have more than doubled, increasing by 110% and 144%, respectively (Table 3).

Fig. 4

AUM of the Region, by Asset Class, YE 2012–YE 2015

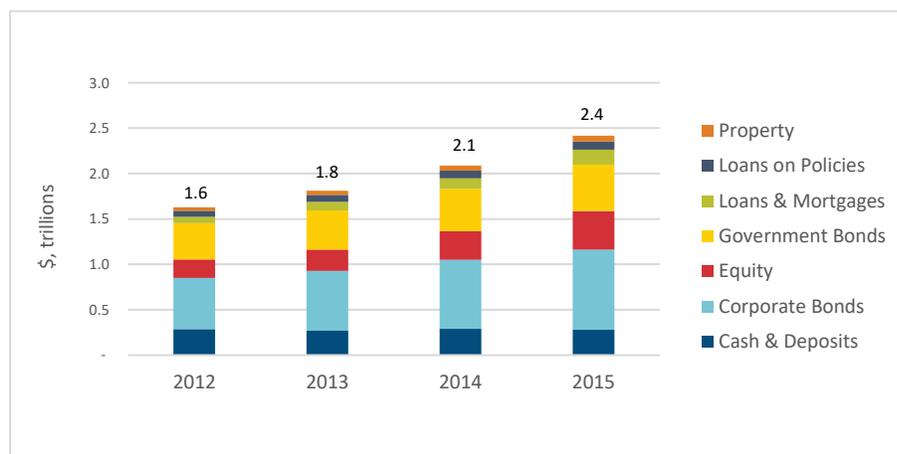


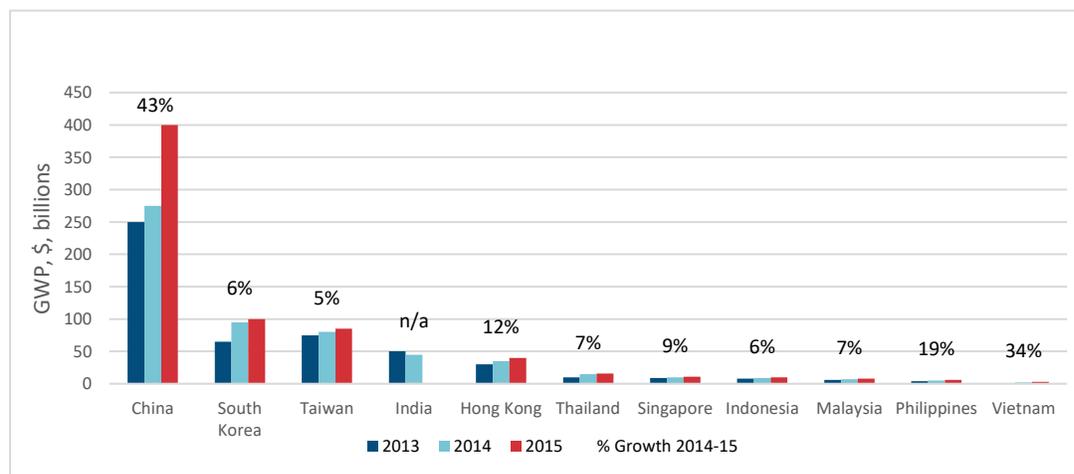
Table 3

AUM Growth of the Region, by Asset Class, YE 2012–YE 2015

Asset Class	Cumulative Growth over 3 Years to 2015	Annualized Growth over 3 Years to 2015
Loans and mortgages	143.9%	34.6%
Equity	109.7%	28.0%
Property	68.6%	19.0%
Corporate bonds	56.4%	16.1%
Loans on policies	32.8%	9.9%
Government bonds	27.4%	8.4%
Cash and deposits	-2.4%	-0.8%
Total (region)	48.5%	14.1%

New money in Asia. As Fig. 5 illustrates, there has been significant growth in premiums. Fast-growing insurers in the region are facing challenges in sourcing assets. Cash can build up due to the lack of investment opportunities, representing 11% of the total AUM as of YE 2015. Local debt markets in Asia are often underdeveloped, lacking depth and liquidity for insurers. In the case of China, direct life premiums totaled \$177 billion as of YE 2014, while only \$5 billion of corporate bonds were issued in the same year.⁷ This is an uncommon problem for mature and efficient markets like the United States, where cash and short-term investments typically represent only 3% of AUM.

Fig. 5
Life Insurance Gross Written Premiums (GWP) in Asia: 2013, 2014 and 2015



Source: 2015 Embedded Value Results: Asia (Excl. Japan). Milliman, 2016, 2015 Embedded Value Results: Asia (Excl. Japan), www.milliman.com/insight/2016/2015-Embedded-Value-Results-Asia-excl_-Japan/.

Advancement slow to catch up with growth. The influx of premiums and the consequential AUM growth have pushed some operational issues to the fore. For instance, some insurers may diversify into new asset classes, which can introduce operational complexity. Other issues could include a shortage of senior experienced investment and risk professionals, underinvestment in business infrastructure (such as front-office, custodian and ALM systems), and risk management culture (such as governance, systems and controls) that lags current best practices in Western developed markets. These issues have an indirect impact on asset allocation, particularly on the appetite for the riskier and alternative asset classes that may require specialized investment teams and more advanced risk management techniques.

The burden of being too big. Some insurers have grown to the point of becoming sizable in a market with relatively closely held or illiquid securities. This can limit the capability of investment managers to add value.

Opportunities for asset managers. The strong growth gives rise to in-house asset managers whereby insurers set up their own asset management company to benefit from scale and fee savings. Examples include Eastspring (part of Prudential Corporation of Asia), Pinebridge (affiliated with FWD) and Manulife Asset Management. External asset managers also service insurers for various asset classes, and we understand these include firms such as BNPIP, Macquarie, Conning, Investec and Schroders (this is not an exhaustive list).

3.2 Variations in Asset Allocations across the Region

The asset allocations for the major life insurers by market across the region are summarized in Figs. 6–7, and Fig. 8 compares them with their counterparts in Japan and the United States. For liability-driven investors such as life insurers, most investments are in fixed income (i.e., 60% to 70%). Allocations to riskier assets depend on several factors, including regulations, capital

⁷ 2014 Insurance Association of China, Industry Statistics, life insurance premiums only.

market, product mix and geopolitical uncertainty in the local markets. Each insurance company is also unique in how it handles multiple sets of books and the implications of any investment decision.

Fig. 6
Asset Allocation by Market/Region, YE 2012

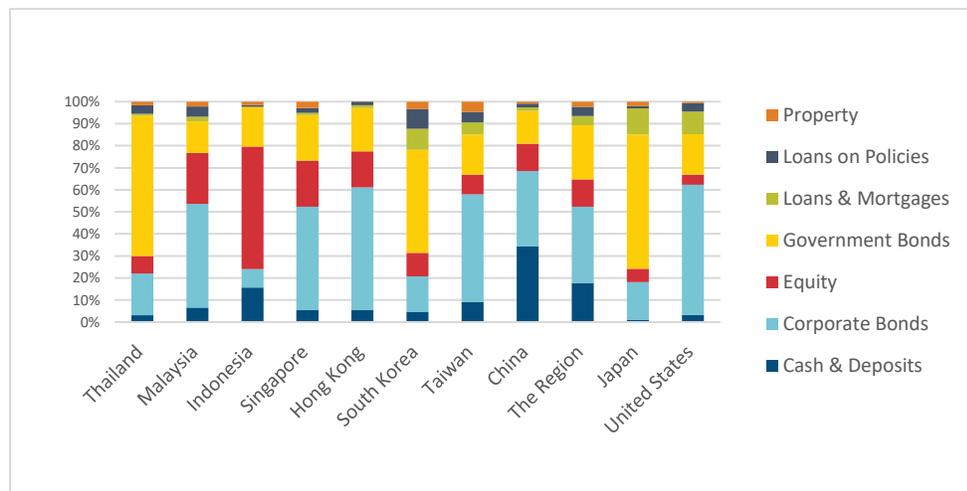
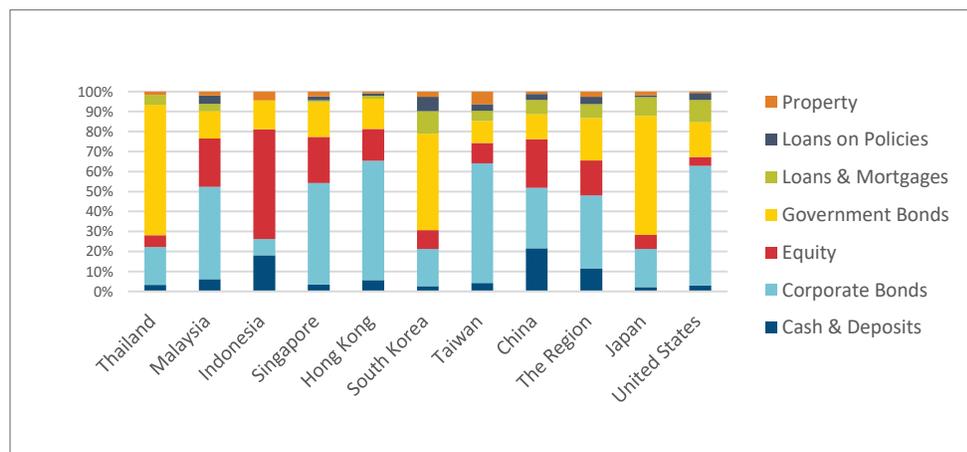


Fig. 7
Asset Allocation by Market/Region, YE 2015



Indonesia is seen to have a high allocation to equities because, as previously mentioned, the data for that market combines both general- and separate-account businesses. Separate-account business dominates in that market and is mostly invested in domestic equities.

Trends in asset allocation. Over the three years to 2015, insurers in the region are generally moving away from cash and deposits, decreasing by 6.0% in asset allocation (in the range of -2.8% to 2.3% by market), and government bonds, decreasing by 3.5% (in the range of -7.3% to 1.6% by market). Between the same period, equity allocations have picked up by 5.1% in the region (in the range of -2.0% to 12.0% by market), mainly attributable to the increase in China of 12.0%. There is no clear and consistent trend for other asset categories as insurers diversify into alternatives. Notable shifts at the market level include Chinese insurers reallocating 5.5% to loans and mortgages (yield enhancement over government bonds), Taiwan insurers reallocating 11.0% to corporate bonds, and Indonesian insurers reallocating 2.9% to real estate.

Fig. 8
Percentage-Point Changes of Asset Allocation in Asset Classes, by Market/Region, YE 2012 to YE 2015

	Thailand	Malaysia	Indonesia	Singapore	Hong Kong	South Korea	Taiwan	China	Total Region	Japan	United States
Cash and deposits	0.1%	-0.5%	2.3%	-1.9%	0.3%	-2.0%	-4.8%	-12.8%	-6.0%	1.1%	-0.3%
Corporate bonds	0.0%	-0.9%	-0.1%	3.8%	4.0%	2.5%	11.0%	-3.9%	1.8%	2.1%	0.9%
Equity	-2.0%	1.3%	-0.7%	2.3%	-0.4%	-1.3%	1.2%	12.0%	5.1%	0.9%	-0.2%
Government bonds	1.6%	-0.5%	-3.5%	-3.3%	-4.6%	1.5%	-7.3%	-2.4%	-3.5%	-1.4%	-1.0%
Loans and mortgages	4.0%	1.4%	0.0%	0.0%	0.3%	1.8%	-0.3%	5.5%	2.7%	-2.4%	1.0%
Loans on policies	-4.0%	-0.5%	-0.9%	-0.4%	-0.4%	-1.8%	-1.3%	1.3%	-0.4%	-0.1%	-0.3%
Property	0.1%	-0.2%	2.9%	-0.4%	0.8%	-0.7%	1.5%	0.3%	0.3%	-0.2%	0.0%

Interview Comments

The market is noting that insurance companies are diversifying into higher-yielding foreign bonds, as regulators across the region are cautiously loosening investment limits on the riskier asset classes (e.g., equity, alternatives, foreign investments) and concentration limits.

