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Definitions and Conventions

As used in this report, the term “country” does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

In this report, the following groupings are used:

- “ASEAN” comprises Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam
- “Asia-10” comprises China (CHN), Hong Kong (HK), India (IND), Indonesia (IDN), Korea (KOR), Malaysia (MYS), the Philippines (PHL), Singapore (SGP), Taiwan (TWN) and Thailand (THA)
- “Euro zone” comprises Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia and Spain
- “European Union” (EU) comprises the euro zone, Bulgaria, Croatia, Czech Republic, Denmark, Hungary, Poland, Romania, Sweden and United Kingdom (UK)
- “G3” refers to the euro zone and United Kingdom, Japan, and the United States (US)
- “G20” refers to the Group of Twenty comprising Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Korea\(^1\), Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States and the European Union

Abbreviations used for financial data are as follows:

- Currencies: Chinese Renminbi (RMB), Euro (EUR), Hong Kong Dollar (HKD), Indian Rupee (INR), Indonesian Rupiah (IDR), Japanese Yen (JPY), Korean Won (KRW), Malaysian Ringgit (MYR), Philippine Peso (PHP), Singapore Dollar (SGD), Taiwan Dollar (TWD), Thai Baht (THB), Vietnamese Dong (VND), US Dollar (USD)

Other Abbreviations

- ABSD Additional Buyer’s Stamp Duty
- ACRA Accounting and Corporate Regulatory Authority of Singapore
- ADB Asian Development Bank
- ANZ Australia and New Zealand Banking Group
- AUM Assets Under Management
- B&C Building and Construction
- BIS Bank for International Settlements
- BPS Basis Points
- BTO Build-to-Order
- CAR Capital Adequacy Ratio
- CBOE Chicago Board Options Exchange
- CBRC China Banking Regulatory Commission
- CBS Credit Bureau Singapore
- CCP Central Counterparty
- CCR Core Central Region

\(^1\) Republic of Korea
CCyB  Countercyclical Capital Buffer
CGFS  Committee on the Global Financial System
CIS   Collective Investment Scheme
COE   Certificate of Entitlement
CPF   Central Provident Fund
CRE   Commercial Real Estate
CREA  Centre for Research on the Economics of Ageing
DBU   Domestic Banking Unit
DDRS  DTCC Data Repository (Singapore) Pte Ltd
DOS   Department of Statistics
DTCC  Depository Trust & Clearing Corporation
EBIT  Earnings Before Interest and Tax
EBITDA Earnings Before Interest and Tax, Depreciation and Amortisation
ECB   European Central Bank
EIOPA European Insurance and Occupational Pensions Authority
EPFR  Emerging Portfolio Fund Research
FSB   Financial Stability Board
FSR   Financial Stability Review
FX    Foreign Exchange
GDP   Gross Domestic Product
GFC   Global Financial Crisis
GFSR  Global Financial Stability Report
HDB   Housing Development Board
ICR   Interest Coverage Ratio
IE    International Enterprise
IFSWF International Forum of Sovereign Wealth Funds
IMF   International Monetary Fund
IORP  Institution for Occupational Retirement Provision
IPTO  Insolvency and Public Trustee’s Office
IRR   Income Replacement Rate
IWST  Industry-Wide Stress Test
LBS   Lease Buyback Scheme
LCR   Liquidity Coverage Ratio
LMPI  Labour Market Pressure Indicator
LTD   Loan-to-Deposit
LTV   Loan-to-Value
MAD   Median Absolute Deviation
MAS   Monetary Authority of Singapore
MMF   Money Market Fund
MND   Ministry of National Development
MOM   Ministry of Manpower
MTI   Ministry of Trade and Industry
NIM   Net Interest Margin
NPA   Non-Performing Asset
NPL   Non-Performing Loan
NUS   National University of Singapore
O&G   Oil and Gas
OCR   Outside Central Region
OECD  Organisation of Economic Co-operation and Development
OIF   Offshore Insurance Fund
OIS   Overnight Index Swap
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>OTC</td>
<td>Over-the-Counter</td>
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<tr>
<td>QFII</td>
<td>Qualified Foreign Institutional Investor</td>
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<tr>
<td>RCA</td>
<td>Real Capital Analytics</td>
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<tr>
<td>RCR</td>
<td>Rest of Central Region</td>
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<tr>
<td>REIT</td>
<td>Real Estate Investment Trust</td>
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<tr>
<td>ROA</td>
<td>Return on Assets</td>
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<td>ROAA</td>
<td>Return on Average Assets</td>
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<tr>
<td>RQFII</td>
<td>Renminbi Qualified Foreign Institutional Investor</td>
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<td>SBF</td>
<td>Singapore Business Federation</td>
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<tr>
<td>SCAV</td>
<td>Standing Committee on Assessment of Vulnerabilities</td>
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<td>SGX</td>
<td>Singapore Exchange Limited</td>
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<td>SHB</td>
<td>Silver Housing Bonus Scheme</td>
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<td>SIF</td>
<td>Singapore Insurance Fund</td>
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<tr>
<td>SiBOR</td>
<td>Singapore Interbank Offered Rate</td>
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<td>SME</td>
<td>Small and Medium-Sized Enterprise</td>
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<tr>
<td>SPRING</td>
<td>Standards, Productivity and Innovation Board</td>
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<tr>
<td>S-REIT</td>
<td>Singapore Real Estate Investment Trust</td>
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<td>SWF</td>
<td>Sovereign Wealth Fund</td>
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<tr>
<td>TDSR</td>
<td>Total Debt-Servicing Ratio</td>
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<td>TSC</td>
<td>Transport, Storage and Communication</td>
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<tr>
<td>URA</td>
<td>Urban Redevelopment Authority</td>
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<td>VAR</td>
<td>Vector Auto Regression</td>
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<tr>
<td>VIX</td>
<td>CBOE Volatility Index</td>
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<tr>
<td>WMP</td>
<td>Wealth Management Product</td>
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<td>WTO</td>
<td>World Trade Organisation</td>
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PREFACE

The Monetary Authority of Singapore (MAS) conducts regular assessments of Singapore’s financial system. Potential risks and vulnerabilities are identified, and the ability of the financial system to withstand potential shocks is reviewed. The analyses and results are published in the annual Financial Stability Review (FSR). The FSR aims to contribute to a better understanding among market participants, analysts and the public of issues affecting Singapore’s financial system.

Section 1 of the FSR provides a discussion of the risks in the external environment. This is followed by an analysis of the Singapore financial sector in Section 2. Finally, a review of the corporate and household sectors is provided in Sections 3 and 4 respectively.

The production of the FSR was coordinated by the Macroprudential Surveillance Department (MSD) team which comprises of Gay Bing Yong Kenneth, Ng Heng Tiong, Chan Lily, Ang Shu Qin, Chen Wanling Evelyn, Choo Chian, Ho Ruixia Cheryl, Koh Zhi Xing, Lam Mingli Angeline, Lee Siew Cheng Wendy, Lee Su Fen, Liang Yongquan Phil, Lim Ju Meng Aloysius, Qiu Qiaoling Angeline, Soon Shu Ning Gael, Teoh Shi-Ying, Wong Jian Xiang, Wong Siang Leng, Wong Siew Yann Justin, Yeo Siok Lee Denise, Yip Ee Xiu, and Yoe Xue Ting Selene under the general direction of Rosemary Lim, Director (MSD) and Wong Nai Seng, Assistant Managing Director (Policy, Risk & Surveillance). The FSR also incorporates contributions from the following departments: Banking Departments I, II & III, Data Governance & Analytics Unit, Economic Analysis Department, Economic Surveillance & Forecasting Department, Insurance Department, Markets Policy & Infrastructure Department and Prudential Policy Department. The FSR reflects the views of the staff of the Macroprudential Surveillance Department and the contributing departments.

The FSR may be accessed in PDF format on the MAS website:  
OVERVIEW

External headwinds continue to grow

Prolonged weak growth and low interest rates have heightened global financial stability concerns. Rising political risks could impede effective policy-making.

Lacklustre growth could weaken corporates’ and households’ debt servicing abilities, and in turn weigh on banks’ asset quality. Bank profitability has also been squeezed by low interest margins, reducing banks’ ability to build up buffers to protect against shocks.

Low interest rates could drive risk-taking behaviour and fuel asset price bubbles, with attendant risks to financial stability. On the other hand, the prospect of faster-than-expected interest rate normalisation by the US Federal Reserve and heightened global political risks could lead to capital flow and currency volatility.

MAS has not observed any excessive broad-based domestic credit growth at this juncture. Accordingly, MAS will maintain the Countercyclical Capital Buffer (CCyB) at 0%.

Corporates remain resilient amid soft economic conditions; they should take steps to reduce balance sheet vulnerabilities

While some industry sectors face headwinds, the overall corporate sector remains resilient. Most firms maintain healthy financial buffers that would enable them to weather potential challenges, as indicated by MAS’ stress test results.

Companies should take steps to reduce balance sheet vulnerabilities, especially if they have significant leverage or foreign currency risks. Firms should also maintain clear communication with investors by providing simple and succinct financial disclosures.

Singapore’s banking system is strong amid a challenging environment, but continued vigilance is warranted

Bank lending to the domestic economy continues to be healthy. Nonetheless, there has been a slowdown in lending (particularly in cross-border loans) and emerging risks to asset quality, given the challenging economic backdrop. Strong capital buffers and provisions built up over the years would enable banks to weather asset quality headwinds.

Banks should continue to maintain prudent credit underwriting standards, monitor their credit portfolios actively and maintain adequate provisioning.

Households continue to deleverage; households should stay financially prudent and manage their debt obligations

Households continue to deleverage, following the series of macroprudential measures undertaken since 2009. Over time, this will help restore household debt sustainability and strengthen household balance sheets. On the whole, households have ample financial buffers to weather the current soft economic and labour market conditions.

Nonetheless, households should stay financially prudent and manage their debt obligations with a view to retirement adequacy. They should also review their investments carefully. In particular, before investing in property, investors should be
aware that rising vacancy rates, declining rentals and impending interest rate increases mean that they may not always be able to rely on rental income to service their investment property loans.

Macroprudential Surveillance Department
Monetary Authority of Singapore
29 November 2016
1 Global Environment

Prolonged weak global growth and low interest rates pose risks to the profitability of corporates and banks. Corporates’ debt servicing ability could deteriorate from weaker profitability, and in turn weigh on banks’ asset quality. Lower profitability would reduce banks’ ability to build up buffers to protect against shocks. Low interest rates could also encourage risk-taking behaviour and fuel asset price bubbles, with attendant risks to financial stability. On the other hand, the prospect of faster-than-expected interest rate normalisation in the US could lead to capital flow and currency volatility.

Developments in China continue to warrant close attention given increasing ties between Asian markets and China’s economy and financial conditions. Rising global political risk could impede effective policy-making.

Weak Global Growth

Prolonged weak global growth environment will weigh on corporates...

Global growth has remained weak seven years after the Global Financial Crisis (GFC) (Charts 1.1 and 1.2). The United Kingdom’s (UK’s) vote to leave the European Union (EU) has clouded the UK’s and the EU’s growth prospects. Global political uncertainty could weigh on business sentiment and economic growth.

As slower growth weighs on earnings and incomes, corporates and households, especially those with higher leverage, could face debt repayment difficulties.

In particular, commodity-related firms could come under further stress in the near term as commodity prices remain at depressed levels (Chart 1.3). Even though oil prices have rebounded somewhat from record lows in early 2016, oil services companies may

Chart 1.2
GDP Growth: Selected Asian Economies

Source: CEIC
Note: Based on latest available data.

Chart 1.1
Gross Domestic Product (GDP) Growth: G3 Economies

Source: CEIC
Note: Based on latest available data.

Structural shifts in cross-border production networks have contributed to a pullback in intra-regional trade in Asia. The short-term economic outlook for Asia ex-Japan will remain stable but sub-par compared to the pre-GFC period.

Chart 1.3
CPI:**

Source: CEIC
Note: Based on latest available data.
continue to face profitability pressures as oil prices remain significantly below their long-run average.

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**Chart 1.3**  
**Selected Commodity Prices**

<table>
<thead>
<tr>
<th>Index (1 Jan 2010 = 100)</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
</tr>
<tr>
<td>Energy</td>
</tr>
</tbody>
</table>

Source: MAS estimates, Bloomberg

Slowing global trade has weighed on shipping-related firms (Chart 1.4) as the sector continues to face the effects of overcapacity from weakening demand. Some major shipping lines have come under stress and the outlook on shipping companies has worsened.²,³

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**Chart 1.4**  
**World Trade Volume vs. Return on Assets (Average) of Global Shipping Firms**

- WTO World Trade Volume
- Return on Assets (Average) (RHS)

Source: Bloomberg, World Trade Organisation (WTO)

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² The Wall Street Journal (October 2016), “Hanjin Shipping’s Asia-U.S. Route Assets to Be Put on Sale”.  
³ Moody’s (June 2016), “Global Shipping Industry’s Negative Outlook Due to Fall in EBITDA”.

...and impinge on global bank profitability

Global bank asset quality could deteriorate as weak growth weighs on borrowers’ debt servicing ability. Banks with significant commodity and shipping-related exposures could face losses as defaults increase. Lower profitability also reduces banks’ ability to build up buffers (through retained earnings or provisions) to protect against shocks, and could impinge on lending activity.

Bank profitability in Asia remains higher than in the advanced economies, despite having fallen in recent years. Nevertheless, the outlook for Asian banks could be dampened by external headwinds (see Box A “What Drives Bank Profitability in Asia?”).

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**Risks of Low Global Interest Rates**

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Low interest rates will add to pressure on financial institutions...

Interest rates have remained low amid weak global growth, with global sovereign bond yields declining over the last six years (Chart 1.5).

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**Chart 1.5**  
**Sovereign Bond Yields**

- Bloomberg Global Developed Sovereign Bond Composite
- Bloomberg Emerging Market Local Sovereign Index

Source: Bloomberg
Low interest rates would reduce bank profitability by squeezing net interest margins (NIMs). In addition, global insurers and pension funds could face challenges meeting their future obligations as low interest rates open up a widening funding gap.4

...and perpetuate financial distortions, posing risks to financial stability

Low interest rates could encourage risk-seeking behaviour in a search for higher yield, leading to a potential build-up of asset price bubbles. Open-ended funds and other institutional investors have increased their allocations to Asian markets. While higher ownership of Asian assets by institutional investors such as insurers, pension funds and sovereign wealth funds (SWFs) has been associated with more stable markets, there are indications that open-ended fund flows could increase market volatility (See Box B “The Impact of Open-ended Funds and Other Institutional Asset Owners on Asia’s Asset Markets”).

Also, investors’ increased allocations into less liquid assets could lead to outsized market movements if investors exit markets en masse in times of stress. Authorities should continue to monitor trends in asset markets closely (See Box C “Commercial Real Estate Investment Flows in Asia: Trends and Drivers”).

An accommodative interest rate environment could induce households and corporates in the region to take on more leverage (Charts 1.6 and 1.7). Higher debt levels would reduce household and corporate debt repayment capabilities when interest rates eventually rise.

An accommodative interest rate environment could induce households and corporates in the region to take on more leverage (Charts 1.6 and 1.7). Higher debt levels would reduce household and corporate debt repayment capabilities when interest rates eventually rise.

Chart 1.6
Household Debt-to-GDP Ratio: Asia-10

Source: MAS estimates, CEIC
Note: Asia-10 comprises China (CHN), Hong Kong (HK), India (IND), Indonesia (IDN), Korea (KOR), Malaysia (MYS), the Philippines (PHL), Singapore (SGP), Taiwan (TWN) and Thailand (THA).

Chart 1.7
Corporate Debt-to-GDP Ratio: Selected Asian Economies

Source: MAS estimates, Bank for International Settlements (BIS)

Against this backdrop, it is worthwhile for policymakers to consider whether monetary policy has become overburdened and whether fiscal policy may need to do more of the heavy lifting to support the economy.

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4 Funding gaps occur when the present value of future liabilities exceeds the market value of assets. The prolonged low interest rate environment has driven up the present value of existing long-term liabilities due to the use of a lower discount rate while at the same time driving down investment income.
Faster-than-expected interest rate rises could lead to capital flow and currency volatility...

Market expectations of interest rate rises in the United States (US) have recently increased. This has been accompanied by early signs of a reversal in capital flows to Asia, after the surge in flows to Asia in the wake of the UK’s vote to leave the EU (Chart 1.8). Some Asian sovereign bond yields have risen (Chart 1.9) and currencies have also depreciated (Chart 1.10).

Policymakers need to watch out for downside risks associated with a further reversal in capital flows and currency volatility, if interest rates in the G3 normalise faster than expected. For instance, corporates with unhedged foreign currency-denominated debt could come under stress, with knock-on effects on banks.

...and further weigh on dollar-reliant financial institutions

US dollar (USD) funding costs, which have risen since 2014 (Chart 1.11) could climb further with the introduction of US money market fund (MMF) reforms. A rise in US interest rates would exacerbate the USD funding shortage. Financial institutions reliant on dollar funding could see an increase in USD funding costs, and if sufficiently acute, face a USD liquidity freeze.

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5 The reforms came into effect in October 2016, and require MMFs to adopt a floating net asset value and in times of stress, to impose liquidity fees and install redemption gates.
The China Factor

Strong policy action and reforms have helped to stabilise China’s financial markets...

China’s financial markets have stabilised following a series of policy measures to support near-term growth and strengthen economic resilience. As China’s linkages with the rest of Asia grow, the region would benefit from China’s economic and financial stability (See Box D “Drivers of Portfolio Flows in Asia: Do Global, Regional or Domestic Factors Matter More?”).

...but challenges remain as financial system vulnerabilities continue to rise

While China’s commitment to market reforms marks a positive step in addressing existing vulnerabilities, challenges remain.

Strong government stimulus in China has helped buoy economic growth, but has come at the expense of rising debt levels which may signal a build-up of banking system risk (Chart 1.12).

The recent growth in mortgage loans amid a buoyant property market could pose risks to banks in the event of a sharp property market correction. In addition, slowing economic growth and measures to curb excessive corporate leverage are weighing on the debt servicing capacity of highly-leveraged corporates in China. This would in turn heighten bank asset quality risks. China policymakers thus face increasing challenges in managing the trade-offs between near-term economic growth and longer-term financial stability.

Shadow banking is another challenge that Chinese authorities face. The China Banking Regulatory Commission (CBRC) has been tightening rules to curb excessive growth of wealth management products (WMPs), a form of shadow banking. Even then, the outstanding value of WMPs has continued to increase by 13% between end-2015 and end-June 2016. Risks from WMPs could spill over to the formal banking sector as shadow banks...
are often intertwined with the banking and corporate sectors.  