Zooming in on China. Chinese life insurers have the largest AUM in the region, holding \$1.0 trillion, or 43% of the region’s AUM as of YE 2015, with cumulative growth of 61.2% over the three years to YE 2015 (see Fig. 9). Asset mixes have evolved rapidly because of the surge in new business, changing market conditions and more relaxed regulatory constraints (e.g., foreign-asset limits were loosened in 2012), as well as a pursuit of higher yields. Insurers held less cash and deposits, down from 34.4% at YE 2012 to 21.6% at YE 2015 (see Fig. 10). Allocation to government bonds had also fallen marginally from 14.8% to 12.4% over the same period. As of YE 2015, China insurers still had the highest holdings of cash and deposits in the region—\$226 trillion, or 81% of the region, partly due to higher domestic money-market rates—but the gradual reallocation to other asset classes with higher expected returns is apparent, as reflected in Table 4.

Interview Comments

Feedback from the market is that historically, insurers in China invested heavily in certificates of deposit or private placements from banks to improve yields, because of limited investment opportunities. However, debt projects with higher yields have emerged in recent years and have somewhat reduced the appeal of deposits.

Fig. 9
China's Changing Asset Allocation: AUM by Asset Class, YE 2012–YE 2015

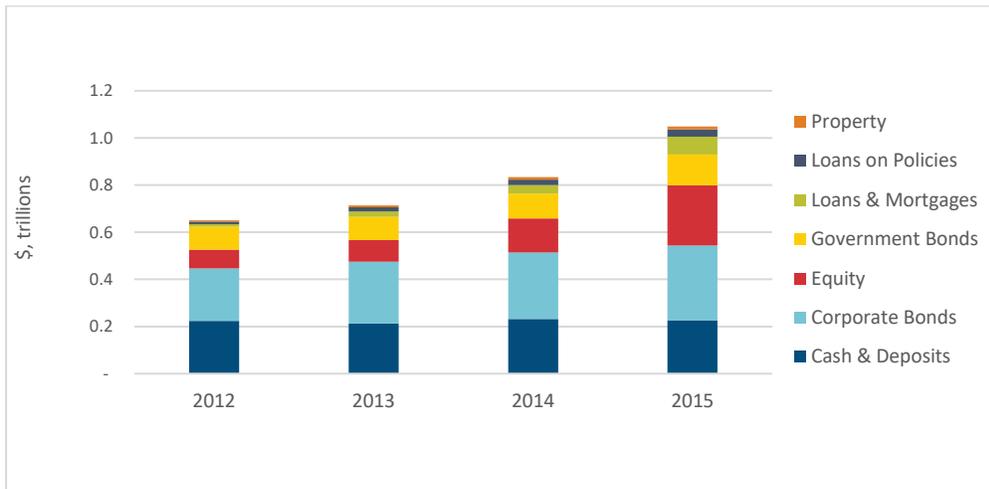


Fig. 10
China's Changing Asset Allocation, YE 2012–YE 2015

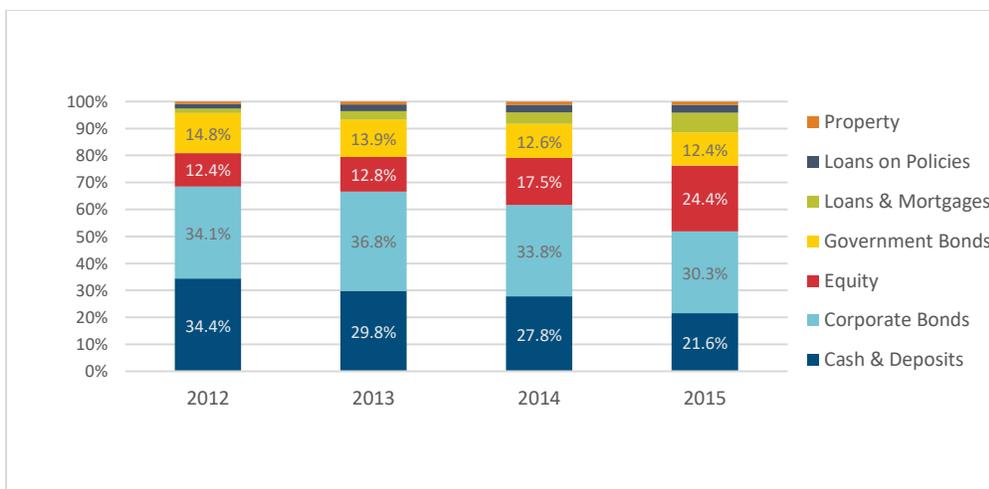


Table 4
AUM Growth by Asset Class in China, YE 2012–YE 2015

Asset Class	Cumulative Growth over 3 Years to 2015	Annualized Growth over 3 Years to 2015
Cash and deposits	1.0%	0.4%
Corporate bonds	43.0%	12.7%
Equity	217.6%	47.0%
Government bonds	34.7%	10.4%
Loans and mortgages	591.0%	90.5%
Loans on policies	176.5%	40.4%
Property	123.7%	30.8%
Total (China)	61.2%	17.3%

3.3 Government Bonds Becoming Less Attractive

The growth in government bond holdings had diminished because of relatively lower yields and constrained supply in some markets. Yet the demand for sovereign debt remains strong, given the regulatory advantages and its role in interest rate risk management.

Of the total public debt securities issued in the top 25 markets, the size of U.S. issues dwarfs those in Asia (see Table 5).

Table 5
Outstanding Debt Securities for Selected Markets, 3Q 2016

Market	Total Debt Securities, * \$, billions
United States	37,859
Japan	13,973
China	9,399
United Kingdom	5,885
France	4,184
Germany	3,460
Italy	3,072
Canada	2,207
Netherlands	2,139
Australia	1,925
Spain	1,839
Korea	1,747
Luxembourg	860
Ireland	809
Denmark	768
Sweden	745
Belgium	681
Austria	498
Norway	457
Hong Kong SAR	405
Russia	399
Singapore	339
Malaysia	332
Thailand	322
Portugal	295
Poland	290
Turkey	270
Finland	262
Indonesia	255

*"Total debt securities" include all public securities issued in domestic and international markets. By sector, they include financial corporations, nonfinancials and general government.

Source: "Summary of Debt Securities Outstanding." BIS Statistics Explorer, Table C1, stats.bis.org/statx/srs/table/c1?p=20163&c=.

The domestic supply of debt securities and credit fundamentals have a direct impact on the amount of assets insurers could allocate to government bonds.

AUM of government bonds. According to the Asset Database, government bonds held by life insurers in the region stood at \$512 billion as of YE 2015, representing 21.2% of the aggregate AUM of \$2.4 trillion (see Fig. 11). Table 6 shows that most of the insurance markets in the region have increased their investments in government bonds. However, Figure 8 shows that as a

percentage of the total portfolio, government bonds has generally diminished. South Korea and China have the largest amount invested in government bonds, as indicated in Fig. 12. Surprisingly, China's allocation to government bonds is only 12%, which is lower than most markets in the region (see Fig. 13). Samsung and China Life accounted for \$80.8 billion and \$55.6 billion in government bonds, respectively. In different markets, government bonds may include state enterprise bonds (e.g., in Thailand) or government agency bonds (e.g., in China).

Fig. 11
AUM of Government Bonds, by Market, YE 2012–YE 2015

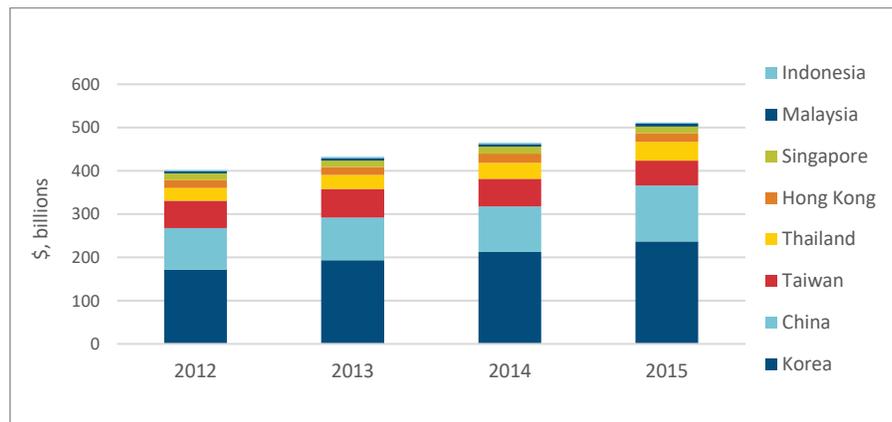


Table 6
AUM Growth of Government Bonds, by Market, YE 2012–YE 2015

Market	Cumulative Growth over 3 Years to 2015	Annualized Growth over 3 Years to 2015
Thailand	49.7%	14.4%
South Korea	38.1%	11.4%
China	34.7%	10.4%
Malaysia	29.7%	9.1%
Indonesia	9.2%	3.0%
Hong Kong	7.5%	2.5%
Singapore	3.2%	1.0%
Taiwan	-10.3%	-3.6%
Total (region)	27.4%	8.4%

Fig. 12
AUM of Government Bonds, by Market, as of YE 2015

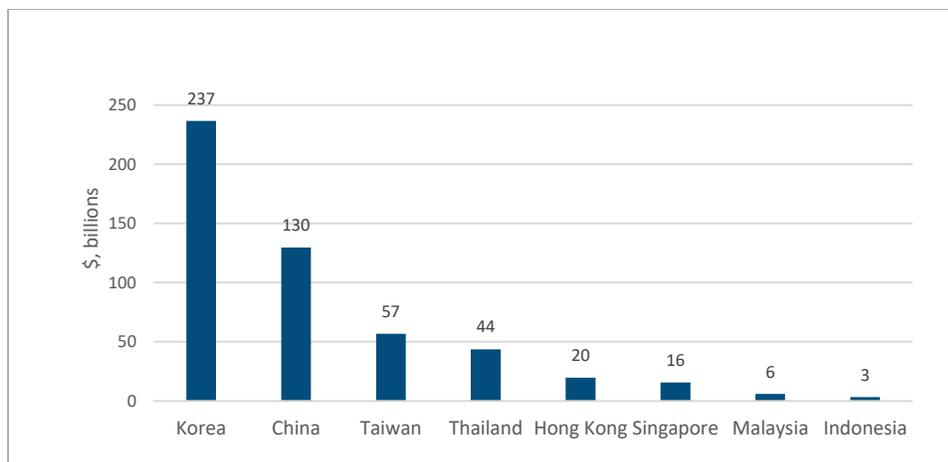
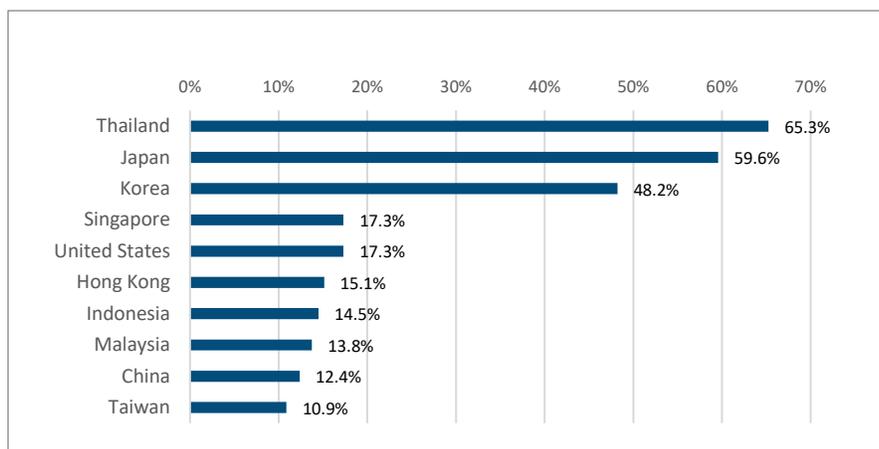


Fig. 13
Insurers' Allocation to Government Bonds as of YE 2015



Government Bond Growth vs. AUM Growth. As shown in Table 7, the cumulative increase in government bond investments was only 27.4% between YE 2012 and YE 2015—a growth rate that lags the 48.5% cumulative growth in AUM. The slow growth can be attributed to persistently low yields and limited supplies. The increase of AUM of government bonds in some markets (South Korea, Malaysia and Thailand) is broadly in line with their overall AUM growth, while other markets have grown them much more slowly. Figure 8 indicates that insurers in South Korea and Thailand have increased the asset allocation to government bonds by 1.5% and 1.6%, respectively, while Malaysia has decreased by 0.5%.

Table 7
AUM Growth in Government Bonds Relative to Overall AUM Growth, 3 Years to 2015

Market	Cumulative Growth over 3 Years to 2015	Overall AUM Cumulative Growth over 3 Years to 2015	Relative Growth of Government Bonds AUM vs. Overall AUM
China	34.7%	61.2%	Slower
Taiwan	-10.3%	50.1%	Slower
Thailand	49.7%	45.9%	Broadly in line
Hong Kong	7.5%	40.2%	Slower
Indonesia	9.2%	35.3%	Slower
South Korea	38.1%	33.6%	Broadly in line
Malaysia	29.7%	32.9%	Broadly in line
Singapore	3.2%	23.1%	Slower

Total (Region)	27.4%	48.5%	Slower
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Impact of Supply/Issuance. According to market practitioners, in some jurisdictions (e.g., Taiwan and Singapore), the gap observed in Table 7 between the growth rate of government bonds held by insurers and their AUM growth rate is the result of stable issuance of government long-tenor bonds being outstripped by the strong-growth insurance assets. In Taiwan, insurers held 32% of outstanding government bonds.⁸

Impact of Yields. Foreign debt with credit and/or illiquidity spreads may offer insurance companies more attractive yields than domestic government bonds, even allowing for the cost of hedging back to the local currency.

Core Asset Class. Government bonds are expected to remain a core asset class for two reasons:

- **“Risk free” under the local regulation.** Regulation is a major driver for the high allocation to government bonds. For instance, the Japanese regulator requires insurers to hold more risk-free assets (about 20% to 40%), and these are forced to hold a significant amount of government bonds. Government bonds are typically regarded as free of credit or liquidity risks under local insurance regulations. Allowing for this favorable treatment, returns may not appear as low on a risk-adjusted basis.
- **Duration matching for interest rate risk management.** Government bonds entail lower asset-related risk charges and are therefore used heavily for duration management. The duration gaps for the major insurers in Taiwan are in the range of five to eight years (see Table 8),⁹ making them highly vulnerable to interest rate risk, especially considering the rather high proportions of liabilities that are of fixed yield in nature. The maximum tenor of Taiwanese government bonds is 30 years, so government bonds are expected to remain an asset of choice to adjust asset durations to match those of the liabilities. A lower duration mismatch carries the benefit of lower capital charges under RBC.

Table 8
Duration Gaps in Five Selected Markets

Market	Guaranteed Products,* % Reserves	Average Guaranteed Rate	Duration Gap**
Taiwan	> 80%	4%–5%	5–8 years
South Korea	> 80%	5%–6%	0–2 years
China	> 80%	2%–3%	N/A
Japan	60%–80%	2%–3%	2–5 years
Hong Kong	60%–80%	2.5%–3.5%	1–3 years

*“Guaranteed products” include long-term non-savings products with interest-rate assumptions embedded in their pricing.

**“Duration gap,” when positive, means assets are shorter than liabilities. The higher the duration gap, the higher the reinvestment risk and the higher the risk in a prolonged period of low interest rates.

Source: “Sector In-Depth: Low Interest Rates Are Credit Negative for Insurers Globally, but Risks Vary by Country,” Moody’s Investor Service, 2015, p. 8, Exhibit 5, www.actuarialpost.co.uk/downloads/cat_1/Moodys%20Report%202015.pdf.

While domestic insurers’ demand for government bonds in the region is expected to remain strong, it is instructive to consider the sovereign credit fundamentals from a global perspective. Table 9 summarizes the long-term foreign-currency credit ratings of sovereign bonds of selected Asian markets (vis-à-vis the United States) by Standard & Poor’s, Moody’s and Fitch at the time of preparing this report.

- From Table 9, Hong Kong and Singapore (highlighted in green) have higher S&P ratings than the United States. Indonesia is rated as below investment grade (by S&P), while Vietnam is rated as below investment grade by all three

⁸ “Taiwan Is Sole Loser in Asian Bonds as Insurers Buy Foreign Debt,” Bloomberg, Sept. 30, 2014, www.bloomberg.com/news/articles/2014-10-01/taiwan-is-sole-loser-in-asian-bonds-as-insurers-buy-foreign-debt.

⁹ Stephan Binder and Joseph Luc Ngai, “South Korea and Taiwan,” in *Life Insurance in Asia: Sustaining Growth in the Next Decade* ([city]: Wiley, 2013), p. 140.

rating agencies (as highlighted for both markets in pink). In the years after the Asian Financial Crisis, Asian markets have worked to increase their foreign-currency reserves, which has helped to lift their sovereign credit ratings.

- On May 24, 2017, Moody's downgraded China's rating to A1 from Aa3 and changed its outlook to stable from negative, as there are concerns over the market's economy-wide debt levels forecast to rise in the future, which can only be slowed via reforms. This was the first downgrade for China since 1989.¹⁰

¹⁰ "Moody's Downgrades China's Rating to A1 from Aa3 and Changes Outlook to Stable from Negative," Moodys.com, May 24, 2017, www.moodys.com/research/Moodys-downgrades-Chinas-rating-to-A1-from-Aa3-and-changes--PR_366139.

Table 9
Long-Term Foreign-Currency Credit Ratings by Major Rating Companies, May 2017

Market	Standard and Poor's	Moody's	Fitch Ratings
China	AA- Negative	Aa3 Negative	A+ Stable
Hong Kong	AAA Negative	Aa1 Negative	AA+ Stable
India	BBB- Stable	Baa3 Positive	BBB- Stable
Indonesia	BB+ Positive	Baa3 Positive	BBB- Stable
Japan	A+ Stable	A1 Stable	A Negative
Malaysia	A- Stable	A3 Stable	A- Stable
Philippines	BBB Stable	Baa2 Stable	BBB- Stable
Singapore	AAA Stable	Aaa Stable	AAA Stable
South Korea	AA Stable	Aa2 Stable	AA- Stable
Taiwan	AA- Stable	Aa3 Stable	A+ Stable
Thailand	BBB+ Stable	Baa1 Stable	BBB+ Stable
Vietnam	BB- Stable	B1 Stable	B+ Stable
United States	AA+ Stable	Aaa Stable	AAA Stable

Investment grade when better or higher than:	BBB-	Baa3	BBB-
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While government bonds held by a domestic insurer may be regarded as free of default risk in the eye of the local regulator, the default risk may not necessarily be zero if the insurer's parent is domiciled overseas. Upon consolidation at the group level, the parent may find itself incurring capital charges for the sub-investment-grade government bonds held by its overseas subsidiaries and branches. Such asymmetric treatment between jurisdictions adds a layer of complexity to determining the asset allocation downstream. Subject to any direct or indirect local regulatory constraints, it may be more advantageous for the local entity to hold corporate bonds instead of government bonds after allowing for the capital impact at the group level.

3.4 Corporate Bonds Chasing Higher Yields

In their pursuit of higher yields, market practitioners are noting that insurers are moving down the credit spectrum and shifting their exposure from government bonds to corporate bonds, subject to local regulations and corporate risk tolerance. Corporate bonds can be an attractive asset class, but the depth and breadth of ratings within the region remain limited. Therefore, the use of foreign credit assets (currency hedged back to the domestic currency) may be the preferred investment strategy.

Compared with the United States, most local corporate bond markets in the region are relatively underdeveloped and illiquid, as evidenced by a relatively high bid-ask spread. In contrast, close to 60% of the AUM of life companies in the United States are invested in corporate bonds with long durations and/or acceptable credit spread for the risks taken.

Corporate bonds covered by the Asset Database totaled \$811.2 billion as of YE 2015 (see Fig. 14), representing 34% of the aggregate AUM of these insurers (\$2.4 trillion). The top five investors in corporate bonds are in China and Taiwan, with Ping An and Cathay Life holding \$88.0 and \$78.3 billion, respectively, in corporate bonds. These two markets hold the largest AUM of corporate bonds, as illustrated in Fig. 15, while Taiwan and Hong Kong hold the largest proportion of corporate bonds in the region (see Fig. 16).

As shown in Table 10, the cumulative growth in corporate bonds held was 56.4% over the three years to YE 2015, outstripping the growth in both government bonds (27.4%) and overall AUM (48.5%). Taiwan has the largest allocation to corporate bonds, in terms of both absolute and percentage of AUM (see Figs. 15 and 16).

Interview Comments

Market feedback is that U.S. insurers invest in fixed income because the U.S. bond market is wider and deeper, and some fixed-income products can provide a relatively high return.

Fig. 14
AUM of Corporate Bonds, by Market, YE 2012—YE 2015

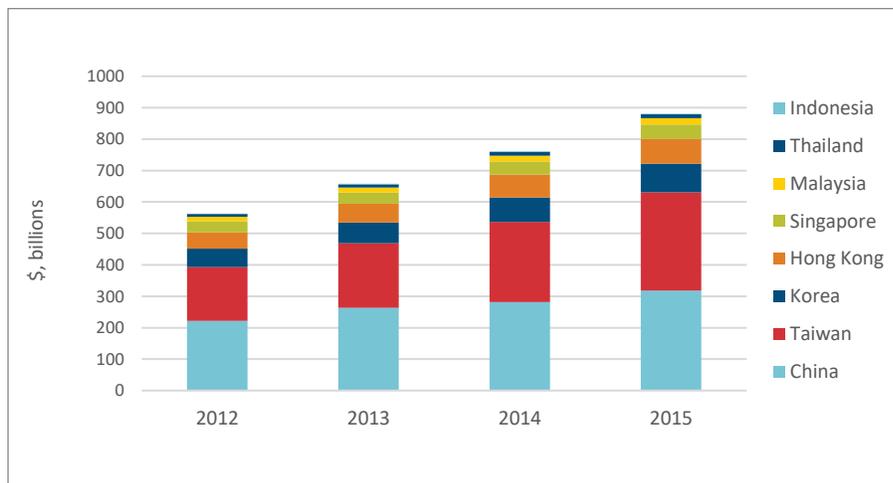


Table 10
AUM Growth of Corporate Bonds, by Market, YE 2012—YE 2015

Market	Cumulative Growth over 3 Years to 2015	Annualized Growth over 3 Years to 2015
Taiwan	83.8%	22.50%
South Korea	54.8%	15.69%
Hong Kong	50.3%	14.55%
Thailand	46.1%	13.46%
China	43.0%	12.67%
Indonesia	33.4%	10.09%
Singapore	32.9%	9.95%
Malaysia	32.2%	9.76%
Total (region)	56.4%	16.07%