At the same time, small and mid-sized Chinese banks have become increasingly vulnerable to funding shocks, due to their increased reliance on short-term wholesale funding — particularly interbank funding. This shift towards more interbank funding could amplify interconnectedness and systemic risk in the Chinese banking system, with potential spillovers to bigger Chinese banks that are net lenders in China’s interbank market.

As China continues its efforts to stabilise its economy, renewed uncertainty (e.g. from possible trade protectionist measures and slower-than-expected growth) could trigger capital outflows and currency weakness. This scenario could constrain China’s market reform progress and ability to cushion shocks via monetary easing.

**Rising Political Risks and Anti-Globalisation Sentiment**

**Rising political risks in Europe...**

Following the UK’s vote to leave the EU, political uncertainty in Europe has increased, with the rise of Euroscepticism and stronger support for populist parties (Chart 1.13).

Financial market volatility could spike in the run-up to and the wake of upcoming elections in France and Germany in 2017, especially if Eurosceptic parties gain ground. The UK’s

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8 Min Liao, Tao Sun, Jinfan Zhang, IMF WP/16/181 (August 2016), “China’s Financial Interlinkages and Implications for Inter-Agency Coordination”.


10 Selected European populist parties refer to the Austrian Freedom Party (Austria), French National Front (France), Alternative for Germany (Germany), Five Star Movement (Italy) and Podemos (Spain).
negotiations on the terms of an exit from the EU will also be closely watched.

**...and pressure on European banks could reignite the sovereign-bank feedback loop**

European banks have come under pressure (Chart 1.1) amid weak growth and low interest rates. The large overhang of non-performing loans (NPLs) has also added on to banks’ troubles, particularly in Italy. Furthermore, high penalties associated with misconduct settlements could threaten to undermine bank profitability further.

**Chart 1.15**

Stock Market Indices: Selected European Banks

![Stock Market Indices: Selected European Banks](image)

Source: MAS estimates, Bloomberg

If adverse developments persist, some European banks may eventually require sovereign assistance — this could reignite market concerns over sovereign-bank feedback loops\(^\text{11}\) and cast further doubt over European integration.

**Political constraints together with the rise of anti-globalisation sentiment could impede effective policy-making**

Recent developments in G3 politics have highlighted wider concerns over the rise of anti-globalisation sentiment. Policymakers increasingly need to balance doing what makes the most economic sense against what is politically palatable, which may have long-lasting effects on global growth and downstream effects on the financial sector.

Financial surveillance increasingly needs to take into account possible shocks from and repercussions of political events. Policymakers should also stand prepared for disruptions and tail risks.\(^\text{12}\)

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\(^{12}\) Straits Times (September 2016), “Terrorism or Technology, the World Must Prepare for Disruptions: Tharman”.

Box A
What Drives Bank Profitability in Asia?

Bank profitability is important for financial stability and economic growth. Healthy earnings enable banks to build capital buffers to protect against shocks. Capital is also needed to underpin banks’ credit intermediation role, which is critical for supporting economic growth.

Given these considerations, the drop in bank profitability following the GFC has raised concerns among some policy makers and led to greater scrutiny of the drivers of bank earnings.\(^\text{13}\) However, the focus has so far been on banks in the advanced economies, with less attention paid to those in Asia.

In this box, we examine the drivers of bank profitability in Asia-10 economies, adapting models used by Borio et al. (2015)\(^\text{14}\) and Kok et al. (2015).\(^\text{15}\) We find that the profitability of Asian banks has been hurt by weak macroeconomic factors, like their advanced economy counterparts, and diseconomies of scale. However, in contrast to advanced economies where accommodative monetary policies have reduced profits, we find a double-edged sword in Asia — while banks have seen their lending margins eroded by abundant liquidity and lower rates, they have also benefitted from cheaper wholesale funding.

Bank profitability is under pressure

European bank profitability\(^\text{16}\) remains depressed seven years after the GFC (Chart A1). In the US, bank profitability has recovered somewhat but not returned to pre-GFC levels. While Asia-10 banks have been more profitable than their Europe and US counterparts, their profitability has been declining in recent years.

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\(^\text{13}\) International Monetary Fund (IMF) Global Financial Stability Report (GFSR) (October 2016), “Fostering Stability in a Low-Growth, Low-Rate Era”.


\(^\text{15}\) Christoffer Kok, Csaba Möré and Cosimo Pancaro, European Central Bank (ECB) FSR (May 2015), “Bank Profitability Challenges in Euro Area Banks: The Role of Cyclical and Structural Factors”.

\(^\text{16}\) In this box, profitability is measured by return on average assets.
Existing studies suggest that subdued global growth and accommodative monetary policies have had a negative impact on bank profitability in advanced economies

Based on an analysis of how bank-specific, macroeconomic and structural factors affect bank profitability, Kok et al. (2015) find that weak cyclical factors have been important drivers of European bank profits post-GFC. Borio et al. (2015), which focused on large international banks in the advanced economies, find that bank profitability is more sensitive to monetary policy when interest rates are lower and yield curves are flatter. Specifically, keeping macroeconomic conditions constant, they find that accommodative monetary policies have had a negative impact on bank profitability.

Data, methodology and findings

Our study covers a total of 82 banks headquartered in Asia-10 economies, accounting for at least 70% of the banking assets in each economy. Using annual data from 2008 to 2015, we conducted a fixed effects panel regression to study Asia-10 bank profitability. Our equation takes the following form:

\[
ROAA_{it} = \alpha_i + \beta_1 G_{t-1} + \beta_2 E_{i, t-1} + \beta_3 B_{i, t-1} + \epsilon_{it}
\]

where ROAA\(_{it}\) is the return on average assets for bank \(i\) in year \(t\). \(G\) is a global rate variable (“Global Rate”) that is included to analyse the effect of accommodative global monetary conditions on Asia-10 bank profitability.

\(E\) and \(B\) are vectors of economy-specific and bank-specific variables, respectively. Economy-specific variables include GDP growth, interest rate spread and market concentration in each Asia-10 economy, which are used to control for macroeconomic and structural conditions. Bank-specific variables include bank assets (“Bank Size”), efficiency ratio as measured by operating cost divided by operating income (“Cost-to-income”), credit risk as proxied by loan loss provisions divided by total loans (“Provisions”), Tier 1 capital ratio (“Tier 1 Capital”) as well as the ratio of liquid assets to total assets (“Liquidity”).

We find that the interest rate spread, GDP growth and market concentration have statistically significant positive effects on ROAA. In contrast, bank size, cost-to-income, provisions as well as the global rate have statistically significant negative effects on profitability. Effects of Tier 1 capital or liquidity on ROAA are not statistically significant. A decomposition of the changes in Asia-10 bank profitability over the past six years shows that, on average, macroeconomic factors have been the main profit drivers (Chart A2).

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17 For Hong Kong, Standard Chartered Bank (Hong Kong) Limited and Hongkong Shanghai Banking Corporation Limited have been included.
18 For the purpose of the regression, pre-tax income has been used in the calculation of ROAA, so as to exclude possible effects of differing taxation regimes in Asia-10 economies.
19 The global rate variable is constructed using an index of the three-month interbank offer rate weighted by the cross-border claims of G3 on each Asia-10 economy, based on BIS data. A higher global rate reflects tighter monetary policy.
20 For each bank \(i\), the economy-specific variables correspond to that of the economy in which the bank is headquartered. For two banks headquartered in the same economy, the corresponding bank-specific variables may take on different values, but the corresponding economy-specific variables would share the same values.
21 The interest rate spread is the difference between the interest rate charged by banks on loans and that paid for deposits.
22 All variables were lagged by one period for the following reasons:
   - Economy-specific variables: to take into account delayed transmission to bank profits. Market concentration, measured by the five-firm concentration ratio by assets, was also lagged by one period to address the possible inherent relationship with ROAA;
   - Bank-specific variables: to address possible endogeneity as bank profitability could have an impact on such characteristics.
Cyclical factors have been a major driver of changes in Asia-10 bank profitability

Chart A2
Decomposition of Changes in Asia-10 Bank Profitability

Slow economic growth has affected credit demand and reduced debt servicing capacity
GDP growth can affect bank profitability in two ways. First, lower GDP growth affects credit demand, as seen by declining loan growth (Chart A3).

A subdued macroeconomic environment has resulted in a decline in banks’ gross loan growth

Second, lower GDP growth also depresses corporate profits and household income, affecting their debt servicing capacity and in turn increasing credit risk. Asian firms’ profitability and debt servicing capacity have been declining (Charts A4 and A5). This is in line with our findings where provisions, a proxy for credit risk, has a statistically significant negative impact on bank profitability.
Accommodative monetary policies have compressed domestic interest rate spreads in Asia-10 economies, with negative impact on bank profitability...

Abundant global liquidity, underpinned by accommodative monetary policies in G3, has led to tightened interest rate spreads, including in Asia (Chart A6). Given their largely domestic focus (Chart A7) and relatively high dependence on net interest income (Chart A8), Asia-10 bank profitability has been hurt by narrowing domestic interest rate spreads. This is consistent with our decomposition, where interest rate spread has been an important driver of the changes in bank profitability (Chart A2).

---

23 ICR is calculated as Earnings Before Interest and Tax, Depreciation and Amortisation (EBITDA) divided by interest expense. It serves as an indicator of debt repayment ability as it measures the degree to which earnings are sufficient to cover the interest on debt.
Asia-10 banks are relatively more reliant on net interest income

<table>
<thead>
<tr>
<th>Chart A8</th>
<th>Net Interest Income as a Proportion of Operating Revenue</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Asia-10</td>
</tr>
<tr>
<td>Per Cent</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>20</td>
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</tbody>
</table>

Banks in several Asia-10 economies have increased their reliance on wholesale funding

| Chart A9 | Share of Wholesale Funding:
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Selected Asia-10 Economies</td>
</tr>
<tr>
<td></td>
<td>2008</td>
</tr>
<tr>
<td>CHN</td>
<td>20</td>
</tr>
<tr>
<td>HK</td>
<td>20</td>
</tr>
<tr>
<td>IND</td>
<td>20</td>
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<td>IDN</td>
<td>20</td>
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<tr>
<td>MYS</td>
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<td>PHL</td>
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<td>SGP</td>
<td>20</td>
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<td>TWN</td>
<td>20</td>
</tr>
<tr>
<td>THA</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: SNL Financial
Source: MAS estimates, SNL Financial

…but has also resulted in cheaper wholesale funding for some Asia-10 banks. However, increased reliance on wholesale funding could be a double-edged sword

On the flipside, our regression results also suggest that low global rates have benefitted Asian bank profitability, potentially via the wholesale funding channel. Some Asian banks appear to have tapped on cheaper wholesale funding (Chart A9) to fund their loan growth.25

As highlighted during the GFC, wholesale funding is not without its risks. While our results suggest that cheaper wholesale funding has benefitted Asian banks, banks and regulators should be vigilant against an over-reliance on less stable funding sources.

In the face of a challenging operating environment, banks could explore the use of technology to improve efficiency and sharpen competitive edge

Cost-to-income ratios are better managed within Asia-10 compared to the global average (Chart A10). With weaker top-line growth, some banks have turned to cost-cutting measures, including exiting certain business lines26 as well as reducing headcount.27 In addition to such measures, which may not be sustainable, Asia-10 banks can also explore digitalisation and other means to improve efficiency and overcome potential diseconomies of scale as they grow.28

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24 Share of wholesale funding is calculated as wholesale funding over total deposits and borrowings.

25 This is in line with IMF findings, where after a prolonged period of low global interest rates and abundant global liquidity, banks in some Asian economies have started to turn to wholesale or other external sources of funding to sustain their loan growth. Nasha Ananchotikul and Dulani Seneviratne, IMF Working Paper (September 2015), “Monetary Policy Transmission in Emerging Asia: The Role of Banks and the Effects of Financial Globalisation”.

26 For example, Australia and New Zealand Banking Group (ANZ) closed its small and medium-sized enterprise (SME) lending business in Hong Kong, Indonesia, Singapore, Taiwan and Vietnam earlier this year. Reuters (March 2016), “ANZ Exits SME Business in Five Asian Countries, cuts around 100 jobs”.

27 For example, China banks are reducing headcount and slashing pay due to sluggish top-line growth. Financial Times (September 2016), “China Banks Shed Staff and Slash Pay in Cost-Cutting Drive”.

28 For example, Standard Chartered is investing in its computing and IT systems to reduce reliance on staff in certain areas. The Telegraph (March 2016), “Standard Chartered Investing in Robots to Help Cut Costs”.
Regulatory reforms aimed at increasing bank resilience could have a mixed effect on the growth outlook of Asia-10 bank profits

Based on our findings, capital and liquidity requirements do not currently appear to constrain Asia-10 bank profitability. Nonetheless, it would be useful to monitor the impact of ongoing global regulatory reforms as they are progressively implemented over the next few years. The objective is to avoid unintended effects that may undermine banks’ longer-term viability and stifle their ability to support continued economic growth.

**Looking ahead: Asian banks well-poised for further growth in spite of headwinds**

**Asia-10 banks should continue to be vigilant against headwinds...**

The operating environment for Asian banks is expected to remain challenging in the near term. Economic growth and thus loan growth are expected to be modest. We also continue to be wary of the turn of the credit cycle, as slow growth and overcapacity continue to weigh on debtors’ repayment capacities. Any rate normalisation in the US is also expected to bring tighter global financing conditions, with attendant impact on debt servicing capacities in Asia.

...while taking advantage of growth opportunities

That said, Asia-10 banks maintain strong capital and liquidity buffers that will help to mitigate asset quality (Chart A11) and funding pressures and enable them to continue supporting the regional economy. Low financial inclusion in several Asia-10 economies (Chart A12) provides opportunities for Asian banks to pursue deeper financial penetration and consequently, higher loan growth. The SME sector would be another area of growth for Asian banks.  

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29 As measured by the percentage of persons aged 15 and above who have an account at a financial institution.

30 According to the Asian Development Bank’s (ADB’s) Asia SME Finance Monitor (2014), SMEs accounted for an average of 96% of all enterprises across Asia-Pacific countries, but contributed only 42% of economic output in each country. Limited access to bank credit has been cited as a persistent problem in parts of Asia that limits SMEs from growing to the point where they can innovate or be part of the global supply chain.
Asia-10 banks can also look forward to greater growth benefits from deeper regional integration.\textsuperscript{31} Ongoing Association of Southeast Asian Nations (ASEAN) integration initiatives\textsuperscript{32} will help ASEAN banks to further expand in the region through greater market access. Another avenue of growth would be to diversify revenue sources. For example, non-interest income has provided support for revenue of some Asian banks.\textsuperscript{33}

\textsuperscript{31} ASEAN Banking Council Meeting (June 2015), Keynote Address by Mr. Ravi Menon, Managing Director, MAS, “ASEAN Financial Integration: Where Are We, Where Next?”.

\textsuperscript{32} These refer to ASEAN Economic Community, ASEAN Financial Integration Framework and ASEAN Banking Integration Framework.

\textsuperscript{33} Straits Times (October 2016), “OCBC Q3 Earnings up 5%, Beating Forecasts, but Asset Quality Remains Stressed”.
Concerns over how risks could have shifted from banks to other parts of the financial system have remained high on the global regulatory agenda. The Group of 20 (G20) leaders reaffirmed in their Hangzhou communiqué that they would continue to monitor and address emerging risks associated with shadow banking, asset management and other market-based finance. A key area of focus has been how the activities and products offered by global asset managers could pose risks to financial markets. The Financial Stability Board (FSB) has also identified potential vulnerabilities of other institutional asset owners such as pension funds and SWFs as another area for further analysis.

The weak macroeconomic backdrop raises additional concerns for both asset managers and other institutional asset owners. The IMF notes that the present low interest rate environment has likely encouraged more risk-taking by non-bank financial intermediaries such as asset managers. In a similar fashion, other institutional asset owners such as pension funds have been moving into higher-yielding assets. Certain oil-funded SWFs have been divesting some of their holdings to meet domestic budget shortfalls in light of the oil price slump. While there have been some studies assessing whether the investment behaviour of institutional investors is pro-cyclical or counter-cyclical, their impact on Asia-10 asset markets remains relatively unexplored.

Against this backdrop, we assess whether open-ended funds and other institutional asset owners affect the volatility of Asia-10 asset prices through their ownership of these assets. Thus far, studies on this topic have focused mostly on the investment behaviour of open-ended funds and/or a subset of institutional asset owners, and typically treat emerging markets as a homogeneous market. Current datasets on institutional asset owners typically either cover a subset of investors (e.g. custodian bank data) or do not cover all Asia-10 asset markets (e.g. Organisation for Economic Co-operation and Development (OECD) statistics).

For the purposes of this study, we used data on open-ended funds and other institutional asset owners to

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34 G20 2016 China (September 2016), “G20 Leaders’ Communiqué Hangzhou Summit”.
35 FSB Consultation Document (June 2016), “Proposed Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities”.
36 These concerns were elaborated upon in MAS FSR Box A (November 2015), “Emerging Fault Lines in the Asset Management Ecosystem”.
38 Willis Towers Watson estimates that pension funds’ allocations to private markets have increased by nine percentage points between 2007 and 2015. Willis Tower Watson (2016), “Global Pensions Asset Study 2016”.
39 Institutional Investor (June 2016), “Negative Rates Drive Major Changes at European Pension Funds”.
40 Bloomberg (October 2016), “Risks Mount for World’s Biggest Wealth Fund”.
41 For instance, IMF found that flows from retail-oriented mutual funds were significantly more sensitive to global financial shocks (proxied by the Chicago Board Options Exchange (CBOE) Volatility index (VIX)) than flows from other institutional investors for both bonds and equities, suggesting that these institutional investors may have long-term investment horizons which enable them to ride out short-term volatility in asset prices. IMF GFSR Chapter 2 (April 2014), “How Do Changes in the Investor Base and Financial Deepening Affect Emerging Market Economies?”.
42 Data from the OECD Global Pension Statistics and the OECD Global Insurance Statistics do not cover all Asia-10 markets, and do not provide a geographical breakdown of asset owners’ assets under management (AUM) exposures.
estimate their Asia-10 equity and bond holdings from 2011 to 2014. Open-ended funds include retail-oriented global fixed income and equity funds, while other institutional investors include insurers, pension funds and SWFs. Unlike open-ended funds, data on the global investment preferences of institutional asset owners are typically not publicly available. Hence, we assume that the geographical asset allocations of institutional asset owners follow those of widely-used asset class benchmarks.43,44,45

Our panel regression to study the volatility of Asia-10 equity and bond indices during the 2011 to 2014 period takes the following form:

\[
\text{Volatility}_t = \alpha_t + \beta_1 \text{Open-ended Funds' Ownership}_{t-1} + \beta_2 \text{Other Institutional Ownership}_{t-1} + \beta_3 C_{t-1}
\]

where Volatility\(_t\) denotes the annualised volatility of each Asia-10 equity or bond index. The variable Open-ended Funds' Ownership\(_{t-1}\) is the fraction of each Asia-10 economy's equity or bond market capitalisation held by open-ended funds. The variable Other Institutional Ownership\(_{t-1}\) is the fraction of each Asia-10 equity or bond market capitalisation collectively held by insurers, pension funds, and SWFs. \(C_{t-1}\) is a vector of variables to control for domestic macroeconomic conditions as well as global market volatility.46 For the equity model, we additionally controlled for market valuations.47

Asia-10 equity and bond indices with a higher proportion of open-ended fund ownership tend to exhibit higher price volatility, while those with a higher proportion of other institutional ownership tend to exhibit lower price volatility

The estimates are presented in Chart B1. A one percentage point increase in open-ended funds' ownership is associated with a 91 basis points (bps) jump in annualised volatility for equity indices, and a 48 bps increase in annualised volatility for bond indices. In contrast, a one percentage point increase in other institutional ownership is associated with a 34 bps reduction in annualised volatility for equities, and a 42 bps decrease in annualised volatility for bonds. This may reflect differences in investment behaviour — retail-oriented open-ended funds may be more influenced by shorter-term market fluctuations, perhaps due to redemption pressures. On the other hand, institutional asset owners could have longer-term investment horizons which enable them to ride out short-term volatility in asset prices.