Fig. 15
AUM of Corporate Bonds, by Market, as of YE 2015

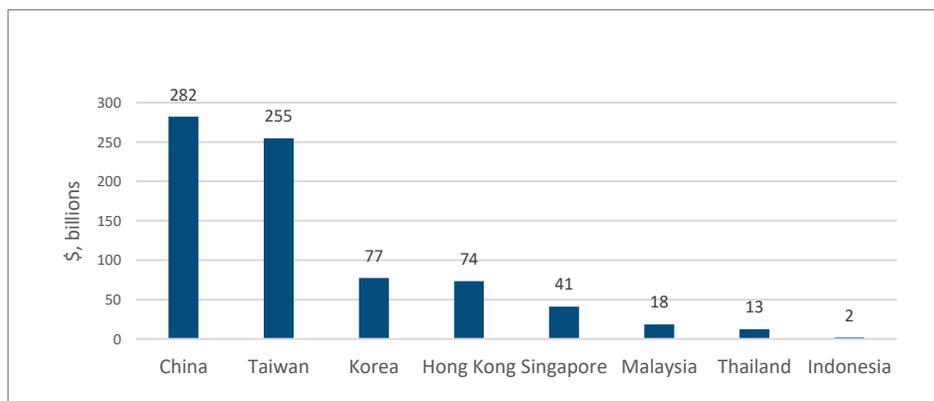
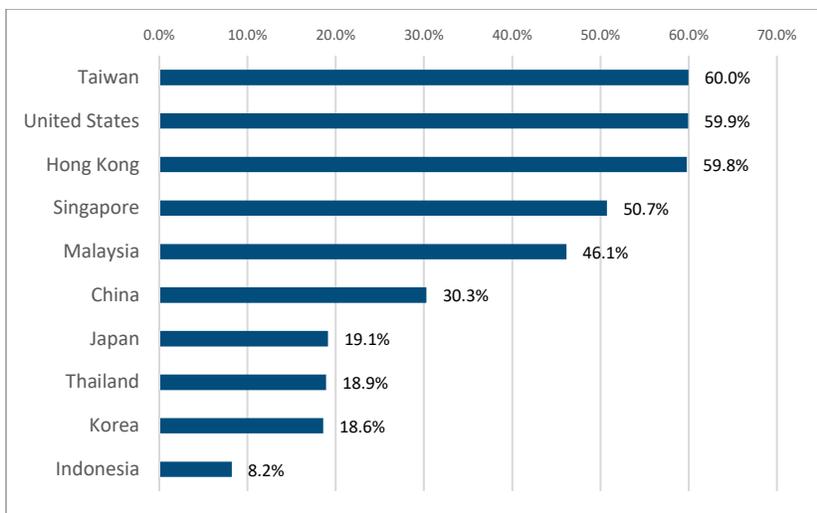
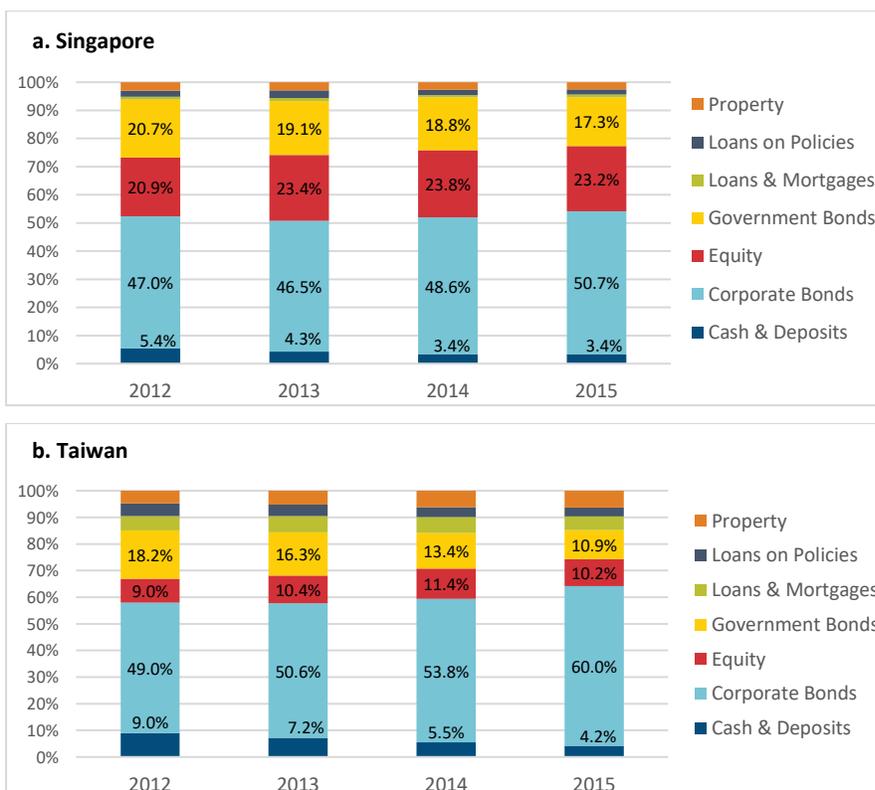


Fig. 16
Insurers' Allocation to Corporate Bonds as of YE 2015



Half of AUM in Corporate Bonds. Singapore insurers invested half their assets in domestic and foreign corporate bonds, increasing from 47% as of 2012YE to 51% as of 2015YE (see Fig. 17a). The prominence of this asset class is even higher for Taiwan insurers, whose allocation was raised from 49% to 60% over the period (Fig. 17b).

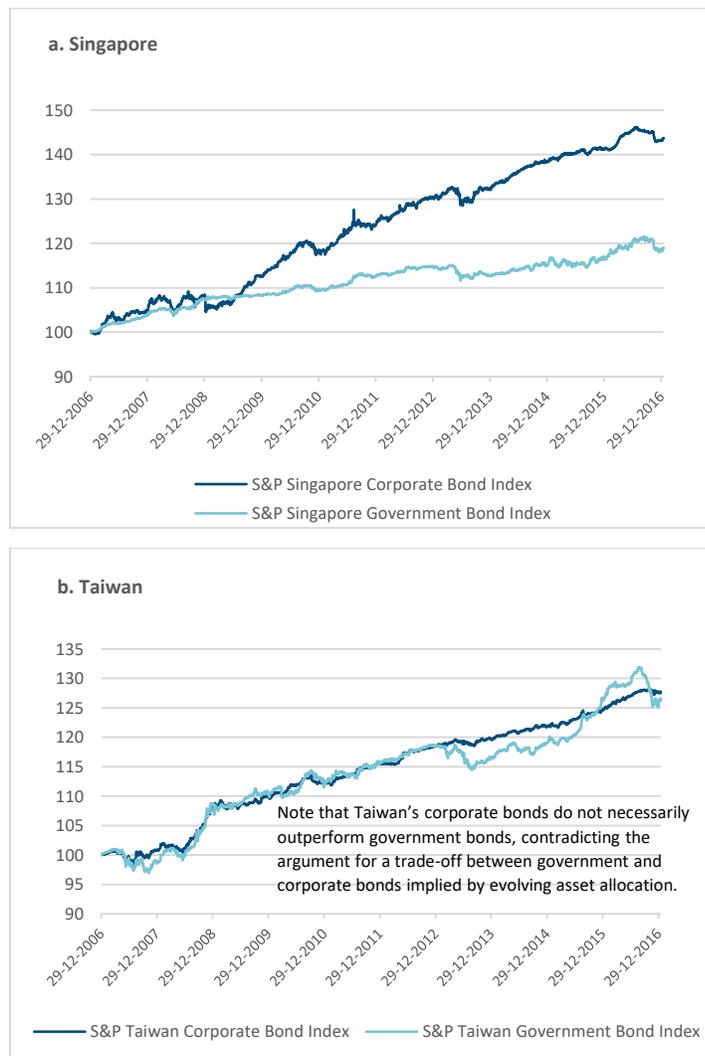
Fig. 17
Asset Allocation, Singapore and Taiwan, YE 2012–YE 2015



Yield Pickup. The increased allocation to corporate bonds (as seen in Figures 17a and 17b) was primarily driven by the depressed yields on government bonds. The changing asset allocation shows the shift from government bonds to corporate bonds for both markets, which can be explained by the underperformance of government bonds as shown in Figs. 18a and 18b.

Fig. 18

Performance of Government and Corporate Bonds, Singapore and Taiwan, YE 2006–YE 2016



Credit Risk Penalized by New Risk-Based Capital (RBC) Frameworks. The case against corporate bonds is that they are generally not as capital-efficient as government bonds under a risk-based capital regime. In fact, newer RBC regimes (e.g., Solvency II and the second wave of RBC regimes in Asia) tend to penalize credit-related assets—particularly those below investment grade—to make them far less attractive on a risk-adjusted basis. For instance, the capital charge for junk bonds in Thailand changed from 12% under RBC1 to 46% under RBC2. Moreover, long-term credit tends to carry higher risk charges than short-term credits under RBC in some jurisdictions, as the likelihood of a default or downgrade (e.g. from BBB– to BB+) increases with bond tenors—i.e., there is a longer time of exposure to the credit risk.

Better Credit Risk Management. Regional insurers have been enhancing their internal credit risk management capability, particularly in aggregating and measuring credit exposures against practical limits that link to risk appetite, internal credit rating, and nonrated bonds. Using credit to enhance yields and/or perhaps to extend asset duration may reduce the mismatch risk

charge at the expense of higher credit risk charges. With the enhanced modeling capabilities in the region, some insurers can evaluate more options/scenarios and optimize capital allocation between interest rate and credit risks.

3.5 Increased Equity Content for Higher Returns

In this section, we look at the equity holdings in the region compared with the U.S. market. The fast-growing market capitalization of the Asian exchanges allows for increased holdings and performance for insurers with this asset class. We also noted that equity is one of the common asset classes for meeting different returns under participating life products.

Asian economies continue to have strong fundamentals and deliver strong growth in the region. Consequently, the equity market outlook remains positive. A list of the top 20 stock exchanges (grouped by market) and their market capitalizations as of YE 2016 is shown in Table 11 to put the U.S. market into context relative to Asian markets.

Table 11

Market Capitalization of World's Top 20 Stock Exchanges as of Dec. 31, 2016

Market	Exchange(s)	Market Capitalization, \$, billions
United States	NYSE & NASDAQ	27,352
China	SSE & SZSE	7,311
United Kingdom	LSE	5,552
Japan	TSE	4,955
European Union	Euronext	3,460
Hong Kong	HKEX	3,193
India	BSE & NSE	3,106
Canada	TMX	1,994
Germany	Deutsche Börse AG	1,716
Switzerland	SIX	1,403
Australia	ASX	1,268
South Korea	KRX	1,255
Northern Europe	OMX	1,248
South Africa	JSE	951
Taiwan	TSE	844
Brazil	BM&F Bovespa	759
Spain	BME	705

Source: *WFE Annual Statistics Guide 2016*, Table 1.1, "Domestic Market Capitalisation," World Federation of Exchanges, www.world-exchanges.org/home/index.php/statistics/annual-statistics; for United Kingdom, London Stock Exchange, *Main Market Factsheet*, December 2016, Table 9, Market Summary. LSE Historical Factsheets, www.londonstockexchange.com/statistics/historic/main-market/main-market.htm.

The equity markets across Asia are generally (but not always) more volatile than the U.S. market. To put this into perspective, Table 12 compares the volatility of the returns of the commonly used stock market price indices over the three years to YE 2015 with the S&P 500. Markets with relative volatility below 1 (compared with the United States) are highlighted in green, those that are between 1 and 1.5 and between 1.5 and 2 are highlighted in yellow and orange, respectively, and those exceeding 2.0 are highlighted in red.

Table 12

Volatilities of Various Asian Equity Indices, Jan. 1, 2012–Dec. 31, 2015

Market	Equity Index	Annualized Volatility
--------	--------------	-----------------------

		in Local Currency	Multiple of U.S. S&P 500 (10.5% p.a.)
China	CSI 300 Index	27.8%	2.7
Hong Kong	Hang Seng Index	18.0%	1.7
India	S&P BSE Sensex Index	14.0%	1.3
Indonesia	Jakarta Composite Index	13.6%	1.3
Japan	TOPIX Index (Tokyo)	17.8%	1.7
Malaysia	FTSE Bursa Malaysia KLCI	7.7%	0.7
Philippines	PSEi - Philippine SE Index	18.0%	1.7
Singapore	Straits Times Index (STI)	12.3%	1.2
South Korea	KOSPI Index	10.2%	1.0
Taiwan	Taiwan TAIEX Index	12.9%	1.2
Thailand	Stock Exchange of Thailand Index	14.4%	1.4
Vietnam	Ho Chi Minh Stock Index	19.4%	1.9

Source: Calculated from monthly price index data sourced from Bloomberg.

Equity allocations for the region’s life insurers at YE 2015 stood at \$424.2 billion (see Fig. 19). “Equities” include listed and unlisted stocks, as well as holdings in listed and unlisted trusts, funds and collective investment schemes (CIS).

As shown in Fig. 19 and Table 13, this asset class experienced the strongest growth over the three years to 2015 and has more than doubled. The biggest contributor was China insurers, which tripled their holdings, followed by Hong Kong, Malaysia and Singapore (see Figs. 20 and 21). The apparently high value of equity holdings for Indonesia is due to its separate-account business and has been disregarded.