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43 Market capitalisation-weighted benchmark indices remain widely used in portfolio management. In the fixed income space, the Barclays Global Aggregate index is one of the most widely-used benchmarks amongst global bond investors. IMF Working Paper (December 2015), “Emerging Market Portfolio Flows: The Role of Benchmark-Driven Investors”.
44 For the equities asset class, 95% of US pension funds use an MSCI index as their benchmark. Aon Hewitt Retirement Solutions (July 2015), “Investment Insights”.
45 As noted by the BIS, portfolio managers’ actual allocations are unlikely to deviate substantively from benchmark allocations on aggregate, as the career risk of short-term underperformance of managers against their peers would induce them to form similar portfolios or to “hug” the benchmarks fairly closely. BIS Quarterly Review (September 2014), “Asset Managers In Emerging Market Economies”.
46 As a proxy for domestic macroeconomic conditions, we use domestic short-end rates. To capture global market volatility, we use the VIX for the equity model and the Merrill Lynch Option Volatility Estimate index for the bond model.
47 To capture equity market valuations, we use price-to-book ratios. High or “over-valued” market valuations could be more susceptible to sharp market corrections.
Higher open-ended funds’ ownership is associated with higher price volatility in Asia-10 equity and bond indices; the converse is true for other institutional ownership

Policy implications and next steps

Our findings suggest that, from an Asian perspective, the global regulatory focus on vulnerabilities associated with open-ended funds is appropriate. There are indications of potential risks to Asia-10 financial markets arising from shifts in global open-ended fund holdings. Good progress has been made to address these potential risks. The FSB and national regulators have been closely monitoring several aspects of open-ended funds, including the liquidity mismatch between fund investment assets and the redemption terms for fund units.  

As for other institutional asset owners, we do not find clear evidence that their investment activities pose risks to financial stability at this juncture. In fact, our study suggests that their investment behaviour has helped to reduce volatility in Asia-10 asset markets. Furthermore, our results are consistent with other authorities’ recent viewpoints that institutional asset owners could contribute to financial stability. For instance, the results from the European Insurance and Occupational Pensions Authority’s (EIOPA’s) 2015 stress test exercise shows that European pension funds behaved in a counter-cyclical fashion during the GFC.  

That said, there have been increasing concerns that the combination of increased longevity and lower investment returns could pose significant challenges to pension funds, insurers and other institutional investors. For instance, pension schemes such as defined benefit schemes have become increasingly unsustainable due to demographic shifts and prolonged low returns. Defined contribution schemes

Other vulnerabilities include leverage within investment funds, operational risk and challenges in transferring investment mandates or client accounts and securities lending activities of asset managers and funds.

49 EIOPA studied the actual investment behaviour of institutions for occupational retirement provision (IORPs) during the GFC, and finds that on aggregate, IORPs’ investment behaviour was counter-cyclical — they moderately rebalanced their portfolios towards equities and away from bonds arising from market movements during 2008. EIOPA (January 2016), “IORPs Stress Test Report 2015”.

50 Singapore Deputy Prime Minister Tharman Shanmugaratnam’s speech on the Central Provident Fund (CPF) and social security at the Economic Society of Singapore (September 2016). A defined benefit scheme is a type of pension plan in which an employer promises a specified monthly benefit to an employee on retirement that is predetermined by a formula based on the employee’s earnings history, tenure of service and age.
have not been spared either, because such schemes may have coverage and adequacy shortfalls\textsuperscript{51}, and their investment returns have typically underperformed market benchmarks, especially net of fees\textsuperscript{52}.

These issues are deep-set in nature, politically challenging and require a broad range of policy tools to address. Policymakers have been implementing and weighing reforms in both developed and emerging markets. We note that European pension systems, particularly in the UK, are already undergoing fairly significant reforms\textsuperscript{53}. In Asia, deliberations are also ongoing in Japan\textsuperscript{54}, China\textsuperscript{55}, Taiwan\textsuperscript{56} as well as Singapore.

In Singapore, we think that the solution to creating a pension system that makes sense over the longer term could be a hybrid that combines the benefits of collective pooling while allowing for individual investment decisions.\textsuperscript{57} We support the concurrent reform efforts taking place globally, and believe these reforms are key to ensuring that the investment behaviour of these institutional investors continues to support financial stability in the longer term, instead of contributing to risks.

\textsuperscript{51} Coverage shortfalls refer to the proportion of individuals without a retirement-oriented savings account, while adequacy shortfalls refer to investment returns in retirement accounts being insufficient to meet retirement needs.

\textsuperscript{52} Over the last 30 years, the average investor in a US equity open-ended fund earned slightly over a third of the annualised returns of the S&P 500 index. Dalbar (2016), “Quantitative Analysis of Investor Behaviour, 2016”.

\textsuperscript{53} The Pensions Regulator (March 2016), “Freedom and Choice — How Occupational Pension Schemes have Implemented the Pension Flexibilities”.

\textsuperscript{54} Nikkei Asian Review (March 2016), “Japan Public Pension Giant to Boost Transparency of Investments”.

\textsuperscript{55} For instance, China has sought the Canada Pension Plan Investment Board’s expertise on a variety of issues, including pension reform. Pensions & Investments (September 2016), “CPPIB to Aid China with Pension Reform, Other Issues”.

\textsuperscript{56} The China Post (September 2016), “Pension Reform Goes On”.

\textsuperscript{57} Collective pooling schemes are also known as defined benefit schemes, while individual investment accounts are also known as defined contribution schemes. Defined contribution schemes operate on an individual basis, but effectively shifts the risk from the employer to the individuals.
Appendix

Methodology to Estimate Ownership of Asia-10 Assets by Open-Ended Funds and Other Institutional Asset Owners

For open-ended funds, we examined over 9,500 global fixed income funds and over 21,500 global equity funds tracked by Morningstar.

For other institutional asset owners, we compiled data on AUM as well as bond and equity allocations based on publicly available information. These data sources include reports from individual pension funds and SWFs, insurance industry associations, the OECD, and the International Forum of Sovereign Wealth Funds (IFSWF). On aggregate, the institutional asset base across global markets amounted to US$56 trillion in 2015. Our asset base coverage for the three types of institutional asset owners — insurers, pension funds and SWFs — ranges from 80% for SWFs to 98% for pension funds (Chart B2).

Detailed coverage of institutional asset owners’ AUM — global insurers, pension funds and SWFs

Detailed Data on Institutional Asset Owners' Holdings as a Percentage of Total Asset Base

Insurers

- 97% AUM covered from industry associations/individual funds
- 3% Remaining AUM not covered

Pension funds

- 98% AUM covered from individual funds
- 2% Remaining AUM not covered

SWFs

- 80% AUM covered from IFSWF/individual funds
- 20% Remaining AUM not covered

Source: MAS estimates, OECD, IFSWF, Preqin

58 We examined data from over 58 pension funds, 12 SWFs, 20 insurance industry associations as well as the IFSWF. IFSWF (2016), “The Sky Did Not Fall – Sovereign Wealth Fund Annual Report 2015”.

59 Of this US$56 trillion, pension funds accounted for US$25 trillion (based on the largest 12 global markets and Asia-10 markets), insurers accounted for US$26 trillion (based on the largest 10 global markets and Asia-10 markets) and SWFs accounted for US$5 trillion (based on the largest 7 global markets and Asia-10 markets, for which data is available). Data in the OECD Global Pension Statistics and the OECD Global Insurance Statistics was provided by or sourced from national authorities or official national administrative sources, covering 34 OECD markets and at least 24 non-OECD markets.
Chart B3 illustrates how this database was constructed for pension funds’ AUM exposures.

**Database on pension fund markets’ AUM exposures**

**Chart B3**

**Aggregating Data on Pension Funds’ AUM Exposures**

**DATA SOURCES**

- Fund-specific Annual Report
- Industry Annual Report
- OECD

<table>
<thead>
<tr>
<th>Pension Fund Markets</th>
<th>AUM (USD trillion)</th>
<th>Asset Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Source: OECD/Individual Funds</td>
<td>Source: OECD/Individual funds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% Bonds (Global)</td>
</tr>
<tr>
<td>USA</td>
<td>$14.3</td>
<td>34%</td>
</tr>
<tr>
<td>UK</td>
<td>$2.7</td>
<td>36%</td>
</tr>
<tr>
<td>Japan</td>
<td>$2.5</td>
<td>13%</td>
</tr>
</tbody>
</table>

Source: MAS estimates, Fund Annual Reports, OECD
Commercial Real Estate Investment Flows in Asia: Trends and Drivers

While property bubbles and their implications for financial stability have been on authorities’ radars for some time, the focus has generally been on residential markets and less attention has been given to commercial real estate (CRE) markets. This box examines the investment trends in Asian CRE markets, the drivers of CRE prices, and the financial stability implications of CRE.

Financial stability risks from CRE
CRE markets are prone to cycles. These cycles reflect economic conditions that affect demand for office and industrial space, but may be amplified by certain market characteristics. In particular, long and lumpy construction lags can result in large and prolonged mismatches in demand and supply, which could in turn lead to sharp price corrections and depressed markets long after an economic downturn. Such volatility could adversely affect the financial positions of construction companies and real estate developers. At the same time, this could have indirect effects on smaller companies that rely on CRE as collateral to obtain financing. There could also be knock-on impact on banks that offer financing to these firms.

CRE investment has been increasing globally, including in Asia...
In recent years, investors have channelled more funds into CRE markets. Global CRE investment has more than tripled since the GFC, rising from US$190 billion in 2009 to US$670 billion in 2015. This trend has also been evident within Asia, where investment has risen from US$50 billion in 2009 to close to US$100 billion in 2015 (Chart C1).

...on the back of higher relative returns on CRE
One likely reason CRE has gained favour among investors is that the relative returns on CRE are higher today as a result of the low interest rate environment — in other words, CRE has become relatively more attractive for investors seeking yield. For instance, the relative returns of offices in certain Asian cities are at least 100 bps higher in 2016 compared to 2007 (Chart C2). The increase in relative returns have been more apparent in cities such as Tokyo and Seoul, where accommodative monetary policies have sent 10-year government bond yields to record lows.
Global investment into CRE has increased... 

While domestic investors dominate, cross-border investment into Asia has been rising...

In Asia, CRE investment has largely been driven by domestic investors. Real Estate Investment Trusts (REITs) and property developers have traditionally been key players in the CRE market, accounting for almost half of total domestic investment between 2007 and 2015 (Chart C3). However, cross-border investors have shown increased interest in CRE, accounting for 24% of total CRE investment in Asia in 2015, up from 14% in 2009.66

...primarily driven by asset management firms and institutional asset owners

The increase in cross-border activity is likely to have been bolstered by the low global interest rate environment. The resulting search for yield has spurred investors to look beyond their borders and acquire alternative assets such as real estate. Asset management firms have been the main cross-border CRE investors, accounting for 54% of cross-border investment into Asian CRE markets in 2015, up from 41% in 2007 (Chart C4).67 Other institutional asset owners, such as SWFs, pension funds and insurers, have also increased their cross-border CRE investment in Asia. Such investors accounted for only 3% of cross-border investment into Asian CRE markets in 2007, but their share has since jumped by more than three-fold to 10% in 2015.

Institutional asset owners are seeking to boost their allocations to real estate. According to data from Preqin, these investors have targeted allocations to real estate in the range of 9–10%, compared to their current allocations of around 6–9% on average.68 For some investors, the volatility in equity markets and the drop in commodity prices may have provided the impetus to diversify into real estate, which could potentially offer more stable, long-term income and a hedge against inflation.69 For others, such as life insurers, the returns on traditionally safer assets like sovereign bonds may be insufficient to cover their promised rates of return, and so they may turn to real estate for higher yields.

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66 A transaction is defined as “cross-border” if the buyer is not headquartered in the same country where the property is located.
67 “Asset management firms” include various investment vehicles such as mutual funds and private equity funds. They exclude pension funds, insurers and SWFs.
While domestic CRE investment has been dominated by REITs and property developers...

...cross-border CRE investment has been dominated by asset management firms and institutional asset owners

Growth in CRE prices has outstripped that of rentals

Increased CRE investment in Asia has, however, led to CRE prices rising faster than rentals in many markets. This has compressed Asian CRE capitalisation rates\(^{70}\), from 5.4% in Q4 2013 to 4.6% in Q2 2016 (Chart C5). Should the trend persist, CRE markets could be at risk of becoming misaligned with economic fundamentals.

\(^{70}\)“Capitalisation rates” refers to ratio of the net operating income produced by a property to the value of the property.
Asian CRE prices have been driven by both domestic and external factors

To investigate the drivers of CRE price growth in Asia, we conduct a panel Vector Auto Regression (VAR) of office prices in six Asian cities — Beijing, Hong Kong, Shanghai, Singapore, Taipei and Tokyo — between Q4 2008 and Q1 2016. Over this period, these six cities accounted for close to three-quarters of Asian office investment flows. In general, there is some persistence in CRE price growth, i.e. past price growth tends to influence future price growth. The VAR model takes this persistence into account.

Studies have shown that domestic macroeconomic variables such as GDP growth, equity prices and short-term rates can affect CRE price growth. Domestic GDP growth is an indicator of the amount of economic activity in the country. Hence it reflects both the demand for office and industrial space as well as the amount of capital available for investment. Equity prices reflect business sentiment, while short-term interest rates affect investors’ borrowing costs.

Aside from domestic factors, external factors could also influence CRE price growth, given the increasing prominence of cross-border CRE investments. For example, foreign GDP growth could be a “push” factor that drives foreign investors to acquire overseas CRE. Differences in capitalisation rates could affect the relative attractiveness of individual CRE markets.

Our panel VAR includes the following domestic and external variables:

<table>
<thead>
<tr>
<th>Domestic Variables</th>
<th>External Variables</th>
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<tbody>
<tr>
<td>Changes in equity prices</td>
<td>Foreign GDP Growth (i.e. GDP growth in home countries of cross-border investors)</td>
</tr>
<tr>
<td>Domestic short-term rates</td>
<td>Differences in capitalisation rates (i.e. office capitalisation rates in the selected Asian cities that were in excess of the overall office capitalisation rate in Asia)</td>
</tr>
<tr>
<td>Domestic GDP growth</td>
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Based on the results of variance decomposition, the effect of past office price growth is strong, accounting for around half the variation in office price growth. Domestic and external factors explain the remaining variation in office price growth.

Domestic factors contribute to almost a fifth of the variation in office price growth (Chart C6). Among the list of domestic factors, GDP growth is found to be the largest driver. Improved business sentiments and low borrowing costs are likely to have boosted demand for office space too.

External factors account for about 27% of the variation in office price growth, more than domestic

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71 Prices of office property were used as the basis of comparison because in office properties are more homogenous across cities as compared to other types of commercial property in general.

72 Haibin Zhu, BIS Papers No. 21 (December 2003), “The Importance of Property Markets for Monetary Policy and Financial Stability”.

73 Zhu (2003) finds that macro factors such as GDP, interest rates, bank credit and equity prices drove prices in the residential and CRE markets. Haibin Zhu, BIS Papers No. 21 (December 2003), “The Importance of Property Markets for Monetary Policy and Financial Stability”.

74 This variable refers to the weighted average GDP growth of countries that have invested significantly in each of these six cities over the last ten years.
factors. Of the external factors, differences in capitalisation rates, which reflect the relative attractiveness of different cities, are found to be the biggest driver. The search for yield among global investors, as evidenced by the rise in cross-border CRE investments in recent years, lends support to the finding that external factors could also play an important role in driving CRE prices.

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**Domestic and external factors are found to contribute to the variation in office price growth, though the magnitude of their contributions vary**

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**Chart C6**

Contribution of Domestic and External Factors in Explaining the Variation in Office Price Growth in Selected Asian Cities

Source: MAS estimates

Our findings underscore the need to monitor developments in CRE markets

Our findings suggest that growth in CRE prices in Asia are influenced by both domestic and external factors. Looking ahead, regional and global economic headwinds could weigh on CRE markets in Asia. At the same time, the growing trend of cross-border CRE investment driven by investors’ search for yield could mean continued price pressures in some markets.

Authorities need to better monitor developments in CRE markets in order to detect risks early. CRE markets are relatively opaque compared to residential real estate markets, and official data on CRE markets are often not readily available. Improvements in data collection would enable authorities to monitor CRE investment flows, signs of overheating or rapid price declines. Authorities can then take appropriate measures to address any resulting financial stability risks.

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75% of the variation in office price growth can be explained by past changes in office price growth. This chart shows the other factors accounting for the remaining 45% of the variation.
Box D
Drivers of Portfolio Flows in Asia:
Do Global, Regional or Domestic Factors Matter More?

Recent studies confirm that China’s financial spillovers to Asia, particularly in equity markets, have increased post-GFC, reflecting China’s growing economic and financial importance to the region. This was evident during the episodes of equity market volatility in China in mid-2015 and early 2016, which generated spillovers to financial markets across Asia.

Spillovers can be transmitted through channels such as trade, financial linkages and portfolio rebalancing by common investors. In this box, we examine how the portfolio channel of contagion can propagate such spillovers. We estimate a panel regression to examine the drivers of equity portfolio flows to Asia, focusing on the relative importance of global, regional and domestic factors. In the panel model, we also include variables to test whether portfolio flows to Asia move in tandem with those to China in the absence of common shocks (be it regional or global). A positive result would suggest contagion from China to Asia when investors adjust their portfolios.

Literature review: less focus thus far on portfolio flows
Recent episodes of China-related financial market volatility in mid-2015 and early 2016 motivated a number of studies on China’s financial spillovers (e.g. Chang et al. (2016), Guimaraes-Filho and Hong (2016) and Arslanalp et al. (2016)). These studies find that spillovers from China’s equity market to equity markets in Asia have increased, as movements in China’s equity returns are impacting equity returns in other Asian markets more significantly.

Existing literature has been less focused on examining the channels through which China’s financial spillovers have been transmitted to Asia. Arslanalp et al. (2016) find that trade remains the main transmission channel for China’s spillovers to Asian equity markets, although financial linkages play an increasing role post-GFC. Although the concept of portfolio flows as a channel of spillover is gaining traction, the impact of a China shock on portfolio flows to Asia has been relatively unexplored.

76 While financial spillovers from China to Asia in the equity markets have increased, spillovers from China to Asia in the bond markets have been negligible. Hence, we focus on examining portfolio equity flows in this box. Chang Shu, Dong He, Jinyue Dong and Honglin Wang, BIS Working Paper No. 579 (September 2016), “Regional Pull vs Global Push Factors: China and US Influence on Asia-Pacific Financial Markets”; and Serkan Arslanalp, Wei Liao, Shi Piao and Dulani Seneviratne, IMF Working Paper WP/16/173 (August 2016), “China’s Growing Influence on Asian Financial Markets”.
77 For the purpose of this box, Asia refers to Asia-9, which comprises Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand.

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In the same vein as Lo Duca (2012)\textsuperscript{82} and Fratzscher (2011)\textsuperscript{83}, we use a factor model to study the drivers of portfolio flows to Asia. We also reviewed the literature on contagion arising from investor behaviour. In particular, Puy (2013)\textsuperscript{84} and Schadler (2008)\textsuperscript{85} find that very few countries receive portfolio flows in isolation and that regionalism and contagion could be significant drivers. We therefore augmented our model to test for such contagion effects.

**Empirical model**

We used data on weekly net equity fund flows to each Asia-10 economy between January 2005 and June 2016 from EPFR Global.\textsuperscript{86}

We first design a panel regression to examine whether global, regional or domestic equity returns matter more in driving portfolio flows to Asia. We then augment the model with interaction terms to test if portfolio flows to China drive the component of portfolio flows to other Asian countries that cannot be explained by market returns.

The regression specification is:

\[
\text{Flow}_{it} = \alpha_i + \beta_1 F_t + \beta_2 G_t + \beta_3 R_t + \beta_4 D_{it} + \beta_5 (\text{Chinaflows}_t \times \text{Inflow}_t) \\
+ \beta_6 (\text{Chinaflows}_t \times \text{Outflow}_t) + \epsilon_{it}
\]

where \( \text{Flow}_{it} \) denotes the weekly net equity fund flows (expressed as a percentage of estimated allocations at beginning of the week) to economy \( i \) in Asia (excluding China) at week \( t \).

\( G_t, R_t \) and \( D_{it} \) represent global, regional and domestic equity returns respectively. The MSCI World Index and MSCI All Country Asia ex Japan Index are used as proxies for global and regional equity returns respectively.\textsuperscript{87} Each economy’s stock market index is used as a measure for its domestic equity returns. \( F_t \) is a vector of variables to control for global risk aversion and global liquidity shocks. These are proxied by the weekly change in the VIX and the spread between the three-month Overnight Index Swap (OIS) rate and the three-month Treasury bill rate respectively.

The two variables, \( (\text{Chinaflows}_t \times \text{Inflow}_t) \) and \( (\text{Chinaflows}_t \times \text{Outflow}_t) \) are the inflow and outflow interaction terms — \( \text{Chinaflows}_t \) represents weekly net equity fund flows to China\textsuperscript{88}, while \( \text{Inflow}_t \) and \( \text{Outflow}_t \) are dummy variables\textsuperscript{89} that represent inflow and outflow episodes respectively.

\textsuperscript{82} Marco Lo Duca, ECB Working Paper No. 1468 (September 2012), “Modelling the Time Varying Determinants of Portfolio Flows to Emerging Markets”.


\textsuperscript{84} Damien Puy, European University Institute (July 2013), “Institutional Investors Flows and the Geography of Contagion”.


\textsuperscript{87} To minimise potential multicollinearity, we use global equity returns orthogonalised against global risk aversion and global liquidity shock, and regional equity returns against the three global factors. Similarly, domestic equity returns are regressed against the global and regional factors, and the residuals are used as the measure of domestic equity returns.

\textsuperscript{88} We use weekly net equity fund flows to China orthogonalised against the three global factors and regional equity returns.
The panel regression is estimated for two sample periods: (i) January 2005 to December 2008; and (ii) January 2009 to June 2016, to examine whether the relative importance of the drivers of portfolio flows to Asia changed pre- and post-GFC.\textsuperscript{90} The results yield a number of insights.

**Increased importance of regional factors may be reflective of deeper economic and financial integration in Asia...**

First, the regression results show that regional equity returns have become relatively more important in driving portfolio flows to Asia post-GFC. In contrast, global equity returns have become more muted (Chart D1). In other words, portfolio flows to Asia are now more dependent on regional developments (e.g. better regional economic fundamentals or improved market returns) and less subjected to shifts in global financial conditions than before.

Regional factors may now be playing a larger role because of deeper intra-regional trade and financial integration. The share of intra-Asia exports rose from 44.7% to 47.5% of total exports between 2008 and 2014 (Chart D2). Even though financial integration in Asia lags behind trade integration, intra-Asia portfolio investment (a measure of financial integration) also increased from 10.5% to 14.8% of total portfolio investments over the same period (Chart D2).

**Increased relative importance of regional equity returns in driving flows to Asia post-GFC...**

...may be due to deeper intra-regional economic and financial integration

**Chart D1**

**Panel Regression Results:**

<table>
<thead>
<tr>
<th></th>
<th>Estimated Coefficient Pre-GFC</th>
<th>Estimated Coefficient Post-GFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Equity Returns</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Regional Equity Returns</td>
<td>0.05</td>
<td>0.10</td>
</tr>
<tr>
<td>Domestic Equity Returns</td>
<td>0.00</td>
<td>0.05</td>
</tr>
</tbody>
</table>

**Chart D2**

**Intra-Asia Exports and Portfolio Investments**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-Asia Exports as a Share of Total Asian Exports</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Intra-Asia Portfolio Investments as a Share of Total Asian Portfolio Investments</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: MAS estimates

Note: All explanatory variables are statistically significant and have the expected signs.

...but closer regional integration and investors' deeper interest in Asia may lead to more intense propagation of intra-regional shocks

The above finding underscores the need for greater focus on Asian developments when monitoring regional portfolio flows. For example, if a downturn in a major regional economy is perceived by investors...
to be a significant regional shock, it could trigger portfolio outflows from other economies in Asia, with implications on the equity markets and financial stability in these countries. In addition, foreign equity portfolio investments in Asia-10 have increased substantially (Chart D3). The share of global equity portfolio allocation to Asia-10 rose to 9.5% in 2015 from 6.3% in 2003. This shift in portfolio allocation towards the region has increased investors’ exposure and hence sensitivity to changes in Asian equity returns. This, in turn, may have increased investors’ propensity to rebalance their portfolios more rapidly in response to valuation changes in Asian stocks. Such portfolio rebalancing would have implications for portfolio flows to the region. Asian policymakers need to be watchful of such potential spillovers to their domestic markets.

There are also indications of contagion from China portfolio flows to portfolio flows elsewhere in Asia...

Next, we examine the effect of contagion through investors’ behaviour (i.e. whether portfolio flows to China drive the component of portfolio flows to the rest of Asia-10 that cannot be explained by changes in market returns).

The estimated coefficients of the interaction terms are positive and statistically significant, indicating that portfolio flows to Asia that were unexplained by global, regional and domestic factors were positively correlated with China’s portfolio flows. This suggests that investments in (or divestment of) Chinese equities tend to be accompanied by buying (or selling) of equities in other Asian countries. A possible explanation for this phenomenon is that investors may not fully differentiate between Chinese equity markets and other equity markets in the region, preferring to enter and exit these markets concurrently. It also implies that, from foreign investors’ perspective, there may not be an Asian safe haven in the event of a sell-off in China.

The results also show that such correlated movements were stronger during outflow episodes than

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91 Data from EPFR.
92 Anecdotal evidence provided some clues to investors’ perception. For instance, analysts opined that “we do not see any safe havens, all markets in Asia are now Underweight to reflect our bearish stance”. DBS Group Research (August 2015), “No Safe Haven in Asia”.
inflow episodes. This suggests that Asia could be more susceptible to spillovers when China is experiencing outflows.

...although the degree of contagion has dampened post-GFC alongside greater investor differentiation

That said, the estimated coefficients for the interaction terms post-GFC are smaller than those before the crisis (Chart D4). This suggests that investors may be taking a more differentiated approach to individual markets in Asia. The gradual opening up of China’s capital markets and the greater availability of instruments that allow investors to achieve more targeted investment exposure to China may have fostered this development. For example, investments in Chinese equities by China-dedicated funds have grown faster than those by Asia ex-Japan funds (Chart D5) following the gradual opening up of China’s capital account in 2012.

However, the estimated coefficient for the outflow interaction term remains larger than that for the inflow interaction term post-GFC. This suggests that the contagion effect on portfolio flows to Asia continues to be larger during a China outflow episode than a China inflow episode. While investors may take a more deliberate, differentiated approach when investing, the risk of herding behaviour when investors exit regional markets en masse cannot be discounted.

A closer look reveals that contagion effects differ across Asian economies

To ascertain whether contagion effects through portfolio flows differ across Asia, we re-estimated the regression model for each Asian economy and compared the sensitivity of each economy’s portfolio flows to changes in portfolio flows to China. Compared to the overall results which show that contagion effects differ across Asian economies, we find that contagion effects may vary significantly across different regions.

93 The lower coefficients on \((China_{flows,t} \times Inflow)\) and \((China_{flows,t} \times Outflow)\) could also be due to China spillovers taking place via the regional factor (Chart D1) as China becomes ever more integrated into the region, instead of as an idiosyncratic risk factor.

94 People’s Bank of China highlighted its plans for capital account liberalisation in 2012. China has since expanded the Renminbi Qualified Foreign Institutional Investor (RQFII) and Qualified Foreign Institutional Investor (QFII) schemes to allow more foreign investors to invest directly in China’s capital markets. Lina Yang, Xinhuanet (November 2012), “China pledges to expand QFII, RQFII programs”.

Contagion through portfolio investor seems to have dampened

Equity investments into China by China-dedicated funds outpaced that by Asia ex-Japan funds

Chart D4

Panel Regression Results:
Sensitivity of Asia’s Portfolio Flows to Changes in China’s Portfolio Flows

Source: MAS estimates

Chart D5

Equity Investments to China by Asia ex-Japan Funds and China-Dedicated Funds

Source: MAS estimates, EPFR
effects have weakened since the GFC (Chart D4), the results for individual economies (Chart D6) indicate that contagion effects have increased for some Asian economies during portfolio outflow episodes from China. These economies may therefore be more susceptible to spillovers from a China shock.

Some Asian economies face stronger contagion during outflow episodes

Chart D6
Regression Results for Individual Asian Economies:
Sensitivity of Asia’s Portfolio Flows to Changes in China’s Portfolio Flows

(a) Inflow Episodes
(b) Outflow Episodes

Source: MAS estimates

Implications for policymakers
The increased relative importance of regional factors in driving portfolio flows to Asia suggest that the region as a whole can benefit from closer surveillance of regional developments and sources of spillovers. Policymakers may also want to gain a better understanding of how portfolio flows affect their domestic markets. Opening up domestic financial markets to portfolio flows can help to reduce cost of capital and boost investments, but may also expose the economy to external spillovers. From a surveillance point of view, this implies that monitoring the exposures of large investors at a micro level is crucial in assessing vulnerabilities. To mitigate contagion effects from portfolio flows, policymakers could take steps to enhance the resilience of their markets such as developing a diversified investor base and improving market liquidity to absorb outsized shocks.

95 Rene Stulz (March 1999), “International portfolio flows and security markets”.

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2 Singapore Financial Sector

Singapore’s banking system stays resilient amid a challenging environment. Banks continue to maintain strong capital and liquidity buffers but continued vigilance is warranted.

Bank lending to the domestic economy continues to be healthy. Nonetheless, there has been a slowdown in lending (particularly in cross-border loans) and emerging risks to asset quality, in view of the economic backdrop. Strong capital buffers and provisions built up over the years would enable banks to weather potential asset deterioration.

Banks should continue to maintain prudent credit underwriting standards, actively manage their credit risks to ensure that their portfolios remain resilient, and maintain adequate provisioning.

Credit Cycle

Non-resident lending has contracted, amid slowing regional growth

Credit growth has contracted since the turn of the year (See Panel 2A “Banking Sector: Credit Growth Trends”). The decline was driven by non-resident loans, which contracted 7.6% year-on-year (y-o-y) in Q3 2016.

The reduction in non-resident lending has been broad-based across emerging Asia and has occurred alongside lacklustre regional economic activity (See Panel 2B “Banking Sector: Cross-border Lending Trends”). In particular, trade bills have fallen on the back of a slowing Chinese economy and a resulting deceleration in trade growth (Chart 2.1).

Domestic loan growth remains positive although it has moderated

While resident loan growth has moderated in line with economic activity, it remains resilient. Positive resident loan growth has been underpinned by lending to the domestically-oriented sectors such as the Building and Construction (B&C) and Housing sectors.

In contrast, loans to externally-oriented sectors such as the General Commerce and Manufacturing sectors have continued to contract over the past year. Softening external demand has impacted businesses in these sectors, reducing their demand for working capital loans. This could also be a reflection of businesses’ increased caution, as they work to build cash buffers and postpone expansion plans in light of the current environment.
Banks indicate in response to an MAS survey that demand for non-bank loans is expected to remain soft. They expect the current economic outlook as well as uncertainties from macroeconomic and geopolitical events to weigh on the demand for corporate credit.

Asset Quality Risks

NPLs have risen, but banks remain resilient

The banking system’s overall NPL ratio has increased over the past year alongside the weakening economic environment and emerging asset quality risks (See Panel 2C “Banking Sector: Asset Quality and Liquidity Indicators”).

The overall NPL ratio increased to 2.1% in Q3 2016, from 1.5% a year ago. In particular, the NPL ratios for the Manufacturing and Transport, Storage and Communication (TSC) sectors have risen further to 5.9% and 7.1% in Q3 2016 respectively (Chart 2.2). The deterioration in asset quality in these externally-oriented sectors has occurred alongside sluggish external demand with slowing trade flows. Low oil prices have also adversely affected the profitability and debt servicing capacity of corporates in the shipping and commodities industries.

In addition, the special mention loan\(^{96}\) ratio has continued to trend upwards, increasing slightly from 3.3% to 3.6% over the past year. However, banks have historically been able to recover a significant proportion of their NPLs.\(^{97}\)

\(^{96}\) Credit facilities that exhibit potential weaknesses but are not yet classified as NPLs.

\(^{97}\) Based on local banking groups’ data.

MAS supervises the banks closely on their ability to monitor and manage asset quality risks prudently. While the rise in NPLs has reduced the banking system’s overall provisioning coverage\(^{98}\) to 98% in Q3 2016, MAS assesses the buffers to be adequate. These buffers are further augmented by the strong capitalisation levels of the local banks as well as general provisions held at the head office of foreign bank branches.

Banks have strong capital buffers to withstand losses

The results of MAS’ annual industry-wide stress test (IWST) underscore the banking system’s ability to withstand severe shocks. All banks would remain solvent, with their capital adequacy ratios (CARs) remaining well above Basel regulatory requirements under the stress scenarios. Strong capital and liquidity buffers built up over the years would enable banks to absorb losses and meet the anticipated cash outflows under the prescribed stressed conditions (See Box E “Industry-Wide Stress Test 2016: A Barometer of Financial System Resilience”).

\(^{98}\) Banking system’s overall provisioning coverage is computed as the sum of general and specific provisions as a share of unsecured NPLs.
Banks should continue to maintain sound credit underwriting standards, and set aside adequate provisions to withstand more NPLs should the economic slowdown be protracted.

**Local Banking Groups are in a Strong Position**

<table>
<thead>
<tr>
<th>Local banking groups continue to extend credit to the economy</th>
</tr>
</thead>
</table>

Local banking groups continue to grow their loan books, although growth has moderated to 1.9% y-o-y in Q3 2016. Similar to the overall banking system, the growth in local banking groups’ non-bank loans was underpinned by resident lending which increased 4.8% y-o-y in Q3 2016 (Chart 2.3).

Local banking groups’ earnings and net profits remained firm over the past year (See Panel 2D “Banking Sector: Local Banking Groups”). The slight fall in net interest income due to a narrowing of NIMs has been partially offset by rising non-interest income.

<table>
<thead>
<tr>
<th>Local banking groups’ asset quality and provisioning buffers remain healthy</th>
</tr>
</thead>
</table>

The asset quality of local banking groups’ loan portfolios remains healthy. Their aggregate NPL ratio remains low at 1.4% in Q3 2016, although it has ticked up from a year ago.

Post-GFC, the local banking groups have been steadily building up provisioning buffers alongside strong credit growth. Although the rise in NPLs has reduced these buffers, local banking groups’ overall provisioning coverage remains strong at 240%.99

<table>
<thead>
<tr>
<th>Local banking groups’ capital and liquidity positions remain strong</th>
</tr>
</thead>
</table>

Local banking groups also have robust capital and liquidity positions. The average CARs and all-currency liquidity coverage ratios (LCRs) have increased over the past year. They remain well above MAS regulatory requirements.

Notwithstanding this, local banking groups should remain vigilant against risks in the current challenging environment. This includes actively managing their credit risks to ensure that their credit portfolio remains resilient, and maintaining adequate provisions against potential deterioration in asset quality.

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99 Local banking groups’ overall provisioning coverage is computed as the sum of general and specific provisions as a share of unsecured non-performing assets (NPAs).
MAS will continue to monitor banking system exposures, trends and asset quality closely, and assess the financial stability risks to the system.
Panel 2A  Banking Sector: Credit Growth Trends

*Resident non-bank lending has remained resilient over the past year, with the decline in overall loan growth mostly due to the reduction in non-resident non-bank lending.*

**Growth in lending to the domestically-oriented sectors has partially offset declines in General Commerce and Manufacturing loans. Trade finance facilities have contracted alongside the slowdown in global trade.**

**The credit-to-GDP gap for Singapore has continued to decline over the past year (−3.4% as at Q3 2016).**
Panel 2B  Banking Sector: Cross-border Lending Trends

Cross-border lending declined, largely due to a reduction in non-bank loans, especially to emerging Asia.

Net lending to emerging Asia continued to moderate over the past year alongside softening regional economic activity, matched by a decline in net funding from rest of the world.

The reduction in lending to emerging Asia was broad-based across banks from different regions. Local and Japanese banks continue to be the main lenders to emerging Asia.