Market practitioners have pointed out that insurers in China appear to be turning away from high-yield onshore bonds toward equities in pursuit of expected returns, as the credit quality of domestic corporate bonds is typically low. This contrasts with U.S. practice, where insurers prefer to take credit over equity risk to achieve higher returns.

Fig. 19
AUM of Equity, by Market, YE 2012–YE 2015

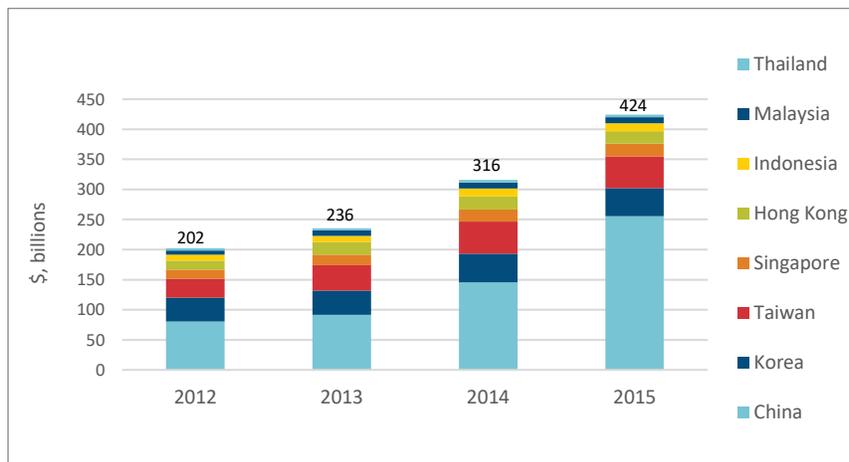


Table 13
AUM Growth of Equity, by Market, YE 2012–YE 2015

Market	Cumulative Growth over 3 Years to YE 2015	Annualized Growth over 3 Years to YE 2015
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China	217.6%	47.0%
Taiwan	71.0%	19.6%
Malaysia	42.5%	12.5%
Singapore	36.7%	11.0%
Hong Kong	36.7%	11.0%
Indonesia	33.7%	10.2%
South Korea	17.1%	5.4%
Thailand	9.9%	3.2%
Total (region)	109.7%	28.0%

Fig. 20
AUM of Equity, by Market, as of YE 2015

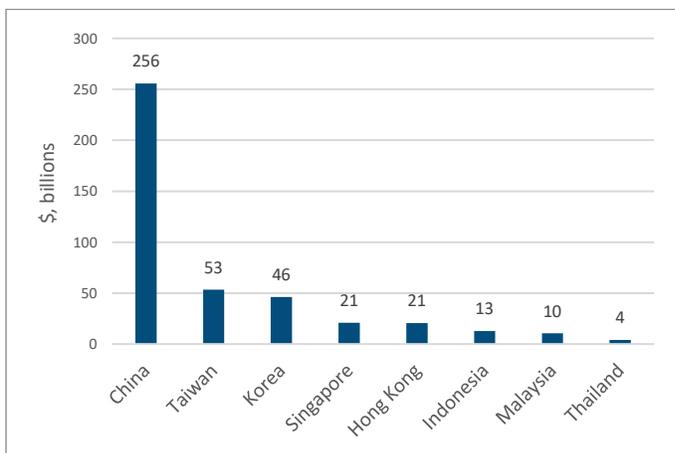
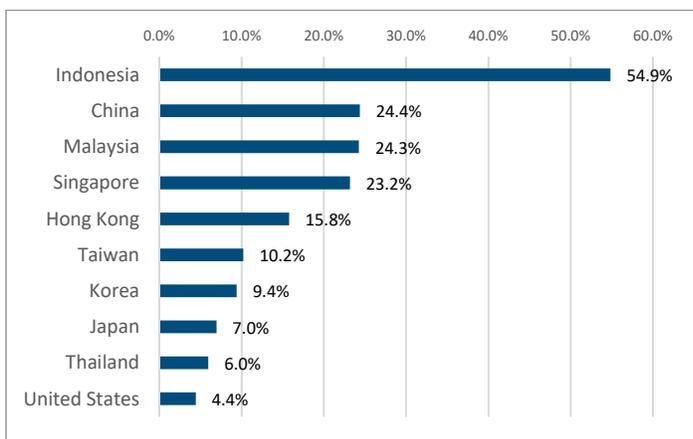


Fig. 21
Insurers' Allocation to Equity, YE 2015



Equity allocation by fund. Participating business tends to be backed by a portfolio with a higher equity content to meet policyholder reasonable expectations. Participating products have proven popular in Hong Kong and Singapore in the wake of the global financial crisis, representing more than half of total new-business premiums. Using Singapore as an example, the average equity allocation for the major life insurers stood at 28.7% for participating funds as of YE 2015 while it was only 3.7% for non-participating funds (see Fig. 22). The allocation patterns are similar among individual insurers, as shown in Figs. 23 and 24. This suggests that insurers tend to avoid equity for non-participating funds.

Fig. 22
Asset Allocations of Participating and Non-Participating Business in Singapore, YE 2015

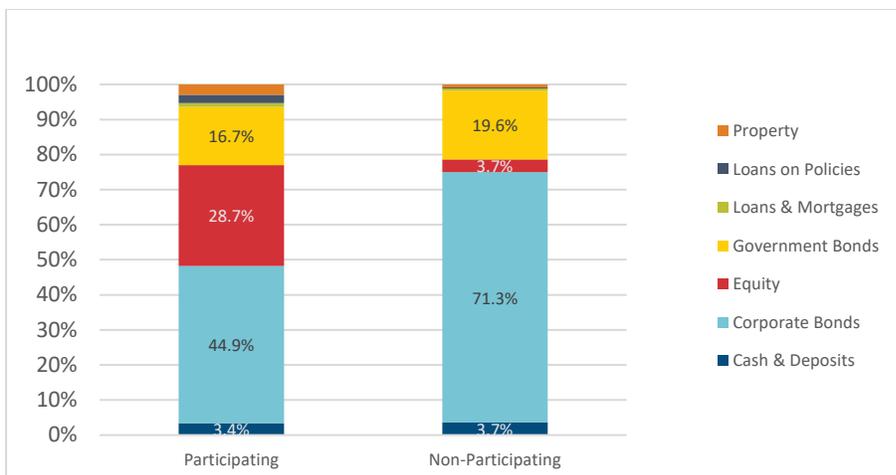


Fig. 23
Asset Allocation of Participating Business in Singapore, by Insurer, YE 2015

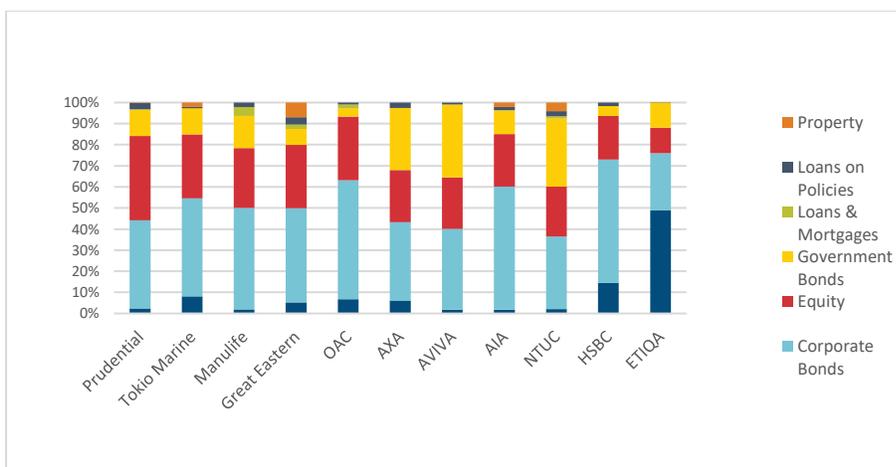
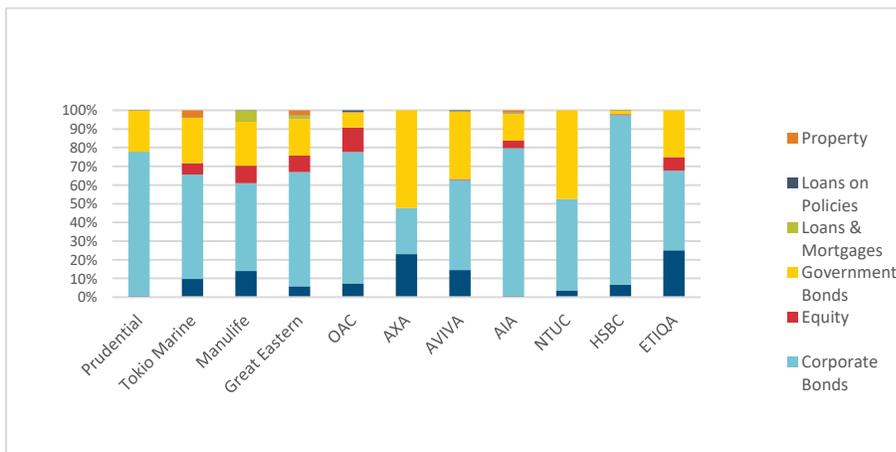


Fig. 24
Asset Allocation of Non-Participating Business in Singapore, by Insurer, YE 2015



Competitive Illustrated Return. Some insurers in Hong Kong, Singapore and Malaysia may try to gain a pricing edge by increasing the equity content of their participating asset portfolio so that they can offer a higher expected earning rate. For instance, in Hong Kong, possibly in response to low interest rates and intensifying competition, we have noticed an increase in the level of equity investments backing participating products disclosed in sales material; in fact, the maximum equity backing can range up to 70% for some participating products, according to product brochures available online in 2016. Policy value projections in the sales illustrations are separated between “guaranteed” and “non-guaranteed” benefits, with the latter payable upon maturity or termination of the contract (i.e., death or surrender). For some participating products, the internal rates of return (IRRs) of the illustrated total surrender benefits (i.e., both guaranteed and non-guaranteed benefits) can be as high as 6% per year after 30 years in force.

Regulators Reducing Investment Constraints but Increasing Capital Charge. Regulators across the region have been relaxing the investment restriction on equity. For instance, the Chinese regulator had progressively raised the caps imposed on insurers in respect of equity investments:

- Allowing participation in foreign equities in late 2012
- Raising the cap on equity from 25% to 30% in 2013
- Further increasing in the equity cap from 30% to 40% in 2015

Meanwhile, there has been a trend toward increasing capital charges on equity investments. Table 14, which summarizes the capital charges imposed on equity investments across the region at the time of writing, shows convergence toward the 39% required under the Solvency II standard formula. While equities may improve total returns, they are not always regarded as a good asset class for ALM, given their historical volatilities (even after allowing for the relief from correlation benefits allowed by some capital regimes).

Table 14
Equity Risk Charge in Selected Asian Markets

Market	Equity Risk Charge
Taiwan	22.74%–36%
South Korea	12%–16%
Singapore	8%
Indonesia	16%–30%
Malaysia	16%–35%
Thailand	16%–20%
China	31%–48% baseline*
Hong Kong	Not risk-based

*There are adjustments on these baseline figures based on whether, for example, the equity is on the main board, it is a main stock exchange and there are capital gains/losses.

There may be opportunities for equity risk management for life insurance companies after two major financial crises in the past 10 years. Given how the capital charges work, life insurance companies tend to reduce exposure to risky assets during volatile times when solvency margins may be weakened (e.g., both AIG and ING de-risked their portfolios by selling off equities in response to the global financial crisis). Insurers can actively manage their equity exposure by hedging using exchange-traded or over-the-counter derivatives or such instruments as inverse ETFs, but not without costs: first through eroded net returns and second through potentially higher risk charges due to the introduction of counterparty risk. The effectiveness of these instruments on a risk-adjusted basis may also be hampered if the RBC regime disallows or limits such instruments. Consequently, there is scope for exploring rule-based rebalancing strategies to achieve a better outcome.

In the following sections, we will provide three case studies to provide additional color about asset classes that may not be used by all markets in the Asset Database and/or where there are data limitations.