Source: MAS

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Panel 2C  Banking Sector: Asset Quality and Liquidity Indicators

Asset quality has weakened, as evidenced by the increase in the overall non-bank NPL ratio, resulting in lower provisioning coverage.

Source: MAS

Singapore’s banking system has sufficient resident deposits to fund resident loans. Foreign currency liquidity pressures have continued to ease over the past year.

Source: MAS
Panel 2D  Banking Sector: Local Banking Groups

Local banking groups’ earnings have remained robust, supported by stable NIMs (1.7% in Q3 2016).

- Chart 2D1: Local Banking Groups’ Profit Components
- Chart 2D2: Local Banking Groups’ NIM

Source: Local banking groups’ financial statements

Local banking groups’ NPL ratios are low with provisioning coverage at a robust 240% in Q3 2016.

- Chart 2D3: Local Banking Groups’ NPLs
- Chart 2D4: Local Banking Groups’ Provisioning Coverage

Source: Local banking groups’ financial statements

Local banking groups’ capital and liquidity positions are strong, with CARs and all-currency LCRs well above MAS regulatory requirements.

- Chart 2D5: Local Banking Groups’ CAR Ratios
- Chart 2D6: Local Banking Groups’ All-Currency LCR

Source: Local banking groups’ financial statements
Panel 2E  Insurance Sector

The insurance industry in Singapore remains well-capitalised. The average CARs for the direct life and direct general insurance industry were 233% and 304% respectively as at Q3 2016.

New business premiums of direct life insurers grew in 2016, largely attributed to growth of participating and non-participating products. Net income improved significantly due to better investment performance.

Gross premium of the direct general insurance industry decreased slightly in 2016, largely due to the significant reduction in Offshore Insurance Fund (OIF) business in Q1 2016. However, the industry achieved underwriting and investment profits.

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100 The chart is truncated at -S$200 million; the underwriting loss and underwriting margin was S$2.1 billion and -254% in Q4 2011, respectively.
Box E
Industry-Wide Stress Test 2016:
A Barometer of Financial System Resilience

As part of its financial stability mandate, MAS conducts an annual stress test of all major financial institutions in Singapore using a common stress scenario. The scenario provides a common baseline for financial institutions and MAS to assess the resilience of individual institutions and the financial system as a whole to adverse economic and financial shocks. This box highlights the key findings from this year’s IWST exercise, focusing on the resilience of the financial system as well as potential risks over a three-year stress horizon.101

The IWST stress scenario includes severe macroeconomic and financial stresses
This year’s stress test assumes a protracted slowdown of China’s economy. The US puts interest rate normalisation on hold, and alongside the euro zone and Japan, slips into recession. Negative spillovers to emerging Asia lead to recession and steep currency depreciation, in turn triggering substantial corrections in their property and stock markets, as well as a sharp fall in commodity prices (Table E1). Alongside the significant weakening of the external economic environment, financial conditions are assumed to tighten significantly, with sharp increases in interest rates and credit spreads. In this scenario, Singapore is not spared and sees substantial interest rate increases, higher unemployment and property prices halved.

Table E1
Selected Financial Market Stress Parameters

<table>
<thead>
<tr>
<th>Financial Market Parameters</th>
<th>Stress Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property prices</td>
<td>China: cumulative drop of 55% over 3 years</td>
</tr>
<tr>
<td></td>
<td>Hong Kong: cumulative drop of 60% over 3 years</td>
</tr>
<tr>
<td></td>
<td>Singapore: cumulative drop of 50% over 3 years</td>
</tr>
<tr>
<td>Oil prices</td>
<td>Cumulative decrease of 50% over 3 years</td>
</tr>
<tr>
<td>Equity prices</td>
<td>Cumulative decrease of 40–60% over 3 years</td>
</tr>
<tr>
<td>Regional currencies (vs USD)</td>
<td>Cumulative depreciation of 20–25% over 3 years</td>
</tr>
<tr>
<td>Domestic interest rates</td>
<td>Cumulative increase of 300bps over 3 years</td>
</tr>
</tbody>
</table>

To further test the resilience of the banking system to stresses in the sovereign, interbank and capital markets as well as the oil and gas (O&G) sector, banks were also asked to assume:

- Sovereign rating downgrades in their top Asian sovereign exposure;
- Defaults by their top small and medium-sized bank counterparties from a major Asian economy;

101 The stress scenario is for the time period 2016–2018.
A significant portion of exposures to asset managers and funds are written off; and
Failure in their top O&G counterparty as well as credit risk rating downgrades on their exposures to the sector.

The banking system would be resilient under the IWST stress scenario
The stress test results underscore the banking system’s ability to withstand severe shocks. All banks would remain solvent, with their CARs remaining well above Basel regulatory requirements under the stress scenario. Strong capital buffers built up over the years would enable the banks to absorb losses from higher stressed NPLs and write-offs even after taking into account the additional O&G stresses, sovereign downgrades as well as the interbank and non-bank stresses. In addition, the banks would have sufficient liquidity buffers to meet the anticipated cash outflows under the prescribed stress conditions.

Corporate asset quality would deteriorate under the stress scenario but remain manageable
The stress test results revealed that corporate loans extended to firms in the TSC sector would be most severely impacted as the economic downturn and oil price shocks prescribed in the stress scenario exacerbate weaknesses in the shipping and commodities industries. Further, the prescribed interest rate shocks would cause TSC NPLs to rise due to the relatively low ICRs of TSC firms. Corporate loans extended to firms in the more externally-oriented sectors, such as Manufacturing and General Commerce, would be most at risk from the regional economic slowdown and depreciation of the regional currencies. B&C loans would be more vulnerable to the significant correction in property prices prescribed in the stress scenario.

Household NPLs would remain low under the stress scenario
Banks reported lower stressed NPL ratios for consumer loans than for corporate loans. More than 90% of consumer loans are secured on collateral such as property and financial assets. Macroprudential policy measures implemented over the past few years, e.g. the Total Debt-Servicing Ratio (TDSR) framework introduced in 2013, have contributed to the resilience of household balance sheets. NPL ratios for mortgage loans, which form the bulk of secured consumer loans, would increase but remain manageable. NPL ratios for motor vehicle loans under stress were the lowest among secured consumer loans, reflecting the shorter tenures and lower Loan-to-Value (LTV) ratios of these loans compared to other secured loans. While unsecured loans generally had higher stressed NPL ratios than secured loans, they formed a small proportion of total consumer loans. Within unsecured loans, stressed NPL ratios for credit card loans were lower than for other unsecured loans, reflecting the possibility that (i) some households may be using credit cards as a convenient mode of payment rather than as a credit line; or (ii) some households may prefer to pay down their credit card debts first due to generally higher interest charges than for other unsecured loans.

The insurance industry would remain resilient under the IWST stress scenario
The stress test results showed that the insurance industry would be able to withstand severe shocks. While the capital positions of major insurers would be impacted, most insurers would still be able to meet regulatory capital adequacy requirements under the stress scenario. A small number of insurers

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102 As at Q2 2016, credit card debt made up 3.4% of total household debt.
103 Examples include unsecured credit lines and personal term loans.
would need to change asset allocations and increase reinsurance coverage to strengthen their capital positions and support their business operations. MAS has reviewed these management actions and assessed them to be feasible.

The IWST exercise is an integral part of MAS’ macroprudential surveillance

The IWST exercise is an increasingly important and integral part of risk management for the financial sector. It helps MAS identify common vulnerabilities across financial institutions, and better understand the sources of risks to the financial system and the potential impact should they materialise. The results also facilitate discussions between MAS and participating institutions on their resilience to plausible adverse scenarios, planned responses, and actions to mitigate the risk management gaps identified. While the stress test results underscore the resilience of Singapore’s financial system and the prudent and sound financial management of the industry, MAS will continue to engage banks and insurers to refine stress testing methodologies and processes\(^{104}\), so as to enhance the resilience of the financial system to severe but relevant stress scenarios.

\(^{104}\) For example, MAS had in previous years asked participating banks to share their reverse stress tests results to help identify stress events that would pose most risk to the banks.
Box F
An Update on the Health of the Singapore Real Estate Investment Trust Sector

This box provides an update on the health and assesses the resilience of Singapore Real Estate Investment Trusts (S-REITs) should (i) interest rates spike; or (ii) the rental environment turn challenging given the incoming supply of Office, Industrial and Retail space from 2016 to 2018.

**S-REIT market has seen continued healthy growth since 2013**
S-REITs' assets have grown robustly at an average of about 7.8% per annum since 2013. As of Q3 2016, S-REITs accounted for 7.9% of total market capitalisation on the Singapore Exchange (SGX), an increase from 6.2% in 2013.

**S-REITs are resilient to funding and income shocks**
Since the GFC, S-REITs have taken steps to better manage their overall leverage and debt maturity. S-REITs maintain a leverage ratio of under 45% as set out in the Singapore Code of Collective Investment Schemes (CIS), with most well under the limit. S-REITs have also improved their debt profiles — the weighted-average debt maturity of the S-REIT sector has increased to 3.5 years, from 3.2 years in 2013.

While the median ICR of S-REITs, which stands at 5.4, is strong, a potential rise in global interest rates would increase their interest burden. Nevertheless, S-REITs appear well-placed to withstand interest rate increases. To hedge against these risks, S-REITs have used derivatives to convert part of their floating-rate borrowings to fixed rates. Stress tests on S-REITs show that their median ICR remains at a healthy ratio of 4.0 after hedging even when interest rates rise by 3 percentage points (Chart F1).

**S-REITs are well-hedged against interest rate risks**

**Chart F1**
Median ICRs of S-REITs

<table>
<thead>
<tr>
<th>Interest Rate Increase</th>
<th>Before Hedging</th>
<th>After Hedging</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>5.0</td>
<td>4.0</td>
</tr>
<tr>
<td>1%</td>
<td>5.1</td>
<td>4.1</td>
</tr>
<tr>
<td>2%</td>
<td>5.2</td>
<td>4.2</td>
</tr>
<tr>
<td>3%</td>
<td>5.3</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Source: MAS estimates, Annual Reports

S-REITs that are exposed to the domestic Office, Industrial and Retail sectors could face some near term challenges as the market absorbs the supply of new space coming on stream between 2016 and 2018.

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105 MAS announced changes to the S-REIT regulations on leverage in July 2015. All S-REITs, regardless of whether they are rated or unrated, would be subject to a leverage limit of 45%.
(Chart F2). While pre-commitments for major upcoming Office and Industrial developments appear to be on track, overall demand for rental space could soften alongside slowing domestic economic activity. This could put some pressure on occupancy rates and rents in the next few years as completions peak (Chart F3). Weaker rental incomes could in turn adversely affect these S-REITs’ ability to meet interest payments and sustain distributions to investors.

Total available Office, Industrial and Retail space supply is projected to increase significantly in the next few years

Chart F2
Supply of Office, Industrial and Retail Space Coming on Stream by Expected Year of Completion

Source: Urban Development Authority (URA)
Office, Industrial and Retail property rents and prices have declined alongside slowing economic growth

Chart F3
Price and Rental Indices of Office, Industrial and Retail Space

Office

Industrial

Retail

Source: URA

Source: URA

Source: URA

To assess S-REITs’ resilience against potential combined funding and income shocks, MAS has stress tested S-REITs with significant Office, Industrial and Retail exposures in Singapore, taking into account a rise in vacancy rates and a reduction in rents alongside an increase in interest rates. Under a severe stress scenario where EBITDA decline by 35%\(^\text{106}\) and interest rates increase by 3 percentage points, the median ICRs for these Office, Industrial and Retail S-REITs remain healthy at around 1.9, 2.4 and 1.8 respectively (Chart F4). Indeed, the ICRs of all such S-REITs would remain above one under the stress scenario (Chart F5).

\(^{106}\) The 35% fall in EBITDA incorporates both a significant increase in vacancy rates and a fall in rental prices.
Office, Industrial and Retail S-REITs remain resilient to interest rate risks under severe stress scenarios

Chart F4
Median ICRs of Office, Industrial and Retail REITs

Office S-REITS

Industrial S-REITs

Retail S-REITs

Source: MAS estimates, Annual Reports
**Office, Industrial and Retail S-REITs’ ICRs remain above one under severe stress scenarios**

**Chart F5**
Distribution of Office, Industrial and Retail S-REITs’ ICRs

Source: MAS estimates, Annual Reports

Note: The red and green horizontal bars represent the maximum and minimum ICRs among the stress-tested S-REITs, while the orange markers represent the median ICR. The top and bottom of the blue boxes indicate the 75th and 25th percentile ICRs respectively.

**Conclusion**

S-REITs remain resilient, demonstrating healthy ICRs and improved debt maturity profiles. Stress tests on S-REITs with significant Office, Industrial and Retail exposures in Singapore suggest that they remain well-placed to meet their debt obligations when exposed to a confluence of risk factors. Nonetheless, the current macroeconomic headwinds and the peak in completions of new Office, Industrial and Retail properties between 2016 and 2018 could pose some risks to maintaining dividend payouts while still meeting debt service obligations. Investors should therefore exercise caution in their search for yield in the current low interest rate environment.
In September 2009, the G20 and FSB agreed to implement a comprehensive reform agenda, aimed at improving transparency, mitigating systemic risk, and protecting against market abuse in the over-the-counter (OTC) derivatives markets. One component of the reforms is to require standardised OTC derivatives to be traded on exchanges or electronic platforms (trading mandate), where appropriate.\textsuperscript{107}

A significant number of FSB jurisdictions have yet to implement the trading mandate, as noted in the FSB’s Eleventh Progress Report on Implementation of OTC Derivatives Market Reforms. The report further sets out that it is important that authorities have frameworks in place to assess regularly whether it would be appropriate to implement the trading mandate, even where authorities do not consider market conditions to be supportive currently or for the foreseeable future.

MAS is taking a two-pronged approach with regard to implementing the trading mandate. First, to lay the legislative groundwork. In February 2015, MAS consulted on proposed legislative amendments to regulate OTC derivatives trading platforms and to introduce powers for MAS to impose a trading mandate if it becomes appropriate to do so.\textsuperscript{108} Following the consultation, revisions to the Securities and Futures Act have been introduced in Parliament in November 2016.\textsuperscript{109}

Second, to establish a framework for determining whether it would be appropriate to impose a trading mandate. This involves studying how a trading mandate could improve the functioning of OTC derivatives markets as well as exploring various techniques for assessing liquidity. Liquidity is multi-faceted and can be assessed using a range of different metrics. But applying multiple measures of liquidity would complicate the task of defining simple thresholds for identifying liquid products that are suitable for the trading mandate. Clustering techniques could be one way to address this challenge.\textsuperscript{110}

As a case study, clustering techniques were applied to assess the liquidity of one-month foreign exchange (FX) forward contracts traded in Singapore. The centroid of the relatively more liquid cluster had an average total count of approximately 650 trades a day, amounting to approximately S$4.5 billion in notional value and involving approximately 70 counterparties a day (Chart G1). This represents about 3% of the total notional value of FX forwards traded in Singapore daily.\textsuperscript{111}

\textsuperscript{107} The G20’s 2009 OTC derivatives reform agenda comprised four elements: (a) All standardised OTC derivatives should be traded on exchanges or electronic platforms, where appropriate; (b) All standardised OTC derivatives should be cleared through central counterparties (CCPs); (c) All OTC derivatives should be reported to trade repositories; and (d) Non-centrally cleared OTC derivatives should be subject to higher capital requirements.

\textsuperscript{108} MAS (February 2015), “Consultation Paper on Proposed Amendments to the SFA”.


\textsuperscript{111} According to the BIS Triennial Survey 2016, an estimated daily average of US$105 billion of outright forwards are traded in Singapore daily.
Clustering techniques can be used to assess the relative liquidity of a contract.

**Chart G1**
Three Dimensional Visualisation of Clusters

Source: MAS estimates, Depository Trust & Clearing Corporation (DTCC) Data Repository (Singapore) Pte Ltd (DDRS)

While the clustering technique may identify the most liquid contracts in a given market, this does not automatically mean that such contracts would be suitable to be subject to the trading mandate. In particular, it is necessary to consider whether the market itself is sufficiently liquid. For example, the 2016 BIS Triennial Central Bank Survey reported that Singapore accounted for 6% of the total global turnover in interest rate and FX derivatives. This is relatively small compared with markets like the US and the UK, which made up 26% and 38% of global turnover respectively. Further work will be needed to determine which markets and products could viably support a trading mandate. MAS staff have done preliminary work using the technique discussed in this box and more details will be published in a forthcoming MAS Staff Paper.

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112 In April 2016, the daily average turnover of OTC Interest Rate Derivatives for Singapore, the UK and the US was US$58 billion, US$1.18 trillion and US$1.24 trillion respectively. For OTC Foreign Exchange Derivatives, the daily average turnover was US$517 billion, US$2.43 trillion and US$1.27 trillion for SG, the UK and the US respectively. BIS, “Triennial Central Bank Survey of Foreign Exchange and OTC Derivatives Markets in 2016”.
3 Singapore Corporate Sector

The corporate sector remains resilient amid soft economic conditions. Most firms maintain healthy financial buffers that would enable them to weather potential challenges, as indicated by MAS’ stress test results. The pressures thus far have been contained within specific sectors (e.g. oil-related industries buffeted by low oil prices), where a small number of firms could face refinancing risks.

Companies should take steps to reduce balance sheet vulnerabilities, especially if they have significant leverage or foreign currency risks. Firms should also maintain clear communication with investors by providing simple and succinct financial disclosures.

Corporate Balance Sheets Resilient Amid Headwinds

Corporate profitability declined amid softening operating environment

Overall corporate profitability has declined amid a challenging operating environment. The median ROA of SGX-listed firms fell from 3.5% in Q2 2015 to 2.8% in Q2 2016 (Chart 3.1).

The ongoing supply overhang in the shipping industry amid slowing trade flows weighed on profitability in the TSC sector, which declined by 0.8 percentage points in Q2 2016 on a y-o-y basis.

Domestically-oriented sectors, such as the property and construction sectors, as well as the multi-industry sector fared better. The construction sector in particular, saw median ROA increase from 3.0% in Q2 2015 to 5.7% in Q2 2016, buoyed by a steady stream of civil engineering projects, including Changi Airport Terminal 5. That said, property firms with higher leverage and exposure to overseas markets could face headwinds if conditions in these markets weaken.

The number of companies wound up moderated slightly in H1 2016, falling from 97 in H1 2015 to 85, just below its 16-year historical average of 88. This reversed an earlier increase from 54 to 97 between H1 2013 and H1 2015 (Chart 3.2).
Monetary Authority of Singapore
Macroprudential Surveillance Department

Chart 3.2
Corporate Bankruptcies

Source: Insolvency and Public Trustee’s Office (IPTO), Ministry of Law

Banks’ corporate NPL ratio ticked up from 1.8% in Q3 2015 to 2.7% in Q3 2016 (Chart 3.3). In particular, the NPL ratios for the Manufacturing and TSC sectors increased by 1.9 and 2.7 percentage points respectively, reflecting external headwinds.