3.6 Case Study: Real Estate Growth Held Back by Supply and Demand

In this first case study, we discuss real estate investments and the factors that are relevant to Asia insurers. Starting from a low base, this is a sector where we see potential for growth, given the relatively low allocations into this asset class, the recent wave of deregulation in several Asian markets and the growing size of insurance portfolios that allow insurers to invest in large illiquid assets. However, our growth view is tempered by expectations of rising interest rates, which could reduce property prices, and by the costs and required expertise to enter this relatively illiquid market.

Real estate is often one of the smallest asset classes for insurers, behind government bonds, corporate bonds, loans and mortgages, and equities. The allocations by market from 2012YE to 2015YE can be seen in Fig. 25.

With a region-wide average exposure languishing at a lowly 2.7% as of 2015YE, this asset class appears to have room to grow. Cumulative growth in real estate investment had been modest (compared to other asset classes) at 68.6% over the three years to YE 2015 (Table 15). China was the main reason behind the slow growth: despite posting the strongest AUM growth (124% overall cumulative growth over the same period), real estate represents a mere 1% in the AUM of China insurers (Fig. 26).

Taiwanese and South Korean insurers dominate real estate investment, in terms of both amount and allocation (Fig. 27). As of YE 2012, Taiwan insurers contributed over 40% to the region’s aggregate real estate investment, followed by South Korea and China, which represent 32% and 14% of the total, respectively. Three years later, at YE 2015, Taiwan insurers had doubled their investment to represent over 50% of the region’s aggregate real estate investments. Over that period, South Korean insurers’ investment in this asset class remained flat, and Chinese insurers caught up.

Fig. 25
AUM of Real Estate, by Market, YE 2012–YE 2015

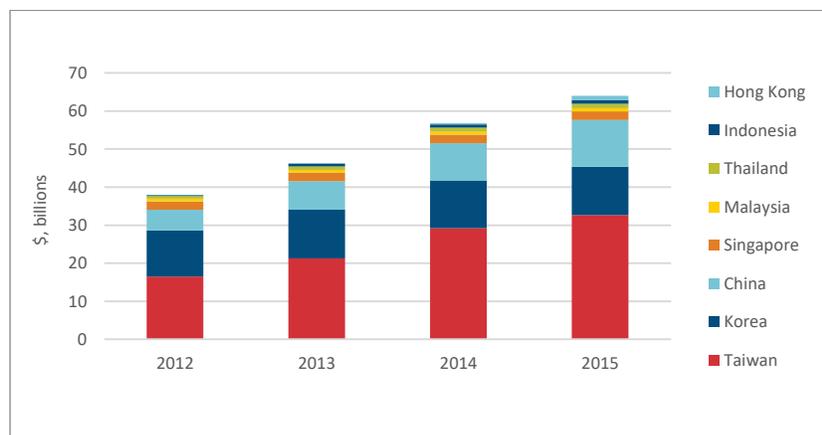


Table 15
AUM Growth of Real Estate, by Market, YE 2012–YE 2015

Market	Cumulative Growth over 3 Years to YE 2015	Annualized Growth over 3 Years to YE 2015
Taiwan	98.5%	25.7%
South Korea	4.6%	1.5%
China	123.7%	30.8%
Singapore	5.1%	1.7%
Thailand	57.5%	16.4%
Hong Kong*	2,725.5%	204.6%
Indonesia	302.1%	59.0%
Malaysia	20.5%	6.4%
Total (region)	68.6%	19.0%

*Hong Kong’s significant increase in cumulative growth is due to the small starting base at YE 2012 and a number of purchases over the years.

Fig. 26
Insurers' Allocation to Real Estate at 2015YE.

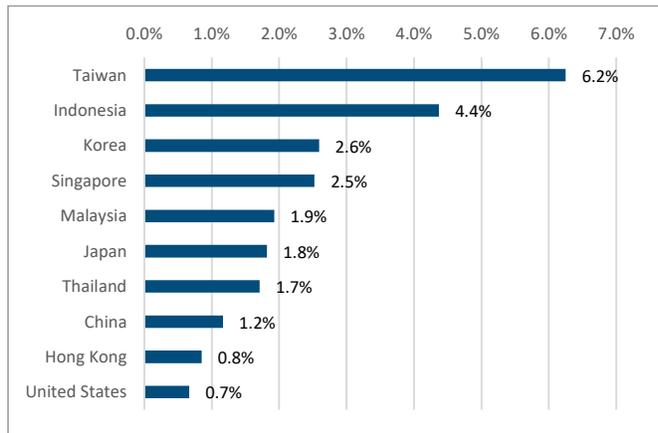
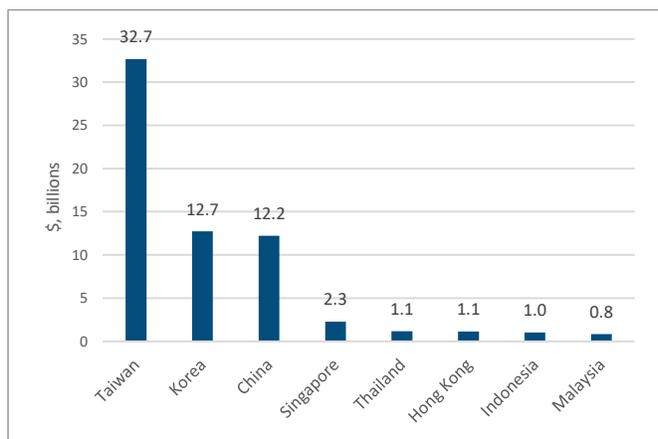


Fig. 27
AUM of Real Estate, by Market, YE 2015



Apart from direct ownership, real estate investments can be affected through a pooled vehicle such as a real estate investment trust (REIT) or a property trust. Holdings in listed vehicles would typically be classified under the life company's equity allocation, whereas "real estate" would commonly refer to direct properties or unlisted pooled vehicles. The asset class may be further segregated into "real estate equity" and "real estate debt." Direct ownership would be classified as real estate equity, while lending money to a third party to own a property would be real estate debt, which is collateralized by the property.

Like other institutional investors, insurers favor commercial properties over residential buildings, given the longer leases and reputable renters, which provide more stable cash flows.

Deregulation across the region has allowed insurers to boost their real estate holdings, particularly in offshore investments:

- Regulators in South Korea and Taiwan have increased the maximum allocation limits to 25% and 30% of the total assets, respectively, and streamlined the procedures for investing in overseas properties.
- Since 2013, Taiwanese insurers have been permitted to invest in overseas real estate and may also use shareholder loans for overseas acquisitions.
- The China Insurance Regulatory Commission (CIRC) allows insurers to invest up to 15% of their total assets overseas, including into money markets, private equity and real estate. Insurers are rather keen to exploit this newfound freedom, as the range of domestic investments is relatively limited. Prominent examples include the acquisitions of the

Lloyd's Building in London in 2013 by Ping An (the second-largest insurer in China) and the Waldorf Astoria in New York in 2014 by Anbang (the fourth-largest insurer in China).

Real estate can be a useful addition to an insurer's multi-asset portfolio:

- Rental income can be stable and is regarded as a broad hedge against inflation. Insurers are also attracted by the cash flows under long leases for meeting their ALM needs. Rental deposits provide some protection against nonpayment of rents until new tenants are found.
- There is the prospect of capital gain in the long run, and property prices tend to be less volatile than stock prices.
- Some research indicates that property prices have low concurrent positive correlations with those of stocks and bonds,¹¹ although there may be lags. Therefore, the addition of this asset class may improve returns while lowering volatility of the overall portfolio. Under RBC regimes that allow diversification benefit across asset classes, adding real estate may potentially lower the aggregate risk charges, particularly if reallocating from assets with higher capital usage.

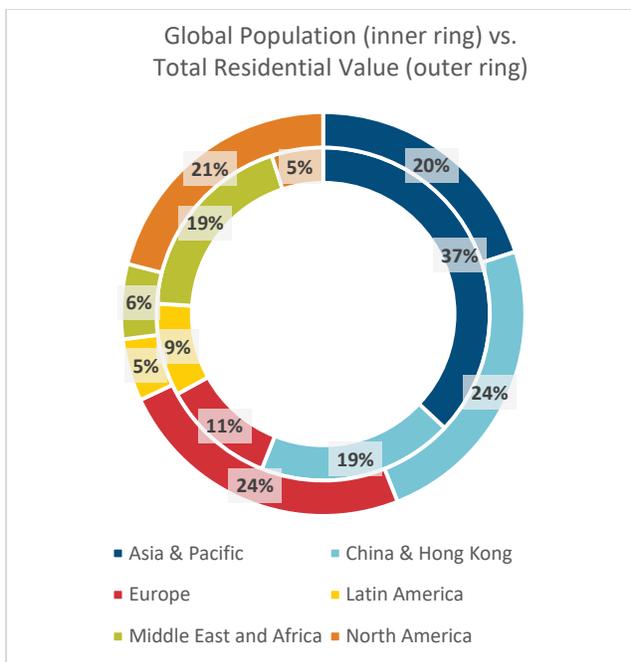
Despite these upsides, there are some hurdles for insurers to think twice about before taking the plunge into direct property investment:

- This asset class—as with other asset classes—is subject to regulatory limits. The rather substantial size of an individual physical property can easily breach the single-asset limit of the balance sheets of small and medium-size insurers and makes the creation of a diversified book of direct properties a challenge.
- The low liquidity of physical properties has been a key deterrent to insurers.
- Acquisition costs (transactions, stamp duties, due diligence costs) and ongoing expenses (property management expenses, valuation fees) associated with direct property investments are typically much higher than for equities and fixed income. Tax treatment of income and gains/losses varies but may be less unfavorable. Fees paid to external property managers are usually higher than to equity or fixed-income managers.
- The skill sets required for seeking out and shortlisting potential investments and for managing properties are different than for investment in equities and fixed income, necessitating a dedicated team of experts and fueling the costs. Insurers may find direct property investments prohibitively expensive to buy and hold.
- While real estate prices are usually sticky, potential volatility in property prices should not be underestimated in certain markets.
- Finally, research has shown that Asia is seeing a real estate shortage, making the search for high-quality properties a challenge (see Figs. 28 and 29).

Given these hurdles, it is unsurprising that insurers in the region are less than enthusiastic regarding real estate investment.

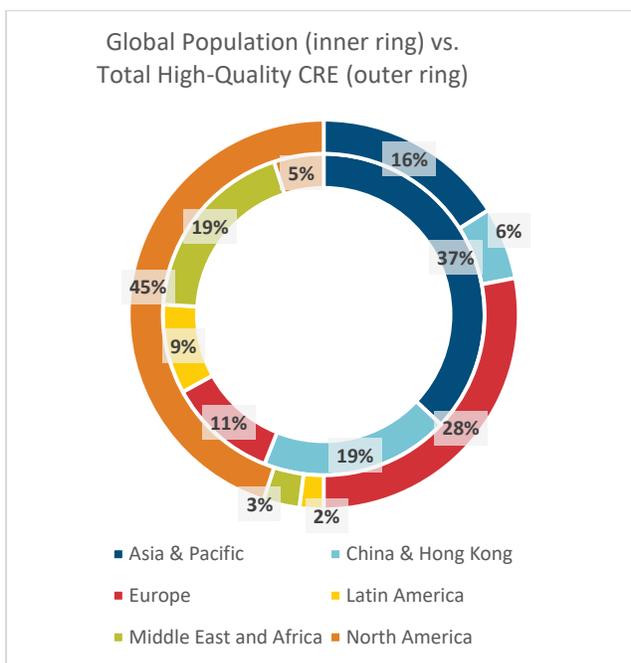
Fig. 28
Global Population and Total Residential Value, by Market, YE 2015

¹¹ "While the performance of direct real estate investments is much less dependent on that of other asset classes. Its correlation with the equity market is relatively low at 0.3, and even slightly negative in the case of the bond market, at -0.15." *Real Estate as an Asset Class*, Credit Suisse, 2014, p.5, <https://www.credit-suisse.com/media/production/asset-management/docs/real-estate/white-paper-real-estate-as-an-asset-class.pdf>. "Property is a risk diversifier—the long-term correlation between real estate and equities/bonds is very low." *The Case for UK Property*, DTZ Investors, 2016, https://www.dtzinvestors.com/media/174479/case-for-uk-property-2016_statistical-version_sep2016_v2.pdf.