Corporate asset quality could deteriorate should conditions worsen, although these risks are manageable. Loans extended to firms in externally-oriented sectors would be most at risk from a regional economic slowdown and depreciation of regional currencies.

Chart 3.3
Corporate NPL Ratio

Source: MAS

Low oil prices over the past year have weighed on some oil-related sectors...

The oil-related sectors have drawn particular attention in the past year. Low oil prices have weakened the debt repayment ability of some oil-related companies, and driven up default rates.

In particular, firms in the Offshore and Marine Services subsector have come under stress. Some of these firms had expanded capacity prior to the oil price slump using borrowed funds, as evidenced by rising leverage ratios. Falling oil prices have hurt profitability in the sector and weakened the debt servicing capacity of these firms. These strains surfaced as the companies’ debt issues came due. Following Swiber’s notable default, a number of issuers from the subsector have also defaulted and some are looking to restructure their debt obligations.

...although risks are manageable

Banks have been actively managing their risks arising from the O&G sector. As at end-June 2016, the banking system’s aggregate exposure to the O&G and related supporting services sector was less than 10% of total exposures.113 Among the local banks, the share of such exposures was even lower, at about 6% of their total non-bank exposures.

NPAs represented about 4.2% of the major lending banks’ aggregate O&G and related exposures.

Furthermore, a large proportion (estimated at 60%) of major lending banks’ O&G exposures is to the downstream, commodity trading and

113 Total exposures includes non-bank loans, debt securities and contingent liabilities.
integrated segments of the industry.\textsuperscript{114} These segments have been less adversely impacted by low oil prices.

Banks have been actively monitoring and managing their exposures, undertaking regular portfolio reviews and stress testing to identify vulnerable borrowers for more intensive monitoring.

Regulatory safeguards, such as MAS’ restrictions on banks’ exposures to single counterparty groups, have also prevented the build-up of concentrated exposures to specific O&G borrowers.

Government schemes, such as International Enterprise (IE) Singapore’s Internationalisation Finance Scheme and the Standards, Productivity and Innovation Board (SPRING) Singapore’s Bridging Loan Programme, would provide some support to viable firms.\textsuperscript{115}

The results of MAS’ 2016 IWST show that corporate asset quality would remain manageable under a severe stress scenario which incorporated a sharp fall in commodity prices and risk rating downgrades of O&G borrowers (See Box E “Industry-Wide Stress Test 2016: A Barometer of Financial System Resilience”).

Nonetheless, banks should continue to be vigilant by maintaining prudent underwriting standards and monitoring portfolio vulnerabilities closely.

Corporate Leverage Broadly Stable

\begin{tabular}{l}
\textbf{Aggregate corporate leverage remained broadly stable, most firms should be able to weather headwinds} \\
\end{tabular}

Corporate leverage, as measured by the corporate debt-to-GDP ratio, has stabilised at about 150% of GDP since 2015 (Chart 3.4). Corporate bond issuances this year have slowed compared to the same period last year. Growth in bank financing has also declined.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{chart3.4.png}
\caption{Corporate Debt-to-GDP}
\label{chart3.4}
\end{figure}

Source: MAS estimates, BIS, Dealogic

However, amid a softening operating environment, some firms have seen shareholder’s equity eroded over the last year. As a result, median debt-to-equity ratios increased from 40.4% in Q2 2015 to 51.7% in Q2 2016, led by the TSC, Hotels & Restaurants and Commerce sectors (Chart 3.5).

\textsuperscript{114} Based on MAS’ survey of major lending banks.

\textsuperscript{115} The Ministry of Trade and Industry (MTI) announced on 25 November 2016 enhancements to IE Singapore’s Internationalisation Finance Scheme and the re-introduction of SPRING Singapore’s Bridging Loan for companies in the Marine and Offshore Engineering industry. These measures will help to address the financing challenges faced by the industry in recent months.
Nonetheless, corporate debt profiles remain sound, with most liabilities in the form of longer-term loans. The median short-term debt to total debt ratio has declined from 54.0% in 2014 to 43.1% in 2016 (See Box H “A Closer Look at Corporate Funding Structures”).

Looking forward, most firms would be able to service their debts, with the median ICR\textsuperscript{116} of SGX-listed firms at a relatively healthy ratio of 3.6 as at Q2 2016 (Chart 3.6).

Firms’ median current ratio remains stable at 1.6, suggesting that corporates have adequate liquidity (Chart 3.7).\textsuperscript{117} However, median cash coverage ratios have deteriorated slightly from 1.2 as at Q2 2014 to 1.1 as at Q2 2016 — this bears close monitoring.\textsuperscript{118}

Stress test shows that most firms would remain resilient

MAS’ corporate stress test suggests that most corporates would remain resilient to interest rate and income shocks.

Under a stress scenario whereby interest costs increase by 25% and EBITDA decline by

\textsuperscript{116} ICR is calculated as Earnings Before Interest and Tax (EBIT) divided by interest expense. It serves as an indicator of debt repayment ability as it measures the degree to which earnings are sufficient to cover the interest on debt.

\textsuperscript{117} The current ratio is calculated as current assets divided by current liabilities.

\textsuperscript{118} The cash coverage ratio is calculated by dividing available cash by short-term debt and current portion of long-term debt. It serves as an indicator of ability to repay debt coming due.
25%, the percentage of firms-at-risk increases from 27% to 36% for all corporates, and their share of debt-at-risk increases from 20% to 35%. Taking cash reserves into account, the share of firms-at-risk would drop to 6% and debt-at-risk to 1% (Chart 3.8).

Chart 3.8
Share of Firms and Share of Corporate Debt Held by Firms with ICR <2

<table>
<thead>
<tr>
<th></th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Stress</td>
<td>0</td>
</tr>
<tr>
<td>After Stress</td>
<td>30</td>
</tr>
<tr>
<td>After Stress (incl Cash Reserves)</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: MAS estimates, Thomson Financial

Firms have also taken steps to manage interest rate risks. Firm-level analysis suggests that about half of SGX-listed firms used fixed-rate bonds and one-fifth of SGX-listed firms used interest rate derivatives to mitigate the risk of future interest rate increases.

Banks in Singapore remain supportive of SME financing

Some SMEs have sought to deleverage and conserve cash in light of the subdued business outlook. Some companies have also become more prudent in extending trade credit to buyers. According to DP Information Group, the average time taken for SMEs to settle their debt decreased from 36 days in Q2 2015 to 29 days in Q2 2016 due to the tightening of trade credit terms.

Banks in Singapore continue to be supportive of SME financing. Except for a slight slowdown in H1 2016 owing to a general contraction in overall corporate loans, loans to SMEs have been increasing consistently since 2013. The number of SME customers, as well as NIM, remained broadly stable as at H1 2016 (See Panel 3A “Small and Medium-Sized Enterprise Financing Conditions”).

There remains a segment of relatively profitable SMEs with low leverage which could prove to be viable business opportunities for banks or other capital providers (See Box I “Casting a Wider Corporate Net: A Closer Look at Private Firms and Small and Medium-Sized Enterprises”).

Nonetheless, firms should take steps to reduce balance sheet vulnerabilities

Current low interest rates have provided leveraged firms with some reprieve in terms of debt servicing load. Nonetheless, risks remain from heightened corporate leverage amid declining earnings.

Firms should take steps to reduce balance sheet vulnerabilities — deleveraging where possible while refinancing existing debt at favourable rates. Firms should also continue to facilitate transparency with investors by providing simple and succinct financial disclosures.

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119 Firms-at-risk refers to firms with an ICR of less than two.
120 Debt-at-risk refers to the amount of corporate debt held by firms with an ICR of less than two.
121 According to the SBF-DP SME Index, SME sentiment registered its second lowest score in seven years as at Q3 2016. The SBF-DP Index is a quarterly index produced jointly by DP Information Group and the SBF. It provides a 6-month outlook of SMEs’ business sentiments in relation to external economic conditions and activities.
Panel 3A  Small and Medium-Sized Enterprise Financing Conditions

Bank lending to SMEs has slowed over the past year...   ...though number of SME customers has remained stable.

The commerce and construction sectors continue to account for the majority of outstanding SME loans.

Outstanding SME loans are increasingly collateralised by property.

SME credit quality has deteriorated, with the NPL ratio rising to 2.1% in H1 2016.

NIMs remained broadly stable at 1.8% in H1 2016.

Source: MAS

Note: Prior to H1 2009, figures were based on banks’ internal SME definitions. SME figures from H1 2009 onwards follow MAS’ definition of SMEs, which are defined as businesses with an “annual sales turnover of up to S$100 million”.
This box analyses trends in the funding sources of domestic non-financial corporates and the implications for financial stability. Corporate funding markets and corporate liability structures may affect financial stability in several ways. While well-functioning capital and financing markets can help fund investment and growth by businesses, high debt levels could expose companies and investors to various risks and exert a drag on future growth. We find that domestic firms have maintained fairly diversified funding bases, with a sufficient level of liquid assets to meet debt repayments.

**Domestic firms have fairly diversified funding bases, and are not excessively reliant on debt**

Non-financial corporates have three main sources of funding — paid-in capital, retained earnings from past profits, and debt (including loans and debentures). We find that SGX-listed firms have maintained fairly diversified funding bases, with paid-in capital and retained earnings making up the majority (more than 60%) of firms’ funding sources (Chart H1). This suggests that firms are not excessively reliant on debt financing, and would be less susceptible to debt repayment stresses. Indeed, MAS’ corporate stress test suggests that most firms would remain resilient to interest rate and income shocks on the back of adequate financial buffers, including cash reserves.

**While firms have increasingly diversified into bond markets in recent years, bank financing remains the dominant source of debt funding for SGX-listed corporates**

In terms of debt financing, we find that domestic firms have increasingly ventured into capital markets to diversify their funding sources (Chart H2). Syndicated loan issuances have traditionally dominated this landscape. However, in recent years, bond issuances by non-financial corporates have increased alongside favourable financing conditions. The volume of bonds issued has increased from approximately

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122 Domestic firms in this box refers to non-financial corporates incorporated in Singapore.
S$3.6 billion in 2008 to S$11.5 billion as of 2016 year-to-date (YTD). Nonetheless, outstanding bonds still comprise a small share of about 13% of total corporate debt. The majority of firms continue to rely on banks for most of their financing. Using SGX-listed firms as a proxy, MAS estimates that 80% of firms derived more than three-quarters of their financing from bank loans in 2015 (Chart H3).

<table>
<thead>
<tr>
<th>Bond issuances by domestic firms have increased in recent years</th>
<th>Bank financing remains the dominant source of funding for SGX-listed firms</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Chart H2: Securities Issuances by Domestic Firms" /></td>
<td><img src="image" alt="Chart H3: SGX-listed Firms by Dependence on Bank Financing" /></td>
</tr>
</tbody>
</table>

Source: MAS estimates, Dealogic

Source: MAS estimates, Annual Reports

Note: Data as as FY 2015.

**Bond market is resilient although pressure on some issuers is expected to remain in the near term**

Turning to the bond market, some firms with debt coming due could face repayment difficulties in the current economic environment. Notably, a number of issuers in the shipping and oil-related sectors have defaulted in recent months, while others have moved to restructure upcoming debt payments. This is reflective of ongoing sector-specific weaknesses arising from the supply overhang in shipping as well as low oil prices. The bond market is expected to remain resilient overall. Defaulted bonds comprise approximately 1.5% of the outstanding non-financial corporate bonds. Bonds coming due within the next two years make up less than 30% of outstanding bonds (Chart H4), with those from the shipping and oil-related sectors accounting for about 4%. MAS' stress test suggests that most corporates would remain resilient to interest rate and income shocks.

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123 This includes Swiber Holdings, Swissco Holdings and most recently, Rickmers Maritime.
124 This includes Marco Polo Marine, Otto Marine and AusGroup, which had successfully restructured S$50 million, S$70 million and S$100 million worth of bonds due in 2016 respectively and Ezra Holdings and KrisEnergy, which are currently in the process of restructuring S$150 million and S$330 million worth of bonds respectively.
Currency mismatch risks are tempered by domestic issuers’ prudence in managing risks

Foreign currency issuances as a proportion of aggregate corporate issuances has been increasing since 2008 as advanced economies kept interest rates low. They accounted for approximately half of all issuances in 2015 (Chart H5) and made up almost 60% of outstanding bonds year-to-date (Chart H6).

This is unsurprising given the open nature of the Singapore economy — approximately 67% of firms surveyed in the Singapore Business Federation’s (SBF) 2015/2016 National Business Survey\textsuperscript{125} reported having business engagements overseas, and roughly half of them derived more than 50% of their turnover from abroad. Firms with revenue streams in foreign currencies would be able to offset currency mismatch risks by issuing debt in a matching currency. Indeed, firm-level analysis suggests that 64% of

\textsuperscript{125} The SBF represents all Singapore companies with more than S$0.5 million in share capital.
SGX-listed firms have natural hedges in place to manage currency risks. Further, about 23% of SGX-listed firms reported using derivative instruments to hedge against currency risks.

**Chart H7**

<table>
<thead>
<tr>
<th>Year</th>
<th>Commerce</th>
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<th>Manufacturing</th>
<th>Property</th>
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<td>2008</td>
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<td>20</td>
<td>30</td>
<td>10</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: MAS estimates, Thomson Financial

**Risks remain contained for the most part, though continued vigilance is warranted**

Domestic firms have maintained a fairly diversified funding base, with a sufficient level of liquid assets to buffer against debt repayment stresses. On aggregate, firms’ debt profiles remain sound, with most of their bonds maturing beyond the next two years. Further, the majority of SGX-listed firms’ total liabilities (including bonds and loans) are in the form of longer-term debt. The median short-term debt to total debt ratio has declined from 54.0% in 2014 to 43.1% in 2016 (Chart H7). This suggests that liquidity risks remain contained. Short-term liabilities are offset by a sufficient level of short-term assets as evidenced by a median current ratio of 1.6.

While bank financing remains the dominant source for debt financing, bond markets continue to serve an important function in helping firms meet their funding needs.\(^{126}\) Having sufficient access to financing channels is vital in enabling companies to sustain operations and support growth and employment for the economy as a whole. For this reason, there have been considerable efforts over the years to increase depth in regional corporate bond markets. For instance, MAS recently announced a new Asian Bond Grant scheme to encourage Asian issuers to raise international capital in Singapore.\(^{127}\) MAS also launched the Securities Repo Facility last year to support secondary market liquidity of certain Singapore Dollar (SGD) corporate bonds. Despite recent stresses in the bond market, risks remain contained to specific sectors. Further, banking system exposure to weaker issuers is likely to be manageable.

Although they do not pose systemic risk, recent defaults and restructurings have nonetheless highlighted

\(^{126}\) In some cases, bond markets may be able to offer companies better terms than that offered by banks. For instance, almost all outstanding issuances have fixed-rate coupon payments (about 99%), which would shield issuers from fluctuations in market interest rates. Issuers would also be able to tailor other terms of the bond to suit their specific funding requirements.

\(^{127}\) Under the Asian Bond Grant scheme, qualifying Asian issuances will be able to offset up to 50% of one-time issuance costs such as credit rating fees, international legal fees and arranger fees.
risks in the bond market. Bonds are not risk-free investments — like any investment product, there are both benefits and risks involved in investing in corporate bonds. As in the developed markets, bond defaults and restructurings do occur from time to time. Investors should exercise due diligence in the selection of financial products, and carefully consider all available information when making investment decisions. It is also prudent to diversify one’s investments and avoid putting a huge sum of one’s savings into a particular investment, even if the investor is of the view that the investment seems safe. At the same time, issuers can facilitate more informed investment decisions by making pertinent information more prominent, such as by disclosing some key financial metrics. MAS will continue to review our regulations as necessary, to ensure that they remain appropriate, balancing investor protection and accessibility to different investment options.
**Box I**

**Casting a Wider Corporate Net:**

**A Closer Look at Private Firms and Small and Medium-Sized Enterprises**

This box showcases how new firm-level data on private firms\(^{128}\) incorporated in Singapore yields additional insights on corporate financial trends. The dataset covers over 118,000 Singapore firms from 2008 to 2015. We find that while larger firms tend to have stronger financials than smaller firms, there is a sizeable group of financially healthy SMEs that lenders can target.

**Private firms make up a significant part of the economy, but private company data is scarce**

Private firms tend to form the bulk of enterprises in many countries, and often contribute to a large proportion of economic and financial activity. In Singapore, 99% of its close to 200,000 enterprises are SMEs, with most SMEs being private entities.\(^{129}\) These SMEs contribute an estimated 48% of total economic output and 65% of total employment.\(^{130}\)

Despite the economic significance of private firms, obtaining sufficiently granular data to analyse these firms remains a challenge.\(^{131}\) For regulators and central banks, the collection of private company data may fall outside of their existing data gathering mandates. Hence, most analysts, in both the public and private domains, rely on either aggregated survey data or listed firms’ data. Such data may not be representative of the total corporate population and would thus skew macro analyses of corporate financial health.

For Singapore, while private firm data is available from the local business registry\(^{132}\), the data coverage, frequency, and reporting standards lag those for listed firms. First, the annual returns of private firms contain much fewer data elements than the disclosure requirements for listed firms.\(^ {133}\) Second, there is significant lag in the filing of annual returns.\(^ {134}\) Last, certain firms are exempt from audit requirements, which could impede data quality as inconsistent reporting would be more difficult to detect.\(^ {135}\)

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\(^{128}\) Private firms refer to companies that are not listed on the stock exchange.

\(^{129}\) Data from SPRING Singapore and the Accounting and Corporate Regulatory Authority of Singapore (ACRA) (as of 2015). For the analysis of financial trends in this box, SMEs are defined as firms with revenues of less than S$100 million.

\(^{130}\) Singapore Department of Statistics (DOS) (as of 2015).

\(^{131}\) The availability of granular data was highlighted as one of the data gaps from the Committee on the Global Financial System (CGFS)-FSB-Standing Committee on Assessment of Vulnerabilities (SCAV) workshop on risks from currency mismatches and leverage on corporate balance sheets. CGFS-FSB-SCAV (September 2014), “Summary: Joint CGFS-FSB-SCAV Workshop on Risks from Currency Mismatches and Leverage on Corporate Balance Sheets”.

\(^{132}\) All locally incorporated companies are required to file an annual return with ACRA under Section 197 of the Companies Act. Certain small private companies with annual revenues of less than S$5 million are exempt from filing annual returns.

\(^{133}\) For example, interest expense and finance costs data was mandated for reporting only from 2014.

\(^{134}\) Annual returns have to be filed within a month of a private company’s Annual General Meeting, which should be held within 6 months of the end of the reference period. This is as compared to listed companies on the SGX Mainboard, which are required to publish financial statements no later than 60 days after the relevant financial period.

\(^{135}\) Companies are exempt from the requirement to audit their accounts if they are private companies and meet two of the following three criteria: i) total annual revenue less than or equal to S$10 million, ii) total assets less than or equal to S$10 million, iii) fewer than 50 employees. For more information on the qualification criteria for exemption of audited accounts, please refer to the ACRA website.
MAS has expanded the scope of its corporate sector surveillance by enhancing data quality of private firm-level financial statement data

MAS has expanded the scope of firms in its corporate sector surveillance by applying statistical methods to enhance the data quality of the firm-level financial statement data obtained from the Singapore business registry. This novel dataset provides granular firm-level information on private firms and sheds insights on firm-level trends that may not be evident in aggregated or listed firm data.

Larger firms were generally more profitable than SMEs...

Our analysis finds that larger firms were generally more profitable than SMEs (Chart I1). This trend was most apparent in Construction, Real Estate, Manufacturing, and Transport and Storage, where higher domestic labour costs and the decline in global trade could have impacted the bottom lines of SMEs more significantly (Chart I2).

According to the National Business Survey 2015–2016 conducted by the SBF, respondents highlighted that the top profit pressures were a reduction in sales and gross margins as well as more intense competition (Chart I3).137

<table>
<thead>
<tr>
<th>Profitability for both SMEs and larger firms has declined</th>
<th>SMEs’ ROA declined relatively more in labour intensive and trade-dependent industries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chart I1</strong> Median ROA</td>
<td><strong>Chart I2</strong> Median ROA by Selected Sectors</td>
</tr>
</tbody>
</table>
| **Larger Firms**                                         | 2008-2009  
| **SMEs**    | 2010-2012  
| **Larger Firms**                                         | 2013-2015  
| **SMEs**    | 2008-2009  
| **Larger Firms**                                         | 2010-2012  
| **SMEs**    | 2013-2015  
| **Larger Firms**                                         | 2008-2009  
| **SMEs**    | 2010-2012  
| **Larger Firms**                                         | 2013-2015  
| **SMEs**    | 2008-2009  
| **Larger Firms**                                         | 2010-2012  
| **SMEs**    | 2013-2015  |

Source: MAS estimates, ACRA


136 Data quality controls were conducted to remove invalid numbers, handle outliers, rebase currencies, and to impute missing data, where possible, for over 118,000 firms from 2008 to 2015. To remove outliers, two methods were used. The first method was the median absolute deviation (MAD) method, where data points that were two MAD distance away from the median values were removed. The second method is based on the winsorisation approach to remove extreme values at the tails to remove 0.005% of data. Voting is conducted on both methods to determine the outliers only when both methods agree, in order to retain as much data as possible. To handle the unbalanced data set, the sample set of firms used in the computation of ratios and variables were dynamically chosen to be as complete as possible while retaining numerical stability.

137 About 83% of respondents in the survey had turnover of less than S$100 million, and hence are largely reflective of SME firms.
Reduction in margins and slow growth in sales are the main drivers of firms' profit pressures.

**Chart I3**

Top Profit Related Challenges

- Reduction in Gross Margins
- Increase in Competition
- Slow Growth in Sales

Note: Reduction in gross margins was not included in the 2013 survey.

...by achieving better asset productivity

To analyse the drivers behind the trends in ROA between larger firms and SMEs, we broke down the ROA metric via the DuPont method into net profit margin and asset turnover. While SMEs enjoy higher net profit margins than larger firms, margins for both segments have declined by about the same amount (0.8 percentage points) from 2008 to 2015 (Chart I4). In contrast, larger firms have much higher asset turnover than SMEs and have been better able to maintain asset productivity over time. The median larger firm generated S$1.52 of revenue with every dollar of asset in 2015, down S$0.14 from 2008 (Chart I5). SMEs, on the other hand, saw their median asset turnover fall by a larger S$0.20 to S$0.49.

**Chart I4**

Median Net Profit Margin Ratio

Larger firms absorbed lower margins...

Source: MAS estimates, ACRA
Note: Net profit margin is defined as net income over total revenue.

**Chart I5**

Median Asset Turnover Ratio

...to stabilise turnover and retain market share

Source: MAS estimates, ACRA
Note: Asset turnover ratio is defined as total revenue over total assets.
Larger firms invested more to build capacity and retain sales turnover, while SMEs invested less and deleveraged

In order to retain sales turnover, larger firms have invested more to build capacity (Chart I6). Coupled with the current low interest rate environment, this drove up demand for financing, with larger firms taking on more debt in their capital structures (Chart I7). On the other hand, SMEs refrained from investments and deleveraged (Chart I7). Furthermore, SMEs have been increasing balance sheet liquidity since 2008 with the median current ratio climbing from 3.1 to 3.6 in 2015 (Chart I8). Larger firms, in contrast, have maintained a stable liquidity profile since 2008 (Chart I8).

SMEs should continue focusing on innovation

Innovation is the key for SMEs to unlock opportunities for growth and to remain competitive in the new economic environment. However, only 51% of SMEs actively engage in innovation efforts.138 SMEs should

---

tap on government support schemes such as the Technology Adoption Programme and actively participate in programmes that have close coordination from research institutions, trade unions, chambers and other private sector organisations.

**Banks in Singapore have supported SME financing**

Despite the deleveraging of SME balance sheets, banks in Singapore have been supportive towards SME financing. Except for a slight slowdown in the latest period arising from a general contraction in overall corporate loans, loans to SMEs have been increasing consistently since 2013 (Chart I9), driven mainly by local bank lending (Chart I10). The recent contraction in lending to SMEs has also been less pronounced than that of the overall lending to corporates, suggesting that lending to SMEs has been more resilient than lending to larger firms.

**SME loan growth has been consistently positive...**

<table>
<thead>
<tr>
<th>Chart I9</th>
<th>Outstanding SME Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 H1</td>
<td>$50 Billion</td>
</tr>
<tr>
<td>2012</td>
<td>$60 Billion</td>
</tr>
<tr>
<td>2014</td>
<td>$70 Billion</td>
</tr>
<tr>
<td>2016 H1</td>
<td>$80 Billion</td>
</tr>
</tbody>
</table>

Source: MAS

**...driven by local bank lending**

<table>
<thead>
<tr>
<th>Chart I10</th>
<th>Bank Lending to SMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 H2</td>
<td>Finance Companies</td>
</tr>
<tr>
<td>2013</td>
<td>Foreign Banks</td>
</tr>
<tr>
<td>2014</td>
<td>Local Banks</td>
</tr>
<tr>
<td>2015 H2</td>
<td>Local Banks % Share (RHS)</td>
</tr>
<tr>
<td>2016 H1</td>
<td>$100 Billion</td>
</tr>
</tbody>
</table>

Source: MAS

**The SME loan portfolio remains healthy with high collateralisation rates, although less asset-rich SMEs could also be viable borrowers**

The risk profile of the SME loan portfolio for the banking system is healthy, with the bulk of financing secured by collateral (Chart I11). Collateral requirements could help mitigate default risk by increasing “skin-in-the-game” to align incentives, especially for smaller firms with lower paid-up capital. However, there are also less asset-rich SMEs that may have high growth potential and could be viable borrowers although they may not have the required collateral. Banks could explore various government risk sharing scheme to extend credit to such borrowers while managing their risks prudently.139

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139 For example, the Loan Insurance Scheme, the Working Capital Loan Scheme, the SME Working Capital Loan Scheme, the SME Equipment and Factory Loan Scheme, and the Enhanced Micro Loans Scheme. These loan schemes are supported by SPRING Singapore for working capital financing, venture financing and for CAPEX activities.
SME lending remains an attractive business segment for banks

Looking ahead, SMEs expect to record lower profits.\(^{140}\) This could dampen SME demand for financing. In the face of economic headwinds and a tendency for flight to quality, some banks may consider rebalancing their loan books to reduce exposure to SMEs. However, there remains a sizeable segment of relatively profitable SMEs with low leverage which could prove to be viable business opportunities for banks or other capital providers (Chart I12). Subject to proper credit risk assessments, lenders could target these firms to grow their SME loan portfolios.

\(^{140}\) The SBF-DP SME Index in Q3 2016 showed that all sectors are expected to record lower profits through to Q2 2017, with the overall profit expectations index falling from 5.3 to 4.8.
Conclusion
SMEs are an important pillar of the Singapore economy. While revenues and profits have slowed in recent years as the economy restructures, there is a sizeable pool of SMEs with sound financials that can leverage external funding meaningfully to boost innovation, expand their operations and capitalise on new opportunities for growth. Banks should remain supportive of SMEs while maintaining strong credit risk management practices to ride the next wave of growth.
4 Singapore Household Sector

Households continue to deleverage, following the series of macroprudential measures undertaken since 2009. Over time, this will help restore household debt sustainability and strengthen household balance sheets. On the whole, households have ample financial buffers to weather the current soft economic and labour market conditions.

Nonetheless, households should stay financially prudent and manage their debt obligations with a view to retirement adequacy. They should review their investments carefully and avoid taking on concentrated exposures to a single product or market. Investors considering property investments should be aware that rising vacancy rates, declining rentals and impending interest rate increases mean that they may not always be able to rely on rental income to service their investment property loans.

Household Balance Sheets — Resilient Amid Economic Headwinds

Household net wealth continued to grow over the past year despite headwinds from lower economic growth

On an aggregate basis, Singapore’s household balance sheets are resilient, with aggregate net wealth at a healthy four times of GDP (Chart 4.1). Liquid assets such as cash and deposits exceed total household liabilities, providing households with ample financial buffers amid softer economic conditions.

The growth in household net wealth slowed from a peak of 8.1% y-o-y in Q4 2012 to 2.8% y-o-y in Q3 2015, following a moderation in residential property prices. Nonetheless, growth in household net wealth picked up over the past year (to 5.7% y-o-y in Q3 2016) due to stronger growth in financial assets and residential property assets (at 7.3% y-o-y and 2.8% y-o-y respectively in Q3 2016), alongside subdued growth in household debt (Chart 4.2).

The growth in financial assets was driven by cash and deposits and CPF balances (at 6.6%...
y-o-y and 9.6% y-o-y respectively in Q3 2016). In contrast, stock market weakness led to a moderation in households’ holding of stocks and shares (at an average of -4.3% y-o-y over the past year). The growth in the value of residential property assets was driven by public housing assets (at 3.5% y-o-y in Q3 2016), as more housing units came on stream amid healthy take-up rates and stable prices. The growth in the value of public housing assets picked up over the past year, after eight consecutive quarters of decline (averaging -3% y-o-y between Q4 2013 and Q3 2015). Growth in the value of private residential property assets remained subdued at 2.2% y-o-y in Q3 2016.

Consequently, growth in overall household net wealth could moderate in the period ahead on the back of a subdued outlook in the residential property market and headwinds in the macroeconomic environment.

**Households continue to deleverage**

Following the series of macroprudential measures introduced since 2009, households continue to deleverage and household debt growth has moderated to a more sustainable path, from an average of 6.9% y-o-y over the last five years to 2.8% y-o-y in Q3 2016. However, it will take time for household balance sheets to strengthen and become more resilient to interest rate and income shocks.

The moderation in household debt growth was driven by trends in housing loans, which make up three quarters of household debt. The growth of housing loans (from financial institutions) has moderated further to 3.3% y-o-y in Q3 2016, from 4.8% y-o-y a year ago (Chart 4.3). Further, the risk profile of housing loans has improved. Most housing loans have LTV ratios of 80% or lower; a negligible share of housing loans is in negative equity.

The debt servicing ratios of households have improved since the introduction of the TDSR framework in June 2013. In particular, the debt servicing ratio for the 20th income percentile household has fallen to 17% in 2015, from 22% in 2013 (Table 4.1). The debt servicing ratios for the median and 90th income percentile households have also edged down slightly to 34% and 44% respectively in 2015, from 35% and 46% respectively in 2013.
The growth of other components of household debt such as car loans and unsecured credit has also moderated. Car loans have contracted by an average of 11% y-o-y over the last three years, although recent trends suggest that the pace of decline has slowed (to an average of −1.8% y-o-y in the first three quarters of 2016).

Restrictions on car financing were imposed in 2013 — at a stringent level — primarily to restrain the strong demand for cars and Certificate of Entitlements (COEs), and consequential pressures on inflation. The objective of curbing inflationary pressures has been achieved, with the contribution of private road transport (excluding petrol) to headline inflation easing from +1.3 percentage points in 2011–2012 to −0.5 percentage points in Q1 2016. Consequently, in May 2016, MAS reset the car financing rules at a level that would continue to promote financial prudence and support the move towards a car-lite society over time.

### Unsecured credit situation remains sound and fewer borrowers are missing payments

Data from Credit Bureau Singapore (CBS) shows that the growth in outstanding unsecured credit extended by financial institutions has eased considerably from the peak of 14% y-o-y in Q2 2012. It turned negative between Q3 2015 and Q2 2016, before reverting to slight positive growth of 1.5% y-o-y in Q3 2016.

The proportion of revolvers\(^{141}\) has declined, from a peak of 38% in Q4 2011 to 33% in Q3 2016, suggesting continued improvement in the unsecured credit situation (Chart 4.4). Further, rollover balances per cardholder fell 5.6% y-o-y in Q3 2016 (Chart 4.5). The number of individuals who had missed two months or more of their unsecured debt payments fell to 83,270 in Q3 2016 (4.9%), from 94,950 (5.8%) a year ago. Credit card charge-off rates\(^{142}\) eased slightly, from the peak of 6.8% in Q4 2015 to 6% in Q3 2016 (Chart 4.6).

#### Chart 4.4

**Revolvers among Credit Cardholders**

- **Number of Revolvers**
- **Revolvers as % Total Credit Cardholders (RHS)**

Source: CBS

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\(^{141}\) Revolvers refer to credit cardholders who do not pay in full their outstanding credit card balances.

\(^{142}\) Charge-off rates refer to bad debts written off expressed as a percentage of total rollover balances.
Since the aggregate industry-wide borrowing limit on unsecured credit was introduced in June 2015, the number of borrowers with outstanding unsecured debt exceeding 24 times their monthly income has more than halved, from 32,000 in February 2015 to 14,000 in September 2016. This reduced number represents less than 1% of all unsecured credit borrowers.

Current low interest rate conditions provide some relief for debt servicing, but headwinds could weigh on household balance sheets

Amid economic headwinds, the resident unemployment rate (seasonally adjusted) rose slightly and the Labour Market Pressure Indicator (LMPI)\(^{144}\) turned negative in H1 2016 (the first time since 2009). This could impact households’ debt servicing ability and weigh on household balance sheets. Consumer confidence in Singapore declined in H1 2016 (Chart 4.7).

The number of individual bankruptcy orders has remained broadly stable over the past two years (at 1,780 cases in 2015 and 1,760 cases in 2014) and below its long run average (Chart 4.8). The first nine months of 2016 saw 1,395 cases, up from 1,252 cases in the same period last year.

\(^{143}\) Outstanding unsecured debt refers to any interest bearing balances incurred on unsecured credit facilities such as credit cards and unsecured personal loans. Interest bearing balances include amounts rolled over on credit cards and balances outstanding on unsecured loans that accrue interest.

\(^{144}\) MAS’ LMPI is a summary statistic which captures the extent of labour market tightness using 31 indicators.
MAS’ simulations suggest that household balance sheets will on the whole be resilient under severe stress. The mortgage servicing burden for the median household remains below 50% under a severe stress scenario of a 10–20% decline in household income, on top of a 3 percentage point increase in mortgage rates. However, lower income households who have purchased private properties may come under stress, with their mortgage servicing burden rising above 60%.

### Households Should Stay Financially Prudent

**Households should stay financially prudent, and review their debt obligations with a longer-term perspective**

Even with improving debt servicing ratios, households should stay financially prudent and review their debt obligations with a longer-term perspective. Housing choices have important implications for household finances and retirement adequacy. This is particularly relevant given the aging population and declining old-age support ratio (See Box J “Housing Choices, Mortgage Debt and Retirement Adequacy”).

---

**Households should continue to carry out due diligence before making any investments**

Domestic private residential property prices have continued to decline while transaction activity has held firm. The latter suggests a better match in price expectations between buyers and sellers (See Box K “Update on the Singapore Private Residential Property Market”). Overseas property transactions by Singapore households moderated further in H1 2016, with the value transacted by real estate agencies in Singapore declining to S$0.2 billion, from S$1.1 billion in H1 2014 (Chart 4.9).

**Chart 4.9**

**Value of Overseas Property Transactions by Singaporeans**

Source: MAS

Properties in the UK, Australia and Malaysia accounted for 80% of total transactions (by value) in H1 2016. Properties in the Philippines, Cambodia and Vietnam made up 11% of total transactions in the same period.

The value of outstanding housing loans granted for the purchase of overseas properties as a share of the housing loan portfolios of the key mortgage lenders in Singapore remained small, at about 2% in Q3 2016.

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145 MAS survey on overseas property transactions by real estate agencies in Singapore (June 2016).
Households should review their investments carefully and avoid taking on concentrated exposures to a single product or market. Investors considering property investments should be aware that rising vacancy rates, declining rentals and impending interest rate increases mean that they may not always be able to rely on rental income to service their investment property loans. Currency fluctuations and shifting monetary policies in foreign economies could also affect the cost of debt obligations and rental returns for overseas properties. It is important for households to make investment decisions prudently and with a longer-term perspective.
Box J
Housing Choices, Mortgage Debt and Retirement Adequacy

Retirement planning is an increasingly pressing issue for Singapore households as our population ages. By 2030, one in four Singaporeans will be 65 years or older. The citizen old-age support ratio is expected to decline from 4.7 in 2016 to 2.3 in 2030 (down from 13.5 in 1970).

A 2014 market survey by DBS Group Research found that 50% of Singaporeans did not have a concrete retirement plan. The survey also revealed that many Singaporeans viewed retirement planning as a daunting and costly task. The key barriers to early retirement planning included uncertainty about the returns from various financial products, inadequate funds to get a head start, competing priorities such as children’s education or mortgages and unwillingness to compromise on one’s current lifestyle. Without adequate planning, households might not be able to meet their retirement goals. They might need to continue working on a part-time basis during their retirement years.

This box examines the impact of housing choices on retirement adequacy. This issue is pertinent given the high home ownership in Singapore — 91% of resident households own their homes. Housing assets make up half of total household assets, while housing loans account for three quarters of household liabilities.

Housing choice has important implications for household finances
There is a trade-off between housing consumption and retirement savings. The more savings are used for housing consumption, the less households will have for their retirement. Compared to the monthly mortgage repayment of about S$1,400 for a S$380,000 housing unit (represented by a HDB 5-room Built-to-Order (BTO) flat), the monthly mortgage repayment for a S$1 million housing unit (represented by a private residential unit) at S$4,000 is almost three times as much (Chart J1).