Source: *Around the World in Dollars and Cents*, Savills World Research, 2016, p. 7, pdf.euro.savills.co.uk/global-research/around-the-world-in-dollars-and-cents-2016.pdf.

Fig. 29
Global Population and Total High-Quality Commercial Real Estate (CRE), by Market, YE 2015



Another challenge that insurers in Asia face when considering diversification into real estate is the lack of investable assets. It can be seen in Fig. 29 that Asia-Pacific (including China and Hong Kong) has 56% of the world’s population but only 22% of the world’s high-quality commercial real estate. At the same time, North America and Europe—representing 5% and 11% of world population, respectively—has 45% and 8% of the world’s high-quality commercial real estate.

Although insurers do not usually invest in residential real estate, Fig. 28 shows that the asymmetric distribution is similar: Asia-Pacific (including China and Hong Kong) has only 44% of the world’s residential value, whereas North America and Europe has 21% and 24% of the world’s high residential value.

Market practitioners have doubts about the growth rate for this asset class. Given the size of Chinese life insurers and the lack of allocation, the overall growth in real estate for insurers in the Asia region is likely to be retarded.

3.7 Case Study: A Shift toward Alternatives and New Asset Classes

Local regulations across the region are constraining risk taking associated with interest rates, equities, exchange rates and credit. In contrast, liquidity risk is treated differently: it is not subject to explicit risk charges, except for higher charges for certain unlisted investments and special approval from the regulator for some illiquid investments. In fact, liquidity risk may suit the liability profile of long-term insurance business, as the lack of liquidity is not a material concern in matching long-dated liabilities. Further, the liquidity risk is ameliorated for portfolios that are growing, which is generally the case for Asian life insurers.

Given fewer levers to maintain profitability, insurers are growing more interested in exploring nontraditional, “alternative” investments to improve yields and diversification. Such alternative investment types include hedge funds, private debt (including loans), and private equity. Subsets of these might be project finance, infrastructure debt and equity, senior loans, aircraft leasing, maritime lending and so on.

Diversifying into nontraditional investments makes sense for insurers that can absorb liquidity risk on long-dated assets and improve their ALM. If expectations are met, yields may be enhanced for the policyholder (and shareholder) through the liquidity spread without a significant impact on their capital requirements.

Alternative investments also come with some downsides. For example, alternative debt may require a third-party valuation and public credit ratings, which can be expensive exercises. Alternative equity may be difficult to model, given the lack of valuation data available in Asia, and may ultimately lead to public-equity volatilities being applied. Seeking out and evaluating these investments may also require special skill sets. Finally, it can be rather time consuming to educate the key stakeholders and decision makers in insurance companies about these investments, given their unstandardized nature.

There is little public information in Asia about investing alternatives. The way alternatives are defined and categorized also is not standardized, making it difficult to understand and analyze.

Table 16 summarizes a case study on infrastructure debt from an insurer’s perspective, highlighting some of the key practical considerations in diversifying into an alternative that has been gaining traction in Asia.

Table 16
Features and Considerations of Infrastructure Debt

Feature	Considerations
Overview	Infrastructure debt appears to be a good asset for matching long-dated liabilities, as infrastructure projects (such as construction of power stations, roads, water plants, ports, airports and railway lines) normally take a long time and have long tenors.
Interest rate risks	The loans to such projects may well be structured as floating-rate assets. From a duration management perspective, for a deal to be useful to an insurer with a large book of long-term, fixed-rate liabilities, either it should be structured as fixed-rate loans, or the insurer will need to enter into a long-term interest rate swap in local currencies (which may be challenging or expensive to arrange).
Cash flow patterns	The cash flows for infrastructure can vary significantly. The investment may behave like a bond, with one outflow at inception, or it could have multiple outflows (coinciding with funding drawdowns) over time. The inflows may be structured in many ways, of which the pattern may not resemble a traditional bond.

J-curve	Due to the patterns of expenditures and valuations, the asset may experience a J-curve whereby the asset value drops significantly below the original book value before it rises. It is therefore critical to control the relative size of individual deals, and a diversified portfolio is desired, so that some earlier deals will have started generating cash inflows to meet the cash outflows on some newer deals.
Foreign-exchange risks	The deals may be in local or foreign currencies (typically U.S. dollars). The latter approach entails foreign-exchange risk, which may require hedging. Infrastructure debt’s long tenor (ranging up to 15 years or even longer) may make it impractical to hedge the foreign-exchange risk economically.
Valuation	Like other illiquid unlisted investments, the valuation frequency for infrastructure debt is likely to be quarterly, based on estimates. A full set of accounts will be drawn up annually by the sponsor, but there are likely to be delays before these can be issued. Further time is required for the information to be reviewed before the final valuation can be produced, by which time the prices will be “stale.” An external independent party can be retained to provide the valuations to meet accounting standards at a cost. According to feedback from the market, because of these valuation hurdles, it is easier to market infrastructure to pension funds than to insurers.
Credit risk	Local regulations may require infrastructure debt securities to be credit-rated publicly, which may prove expensive to the point of being a deal breaker. A private rating is less costly and might suffice, particularly given the limited number of investors. Infrastructure debt is akin to project finance to the extent that the probability of a corporate bond default tends to increase with the increasing tenor, as it may transition through downgrades. The probability of a project default tends to plateau over time; there is no further risk of completion once a power plant is built. A project’s loss given default also is limited, because the infrastructure exists as collateral to the borrowing.

If such issues can be resolved and the marginal return is sufficiently large to overcome the additional liquidity risk, diversification into illiquid assets can be a worthwhile proposition. Besides adding value to an insurer’s portfolio, infrastructure contributes to the socioeconomic well-being of the geographic area. For example, the provision of steady power, water and gas and the transportation of goods and services can be life changing.

Interview Comments

The consensus among market practitioners is that interest rates will be rising slowly but will still be low in absolute terms. To meet policyholders’ reasonable expectations, it is anticipated that interest in alternatives will continue.

There is interest in private equity, as these investments can achieve double-digit returns compared with hedge funds, which are returning a margin (for example, 3% or 4%) above a floating rate like the London Interbank Offered Rate (LIBOR). At the time of writing, LIBOR is low, which makes hedge fund returns relatively unattractive.

Table 17
Recent Infrastructure Investment Transactions by Insurers: Selected Examples

Date	Asset Class	Deal	Investor (Insurer)	Size, millions
June 2016	Convertible bond	Convertible senior notes due in 2020 issued by Nu Skin Enterprises	Ping An Insurance	\$210
Oct. 2015	Convertible bond	3-year convertible bonds issued by China Innovative Finance Group Ltd.	China Taiping	\$50

April 2015	Global property	First-phase project of Boston’s Pier 4m, with each insurer owning a one-third stake (\$167 million)	China Life; Ping An Insurance	\$500
Jan. 2015	Infrastructure	Bus Depot Cluster II, a 32-year contract involving the construction of four depots	AG Insurance	€60 (\$68)
Jan. 2015	Global property	Tower Place, an office property in London’s financial district	Ping An Insurance	€419 (\$473)
July 2014	Infrastructure	Stoke Extra Care Housing PFI	Aviva	£65 (\$87)

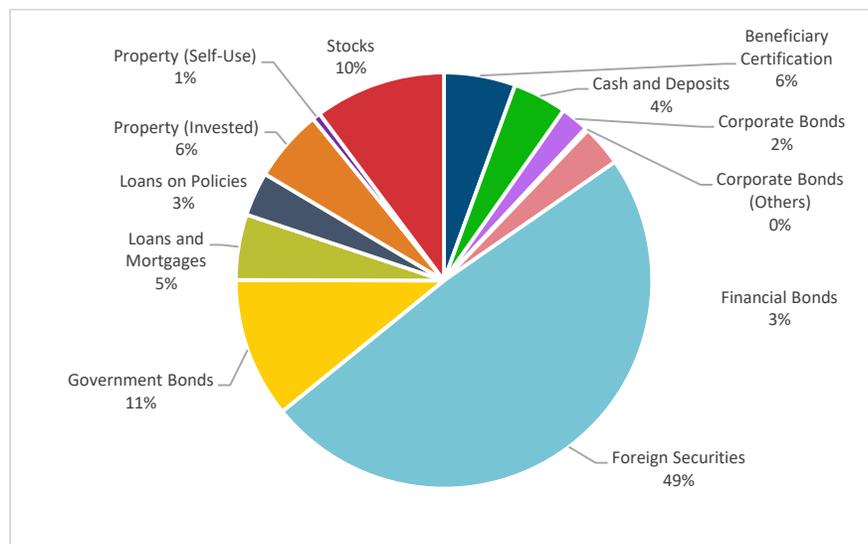
3.8 Case Study: Foreign Investments and Foreign-Exchange Risk

Except the data for Taiwan, the Asset Database does not consistently distinguish foreign assets from domestic assets, due to source data limitations. This case study therefore is primarily based on comments from market practitioners.

There are many reasons for Asian insurers to expand their portfolios to foreign investments, especially given the limited debt markets in the region.

- The cases for investing in foreign bonds are manifold: potentially higher yields (even after allowing for the cost of currency hedging), access to wider credit spectrum and maturity profiles that is not available in the domestic fixed-interest market, and more economical use of the risk budget compared with foreign equities, which tend to incur a high capital charge.
- Figure 30 shows that Taiwanese insurers allocate close to 50% of AUM to foreign securities (with foreign bonds making up the clear majority), given the supply shortage in domestic fixed income. Regulatory restrictions apply, limiting the amount of foreign assets by the maturity of the individual insurer.

Fig. 30
Level 2 Asset Allocation in Taiwan, YE 2015



- The Financial Supervisory Commission (FSC), the Taiwanese regulator, in 2013 and 2014 lifted some limits on foreign investment it had imposed on insurance companies. The two key aspects of relaxations relate to (1) the types of overseas investment instruments in which insurers can invest and (2) the amount of each insurer’s “Overseas Investment Ceiling” with approval from the FSC.

- Insurance products written in Hong Kong are denominated in Hong Kong dollars (HKD), Chinese yuan renminbi (CNY) and U.S. dollars (USD). As shown in Table 18, 60% of policies sold in foreign currencies and therefore assets denominated in CNY and USD are required for currency matching. USD-denominated insurance products are popular, particularly as HKD has been pegged to USD since 1983.¹² More and more Chinese citizens are buying Hong Kong insurance policies (especially those denominated in USD) to diversify their investment risks in response to CNY depreciation.¹³ According to statistics published by the Hong Kong insurance regulator, \$4.1 billion (or 24%) of all new premiums were purchased by mainland Chinese.

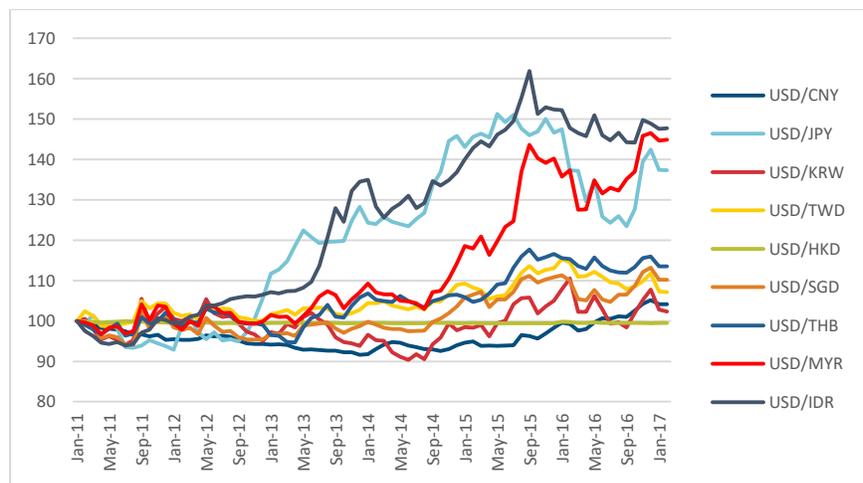
Table 18
Percentage of Policies in Foreign Currency, Selected Markets, YE 2015

Market	Foreign-Currency Policies, % of Total Policies
Hong Kong	60.0
Japan	20.0
Taiwan	15.0
China	0.0

Source: "AIA Road Map to 2020," Morgan Stanley, 2016, p. 11, Exhibit 23.