The Income Replacement Rate (IRR) is a commonly used indicator to assess retirement adequacy. Taking into consideration lower expenditure during retirement, international benchmarks suggest that a net IRR of 53–78% would generally be adequate to maintain a comfortable living standard during retirement. This is corroborated by a 2013 survey conducted by HSBC which found that respondents in Singapore generally expect that they would need 66% of their current income for a comfortable retirement.

146 Data on Singapore citizen projections are compiled by DOS based on assumptions specified by the National Population and Talent Division, Strategy Group, Prime Minister’s Office. The projections are not predictions or forecasts, but are illustrations of the growth and change in population that would occur if certain demographic assumptions prevailed over the projection period. These assumptions may or may not be realised.

147 The old-age support ratio refers to the number of persons aged 20–64 years per persons aged 65 years and over.

148 DBS Group Research (December 2014), “The Best is Yet to Be, Retirement Planning in Singapore: Trends, Challenges and Solutions”.

149 The IRR represents retirement payouts relative to pre-retirement incomes.

150 53% corresponds to net final year wage and 78% corresponds to the net average lifetime wage. Net IRR is defined as net pension entitlement divided by net pre-retirement earnings, taking into account personal income taxes and social security contributions paid by workers and pensioners. The World Bank (1994), “Averting the Old Age Crisis (pg 293–295)”, recommends a net IRR of between 53% and 78% for middle income earners.


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Monetary Authority of Singapore
Macroprudential Surveillance Department
Housing choices have significant impact on household finances
— monthly repayments for private housing are significantly higher compared to HDB housing

<table>
<thead>
<tr>
<th>Monthly Mortgage Repayment by Housing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDB (4-room)</td>
</tr>
<tr>
<td>$1,000</td>
</tr>
</tbody>
</table>

Source: MAS estimates, HDB
Note: Estimated based on median property prices for HDB BTO flats in non-mature estates and private housing, assuming 80% LTVs, loan tenure of 25 years and medium-term interest rates of 2.6% for HDB housing loans and 3.5% for private housing loans.

A study commissioned by the Ministry of Manpower (MOM) in 2012 found that median income couples who purchased HDB 4-room BTO flats would have IRRs of about 70%. However, if they purchased larger flats, such as HDB 5-room BTO flats, their IRRs would fall to about 60%. While private housing was not within the scope of that study, it would be reasonable to expect that median income couples purchasing more expensive private housing would have lower IRRs. That said, actual circumstances may vary across individuals depending on factors such as income growth, savings rate and investment strategy.

Households tend to underestimate their retirement expenditure, resulting in savings being depleted faster than expected

A 2015 survey by HSBC found that 44% of retirees felt they had not prepared adequately for retirement. Further, pre-retirees estimated their savings could last only 13 years in retirement. This implies a retirement funding gap of about eight years, given that the average life expectancy at age 65 years in 2015 is about 21 years (reaching an age of 86 years). While most retiree households would not have any mortgage liabilities, they would still need to provide for housing-related expenditures such as utility bills and routine maintenance.

---

153 The IRR of median income couples purchasing private housing could fall below 50% given the substantial price difference between a HDB 5-room BTO flat and private housing.
Households would also need to plan for unforeseen life events such as illness. A study by the Centre for Research on the Economics of Ageing (CREA) found that one in four individuals aged 65 years and above had experienced a health shock. Health events such as cancer, diabetes and stroke can lead to considerably higher healthcare spending and reduced work. Subscriptions to health insurance plans would help mitigate the costs of medical expenditure.

**Discretionary savings can supplement CPF savings**
While CPF savings would be able to cover the basic retirement expenses of median income households that adopt prudent housing choices, additional discretionary savings might be needed for households that aspire to a higher standard of living at retirement. A young couple (aged 30 years), who plans to spend S$4,000 per month (at current prices) during retirement, would need to save S$2,800 per month during their working years (Chart J2). A large part of this can be in the form of CPF savings should the couple make prudent housing choices.

Households with higher post-retirement expectations may require higher private savings to supplement their CPF savings. Should the couple aspire to spend S$6,000 per month (at current prices) during retirement, they would need to save S$4,100 per month during their working years.

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**Households with higher post-retirement standard of living may require higher private savings to supplement CPF savings; households would need to save and invest wisely during their working years**

**Chart J2**

**Required Monthly Savings during Working Years by Post-retirement Monthly Expenditure for a Couple Aged 30 Years**

Source: MAS estimates
Note: Simulations assume investment returns of 2.5%, broadly in line with expected inflation of 2%. Monthly savings required are lower if higher investment returns are assumed.

---

155 Adjusting for inflation, the couple would need S$8,000 per month at retirement in 35 years’ time.
Households that have stretched their finances to purchase more expensive properties will be less likely to meet their savings target. They would then need to manage their retirement expectations. For example, a household with monthly post-retirement income of only S$2,000 (at current prices) would be more constrained in their consumption choices compared to a household with monthly post-retirement income of S$4,000. Retiree households with average monthly household expenditure of about S$2,000 spent significantly less on dining out, holidays and other recreational activities compared to retiree households with average monthly household expenditure of about S$4,000 (Chart J3).

Achieving adequate retirement savings requires the discipline to commit to a regular savings plan and adhere to it even as consumption preferences vary over time.

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Households that aspire to spend more could be constrained if their actual monthly post-retirement income does not support their lifestyle aspirations; those with lower monthly post-retirement income would have to manage their expectations and spend less.

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**Chart J3**

Monthly Household Expenditure on Selected Goods & Services among Retiree Households by Total Monthly Household Expenditure

Source: MAS estimates, DOS

Note: Based on DOS Household Expenditure Survey 2012/13, the average monthly household expenditure of about S$2,000 corresponds to the average expenditure of retiree households in the 61st to 80th expenditure percentile group. The average monthly household expenditure of about S$4,000 corresponds to the average expenditure of retiree households in the 81st to 100th expenditure percentile group. Holiday expenses refer to package tours including free and easy packages and local-conducted tour packages.
It pays to start planning early
Households should plan early for retirement to ensure adequate retirement savings. A 2015 study by DBS-Manulife indicated that Singaporeans started planning for retirement at 38 years old on average.\textsuperscript{156} Households may find it increasingly difficult to meet their retirement goals should they delay retirement planning. A young couple (aged 30 years), who plans to spend S$4,000 per month (at current prices) during retirement, would need to save S$2,800 per month during their working years if they start saving today (Chart J4). Should they start saving only at the age of 40, they would need to save 1.6 times more (about S$4,500 per month) to achieve the same retirement sum.

\begin{center}
\textit{Delaying retirement planning makes it increasingly difficult to fulfill one’s retirement goals}
\end{center}

\begin{figure}[h]
\begin{center}
\textbf{Chart J4}
Required Monthly Savings during Working Years to Achieve Post-Retirement Monthly Expenditure of S$4,000 (at Current Prices) by Age the Couple Starts Saving for Retirement
\end{center}
\end{figure}

Source: MAS estimates
Note: Simulations assume investment returns of 2.5%, broadly in line with expected inflation of 2%. Monthly savings required are lower if higher investment returns are assumed.

Households may consider monetising their housing assets to supplement their retirement income, depending on their financial circumstances
To supplement their retirement income, households may consider various options of monetising their housing assets. These include right-sizing to smaller homes with the option of taking up the Silver Housing Bonus (SHB)\textsuperscript{157}, renting out their properties or spare bedroom(s), or applying for the Lease Buyback Scheme (LBS)\textsuperscript{158} offered by HDB.

We consider the case of an elderly couple (aged 60 years) with insufficient retirement funds and who can

\textsuperscript{156} DBS and Manulife (November 2015), “DBS-Manulife Retirement Wellness Study”.
\textsuperscript{157} The SHB was introduced to help elderly households supplement their retirement income when they right-size their flat. If an elderly household buys a smaller flat type (up to 3-room flat), they can apply for the SHB and receive up to S$20,000 cash bonus per household by using some of the net sale proceeds to top up their CPF Retirement Accounts and join CPF LIFE.
\textsuperscript{158} The LBS caters to elderly home owners living in 4-room or smaller flats. Under the LBS, they may choose to keep a lease of between 15 and 35 years, and sell the remaining tail-end lease to HDB. The LBS proceeds will be used to top up their CPF Retirement Accounts and join CPF LIFE. This provides them with monthly payouts while they continue living in their flats.
replace only 30% of their pre-retirement income. The couple may consider right-sizing to a smaller home (e.g. from a 4-room HDB flat to a 3-room HDB flat). Assuming that the couple is able to withdraw S$100,000 in housing equity from right-sizing and place the proceeds in private annuities, the household could receive an estimated payout of close to S$500 each month. The share of pre-retirement income they are able to replace post-retirement improves from 30% to 36% (Chart J5).

Elderly households that own 4-room and smaller flats and do not wish to right-size to a smaller flat or sublet their flat/spare bedroom may consider the LBS, provided that all owners have reached the CPF Payout Eligibility Age. For instance, a couple living in a 4-room HDB flat (with 65 years of remaining lease) who can currently replace only 30% of their pre-retirement income could accumulate additional retirement income of S$190,000 if they take up the LBS as a monetisation option. Under the LBS, they may choose to keep a 30-year lease and sell the tail-end 35-year lease to HDB. The proceeds will then be used to top up their CPF Retirement Accounts (up to the age-adjusted Full Retirement Sum on a household basis). This would generate an additional monthly payout of S$750 from CPF LIFE for the household. The share of pre-retirement income that they are able to replace post-retirement improves from 30% to 39% (Chart J6). In addition, depending on the initial amount in the Retirement Accounts and the amount of top-up, the household may receive additional cash proceeds and a LBS bonus.

Each option has different trade-offs and the eventual choice depends on individual preferences, needs and family circumstances. Under the LBS, the couple has the benefit of living in their home and receiving a lifelong income. However, they would not be able to sell the flat in the open market. For the right-sizing option, the couple would be able to sell the flat in the open market but would have to contend with living in a smaller flat. By renting out their spare room(s), a couple may lose some degree of privacy but can continue to live in the same home while retaining the flexibility to unlock home equity in future.

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159 The estimated LBS payout is obtained from HDB InfoWEB. In the above example, the couple has S$25,000 in their Retirement Accounts pre-top up. S$136,000 from the LBS is used to top up the couple’s Retirement Accounts, with the residual amount distributed as cash proceeds. Please refer to http://www.hdb.gov.sg/cs/infoweb/residential/living-in-an-hdb-flat/for-our-seniors/how-it-works for the full illustration.
Right-sizing to a smaller house helps to enhance one’s retirement income

<table>
<thead>
<tr>
<th>Chart J5</th>
<th>Median Income Elderly Couple Household who are Able to Replace Only 30% of Pre-retirement Income Benefit from Right-sizing</th>
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</tbody>
</table>

Source: MAS estimates
Note: Assumes an elderly couple household with median household income of $8,600 pre-retirement. The couple is able to withdraw $100,000 in housing equity from right-sizing and place the proceeds in private annuities, receiving an estimated payout of close to $500 each month.

Other available options include the HDB’s LBS

<table>
<thead>
<tr>
<th>Chart J6</th>
<th>Median Income Elderly Couple Household who are Able to Replace Only 30% of Pre-retirement Income Benefit from LBS</th>
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</tbody>
</table>

Source: MAS estimates, HDB

Conclusion
To retire comfortably, households must consider their housing choice as part of their retirement planning. They should plan early for retirement to ensure adequate savings. Households should tailor their investment portfolios according to their risk appetites and age. Retirees can also use housing assets to supplement their retirement income, depending on their preferences, needs and family circumstances.
Box K

Update on the Singapore Private Residential Property Market

Private residential property prices have moderated for 12 straight quarters, at an average pace of 1% per quarter. While the pace of price decline has been more gradual (at 0.6% per quarter on average) over the first two quarters of 2016, prices fell by a sharper 1.5% in Q3 2016. MAS remains vigilant to the risk that demand-supply dynamics could weigh on the property market outlook amid rising vacancy rates and softer economic and labour market conditions.

At the same time, transaction activity has held firm, perhaps buoyed by the low interest rate environment and better matching of price expectations between buyers and sellers. Resale activity has increased and take-up at some newly-launched projects has been strong. The upside risk that current low global interest rates could spur further demand in the market cannot be discounted.

Prices have continued to decline gradually across different market segments

Private residential property prices have continued to decline through 2016, falling a cumulative 10.8% since Q3 2013. While prices dropped by a slightly sharper 1.5% in the most recent quarter in Q3 2016, the pace of price decline year-to-date has been more gradual, at an average of 0.9% per quarter. This is close to the average of 1.0% per quarter between Q4 2013 and Q4 2015 (Chart K1). The cumulative price falls were largely uniform across market segments, with the Outside Central Region (OCR), Rest of Central Region (RCR) and Core Central Region (CCR) falling 9.4%, 10.1% and 10.1% respectively (Chart K2).

Transaction demand has been supported by the low interest rate environment

While transaction volumes have fallen since 2013, they have remained fairly stable in the last three years. An average of 1,389 transactions was recorded in the first ten months of 2016, compared to 1,210 transactions recorded over the same period last year (Chart K3).

Current low interest rates have kept a lid on the holding cost of property units for both owner occupiers and investors. The three-month SGD Singapore Interbank Offered Rate (SIBOR), which is commonly used as the reference rate for housing loans, has remained low at 0.9% in November 2016. This has
contributed to the steady demand for private residential property.

A monthly average of 714 new sale transactions was recorded in the first ten months of 2016, close to the monthly average of 662 new sale transactions during the same period last year. Some newly-launched projects have experienced relatively positive sales, selling at least half of their launched units within a month of their launch. By offering discounts, some developers have also managed to sell unsold residential units in older projects.\(^{160}\)

In the secondary market, the continued decline in prices might have prompted some sellers to lower their asking prices, resulting in better matching of price expectations. Resale volumes have increased 25% in the first ten months of 2016 as compared to resale volumes in the same period last year.

Transaction volumes have been steady and were similar to volumes recorded last year.

![Chart K3: Number of Private Residential Property Transactions](chart)

Source: URA

Demand-supply dynamics are likely to weigh on the property market outlook...

Vacancy rates have been rising and reached 8.7% in Q3 2016, up from 7.8% a year ago. This could remain elevated as the pipeline supply of residential units comes on stream (Chart K4). Rentals have fallen alongside the increase in vacancy rates, dropping by a cumulative 10.7% since Q3 2013 (Chart K5).

Rising vacancy rates and declining rentals mean that potential investors may not always be able to rely on rental income to service their investment property loans.

\(^{160}\) Developers have lowered prices in order to meet deadlines pertaining to the Additional Buyer’s Stamp Duty (ABSD) for developers and Qualifying Certificate charges. The Straits Times (January 2016), “Home Prices Starting to Fall as Stamp Duty Deadline Nears”.\(^{160}\)
Vacancy rates reached 8.7% in Q3 2016, up from 7.8% a year ago

Rentals have declined alongside the increase in vacancy rates

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Chart K4
Vacancy Rates for Private Residential Property

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</thead>
<tbody>
<tr>
<td>1995</td>
<td>7.8%</td>
<td>6.5%</td>
<td>7.0%</td>
<td>7.5%</td>
<td>8.0%</td>
<td>8.7%</td>
</tr>
</tbody>
</table>

Source: URA

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Chart K5
Private Property Rental Index

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<tbody>
<tr>
<td>2004</td>
<td>100</td>
<td>110</td>
<td>120</td>
<td>130</td>
<td>140</td>
<td>150</td>
</tr>
</tbody>
</table>

Source: URA

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...although the time taken to clear the pipeline supply of unsold units is in line with its long-term average

The pipeline supply of units that is set to come on stream has continued to decline steadily. As of Q3 2016, 43,693 units are projected to come on stream within the next five years, down from 55,638 units at end-2015. The majority of these units have already been sold, with the number of unsold units at a historical low of 20,577 as of Q3 2016 (Chart K6).

Assuming a take-up rate of new units equal to that seen in the preceding four quarters, it would take an estimated 2.8 years to clear the pipeline supply of unsold units, which is slightly below the long-term average of around three years (Chart K7).

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Chart K6
Pipeline Supply of Sold and Unsold Private Residential Units

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<td>2004</td>
<td>100</td>
<td>90</td>
<td>80</td>
<td>70</td>
<td>60</td>
<td>50</td>
<td>40</td>
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</tbody>
</table>

Source: URA

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Chart K7
Number of Years Taken to Clear Unsold Units Based on New Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Q3</th>
<th>2006</th>
<th>2009</th>
<th>2012</th>
<th>2015</th>
<th>2016</th>
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<tr>
<td>2006</td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: MAS estimates, URA
Growth in housing loans has eased considerably and the overall risk profile of housing loans is strong, but repayment risks remain for a small group of borrowers amid the weaker economic backdrop.

The growth in outstanding housing loans has remained moderate at 4.2% y-o-y in September 2016, largely unchanged from the 4.5% a year ago. This is significantly lower than the average y-o-y growth of 18% recorded between 2010 and 2012. The value of new housing loans also remained stable at an average of S$2.8 billion per month in the first nine months of 2016, compared to S$2.7 billion per month over the same period last year. As of September 2016, housing loans accounted for 17.1% of non-bank loans, up from 15.7% a year ago.

The series of property measures implemented by the government has continued to improve the risk profile of housing loans and encourage financial prudence amongst buyers. The share of housing loans with LTV ratios above 70% stood at close to 60% in Q3 2016, down from 77% in Q2 2010. The average tenure of new housing loans has fallen from 30 years in Q3 2012 to 25 years in Q3 2016. The results of this year’s IWST indicate that the banking system would be resilient to a sharp fall in property prices.

Though the overall risk profile of housing loans is strong, repayment risks remain for a small group of borrowers amid the weaker economic outlook. The share of mortgage loans that were more than 30 days in arrears increased to close to 1.0% in September 2016, up from 0.9% a year ago (Chart K8). Non-performing housing loans also inched up slightly over the past year and stood at 0.4% in Q3 2016 (Chart K9). Nonetheless, this is significantly lower than the peak of 1.0% recorded during the GFC.

| Chart K8 | Housing loan NPL ratio and the share of housing loans in arrears remain low but have ticked up over the past year |
| Chart K9 | Mortgage Loans that are More than 30 Days in Arrears |

Continued vigilance is required amid uncertainties in the outlook.

The property market has been stabilising over the past two years, with prices moderating from their peak in 2013. Property prices have continued to soften at a gradual pace in 2016. Demand-supply dynamics could weigh on the property market outlook as the market adjusts to the impending supply of new units, although steady take-up provides some support. Transaction activity has been stable and the increase in resale transactions suggests better matching of price expectations between buyers and sellers. Property demand could see upside surprises, on the back of current low interest rates and as investors search for yield, as evidenced by the strong take-up at some recent launches. MAS remains vigilant in monitoring.
property market developments and, if necessary, will take appropriate measures to maintain a stable and sustainable market.