- Shifting investments to foreign assets entails foreign exchange (FX) risk. The cost of currency hedging depends primarily on the interest rate differentials between the markets. Over the six years to January 2017, the USD had appreciated against the major Asian currencies (as shown in Fig. 31). In hindsight, it would have been beneficial for life insurers to have left their international assets on a currency-unhedged basis.

Fig. 31
Exchange Rate of USD vs. Major Asian Currencies, January 2011–January 2017



Note: Rescaled base on January 2011.

Interview Comments

Feedback from many investment insurance professionals is that there is usually no appetite for FX risk for fixed-income allocations, as the loss from an unfavorable currency movement can easily negate any gain from fixed-income movements. For more volatile asset classes such as equities, the asset returns may dominate the FX movements, and

¹² <http://www.scmp.com/business/article/2050400/us-dollar-peg-has-served-hong-kong-well-34-years>

¹³ <http://www.scmp.com/news/china/money-wealth/article/1883070/chinese-visitors-snap-hong-kong-insurance-policies-diversify>

there may be some natural hedges. Therefore, there is room to leave these asset classes unhedged or only partially hedged.

Some investment managers offer currency overlay products to add further value (or reduce volatility) for their clients, while others claim to offer a more optimal hedging strategy for equities than to simply leave the equity portfolio totally unhedged. Ultimately, the hedging decision will depend on such factors as the overall risk tolerance of the insurance company, currency volatility expectations over the near and longer terms, the affordability of hedging solutions and, finally, the relative risk-return profile of the asset class pre- and post-hedging, taking capital charges into account.

Appendix A: Covered Insurance Companies, by Market

Insurance Companies in China	
友邦保险有限公司 AIA Life Insurance Co., Ltd.	汇丰人寿保险有限公司 HSBC Life Insurance Company Ltd.
安邦人寿保险股份有限公司 AnBang Life Insurance Company	华夏人寿保险股份有限公司 HuaXia Life Insurance Co., Ltd.
建信人寿保险股份有限公司 CCB Life Insurance Company Ltd.	工银安盛人寿保险有限公司 ICBC-AXA Life Insurance Co., Ltd.
中国人寿保险股份有限公司 China Life Insurance Company	新华人寿保险股份有限公司 New China Life Insurance Company Ltd.
中国太平洋人寿保险股份有限公司 China Pacific Insurance Company	中国人民人寿保险股份有限公司 People's Insurance Company of China
太平人寿保险有限公司 China Taiping Insurance Company	中国平安人寿保险股份有限公司 Ping An Insurance
信诚人寿保险有限公司 Citic-Prudential Life Insurance Co., Ltd.	富德生命人寿保险股份有限公司 Sino Life Insurance Co., Ltd.
国华人寿保险股份有限公司 GuoHua Life Insurance Co., Ltd.	光大永明人寿保险有限公司 Sun Life Everbright Life Insurance Co., Ltd.
幸福人寿保险股份有限公司 Happy Life Insurance Co., Ltd.	阳光人寿保险股份有限公司 Sunshine Life Insurance Corporation Ltd.

Insurance Companies in Hong Kong	
Ageas Insurance Company (Asia) Ltd.	FWD Life Insurance Company (Bermuda) Ltd.
AIA International Ltd.	Hang Seng Insurance Company Ltd.
Aviva Life Insurance Company Ltd.	HSBC Life (International) Ltd.
AXA China Region Insurance Company (Bermuda) Ltd.	ING Life Insurance Company (Bermuda) Ltd.
AXA China Region Insurance Company Ltd.	Manulife (International) Ltd.
BOC Group Life Assurance Company Ltd.	Prudential Hong Kong Ltd.
China Life Insurance (Overseas) Company Ltd.	

Insurance Companies in Indonesia	
PT Ace Life Assurance	PT Asuransi Jiwa InHealth Indonesia
PT AIA Financials	PT Asuransi Jiwa Mega Life
PT Asuransi Jiwa Bersama Bumiputera 1912	PT Asuransi Jiwa Nusantara
PT Asuransi Allianz Life Indonesia	PT Asuransi Jiwa Recapital
PT Asuransi Aviva Indonesia	PT Asuransi Reliance Indonesia
PT Avrist Assurance	PT Asuransi Jiwa Sequis Financials
PT AXA Financial Indonesia	PT Asuransi Jiwa Sequis Life
PT AXA Life Indonesia	PT Asuransi Jiwa Sinansari Indonesia
PT AXA Mandiri Financial Services	PT Asuransi Jiwa Sinarmas MSIG
PT BNI Life Insurance	PT Asuransi Jiwa Taspen
PT Asuransi Jiwa Central Asia Raya	PT Asuransi Jiwa Tugu Mandiri
PT Asuransi CIGNA	PT Asuransi Jiwasraya (Persero)
PT CIMB Sun Life	PT Asuransi Kresna Life
PT Commonwealth Life	PT Lippo Life Insurance
PT Equity Life Indonesia	PT Asuransi Jiwa Manulife Indonesia
FWD Life Indonesia	PT MNC Life Assurance
PT Great Eastern Life Indonesia	PT Multicor Life Insurance
Hanwha Life Insurance Indonesia	PT Panin Dai-ichi Life
PT Heksa Eka Life Insurance	PT Panin Life
PT Indolife Pensiortama	PT Pasaraya Life Insurance
PT Asuransi Jiwa Adisarana Wanaartha	PT Prudential Life Assurance
PT Asuransi Jiwa BCA	PT Sinergi Mitratama Proteksi
PT Asuransi Jiwa Bringin Jiwa Sejahtera	PT Sun Life Financial Indonesia
PT Asuransi Jiwa Central Asia Raya	PT Tokio Marine Life Insurance
PT Asuransi Jiwa Generali Indonesia	PT Financial Wiramitrsa Danadiaksana
PT Asuransi Jiwa Indosurya Sukses	PT Zurich Topas Life

Insurance Companies in Korea	
ACE Insurance Korea	KDB Life Insurance Co., Ltd.
American International Assurance Korea	Kyobo Life Insurance
Allianz First Life Insurance	Kyobo Life Planet Insurance Company
BNP Paribas Cardif Life Insurance	LINA Life Insurance
DGB Life Insurance Co. Ltd.	MetLife Insurance
Dongbu Life Insurance	Mirae Asset Life Insurance Co., Ltd.
Hana Life Insurance	NongHyup Life Insurance Company
Hana HSBC Life Insurance Company Ltd.	PCA Life Insurance
Hanwha Life Insurance Co., Ltd.	Prudential Life Insurance
Hungkuk Life Insurance	Samsung Life Insurance
Hyundai Life	Shinhan Life Insurance
IBK Insurance Co., Ltd.	Tongyang Life Insurance
ING Life Insurance	WooriAviva Life Insurance Co., Ltd.
KB Life Insurance	

Insurance Companies in Malaysia	
AIA Bhd.	Hong Leong Assurance Bhd.
Allianz Malaysia Bhd.	Manulife Insurance Bhd.
AmMetLife Insurance Bhd.	Prudential Assurance Malaysia Bhd.
Aviva Insurance Bhd.	SunLife Malaysia Assurance Bhd.
AXA Affin Insurance Malaysia	Tokio Marine Insurans (Malaysia) Bhd.
ETIQA Insurance Bhd.	Zurich Insurance Malaysia Bhd.
Great Eastern Life Assurance (Malaysia) Bhd.	

Insurance Companies in Singapore	
American International Assurance Company, Ltd.	Manulife (Singapore) Pte. Ltd.
Aviva Ltd.	NTUC Income Insurance Co-operative Ltd.
AXA Insurance Pte. Ltd.	Overseas Assurance Corporation Ltd.
Etiqa Insurance Pte. Ltd.	Prudential Assurance Co. Singapore (Pte) Ltd.
Great Eastern General Insurance Ltd.	Tokio Marine Life Insurance Singapore Ltd.
HSBC Insurance (Singapore) Pte. Ltd.	

Insurance Companies in Taiwan	
三商美邦人壽保險股份有限公司 Mercuries Life Insurance Co. Ltd.	友邦人壽 AIA International Ltd. (Taiwan)
中國人壽保險股份有限公司 China Life Insurance Company (Taiwan)	台灣人壽保險股份有限公司 Taiwan Life Insurance Co., Ltd.
中國信託人壽保險股份有限公司 CTBC Life Insurance	國泰人壽保險股份有限公司 Cathay Life Insurance Co., Ltd.
中華郵政股份有限公司 Chunghwa Post Co., Ltd.	富邦人壽保險股份有限公司 Fubon Life Insurance Co., Ltd.
保誠人壽保險股份有限公司 Prudential Corporation Asia Life Taiwan	新光人壽保險股份有限公司 Shin Kong Life Insurance Co., Ltd.
全球人壽保險股份有限公司 TransGlobe Life Insurance Inc.	蘇黎世國際人壽保險股份有限公司 Zurich International (Taiwan) Ltd.
南山人壽保險股份有限公司 Nan Shan Life Insurance Co., Ltd.	

Insurance Companies in Thailand	
ACE Life Assurance Public Company Ltd.	Muang Thai Life Assurance Public Co., Ltd.
AIA Co., Ltd.	Ocean Life Insurance Public Co., Ltd.
Advance Life Assurance Public Co., Ltd.	Phillip Life Assurance Co., Ltd
Allianz Ayudhya Assurance Public Company Ltd.	Prudential Life Assurance (Thailand) Public Co., Ltd.
Bangkok Life Assurance Public Co., Ltd.	Union Life Insurance Public Co., Ltd.
BUI Life Insurance Public Co., Ltd.	SCB Life Assurance Public Co., Ltd.
Dhipaya Life Assurance Public Co., Ltd.	Siam City Life Assurance Public Company Ltd.
Finansa Life Assurance Co., Ltd.	Southeast Life Insurance Public Co., Ltd.
FWD Life Insurance Public Co., Ltd.	Thai Cardif Life Assurance Public Co., Ltd.
Generali Life Assurance (Thailand) Public Co., Ltd.	Thanachart Life Assurance Public Co., Ltd.
ING Life Ltd. Thailand	Thai Life Insurance Public Co., Ltd.
Krungthai AXA Life Insurance Public Co., Ltd.	Tokio Marine Life Insurance (Thailand) Public Co., Ltd.
Manulife Insurance (Thailand) Public Co., Ltd.	Thai Samsung Life Insurance Public Co., Ltd.

Appendix B: Assumptions

The Asset Database provides a summary of life insurance asset statistics and regulations based on publicly available information. Asset data is presented at three levels of granularity: the regional level, market level and company level. Some judgments were required regarding the classifications and hierarchy of assets, due to data limitations and/or inconsistencies, as well as to facilitate comparability across companies and markets.

The database focuses on life insurers' invested assets, excluding other balance sheet items such as receivables and intangibles. General exclusion includes unit-linked funds (if stated explicitly) and non-invested assets such as receivables, derivatives, intangible assets, tax recoverables, operating assets and reinsurance assets. The exclusion list varies by markets, depending on the data availability and reporting standards.

All amounts are denominated in U.S. dollars, based on the conversion table below. All market statistics are as of year-end 2015, unless otherwise stated.

The Asset Database is prepared by Coherent Capital Advisors Limited, a consulting company based in Hong Kong.

Exchange Rates for Translation of Reporting Currency to Presentation Currency, as of Dec. 1, 2016

Market	Reporting Currency	Exchange Rate, per USD
China	CNY	6.89
Hong Kong	USD	1.00
Indonesia	IDR	13,555.00
Japan	JPY	114.07
Korea	KRW	1,169.15
Malaysia	MYR	4.47
Singapore	SGD	1.43
Taiwan	NTD	31.89
Thailand	THB	35.68
United States	USD	1.00

About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world, dedicated to serving 28,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public-policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policy-makers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public-policy makers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policy-makers and regulators and follow certain core principles:

Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public-policy discussions. The SOA does not take advocacy positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and nonactuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

Relevance: The SOA provides timely research on public-policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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