



PEOPLE'S REPUBLIC OF CHINA— HONG KONG SPECIAL ADMINISTRATIVE REGION

FINANCIAL SYSTEM STABILITY ASSESSMENT

May 2014

In the context of the Financial Sector Assessment Program, a team of IMF staff and experts prepared the Financial System Stability Assessment for the consideration of the Executive Board of the IMF on May 9, 2014. This report is based on missions to People's Republic of China—Hong Kong Special Administrative Region during September and November 2013, and March 2014, and includes information available until the time of its completion on April 25, 2014.

The Report on Observance of Standards and Codes has been posted separately.

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April 25, 2014

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This report summarizes the work of the Financial Sector Assessment Program (FSAP) missions that visited the Hong Kong Special Administrative Region (HKSAR) in September and November 2013. The FSAP findings were discussed with the authorities during the Article IV consultation mission in March 2014.

- The FSAP team was led by Carlos Medeiros and included Allison Holland, Chikako Baba, Ana Carvajal, Mali Chivakul, Andy Jobst, Dinah Knight, Katharine Seal, and Xiaoyong Wu (all IMF), Su Hoong Chang, Göran Lind, Philipp Keller, Elizabeth Roberts, Malcolm Rodgers, and Christine Sampic (all IMF experts). Ratna Sahay, Deputy Director of the Monetary and Capital Markets, joined the mission in November 2013. The mission met with Mr. John Tsang (Financial Secretary), Prof. K. C. Chan (Secretary for Financial Services and the Treasury), Mr. Norman T. L. Chan (Chief Executive, Hong Kong Monetary Authority), Mr. Ashley Alder (Chief Executive Officer, Securities and Futures Commission), Ms. Annie Choi (Commissioner of Insurance), Ms. Haster Tang (Chief Executive Officer, Hong Kong Interbank Clearing Limited), senior representatives of Hong Kong Exchanges and Clearing Limited, and their staff. The mission also met with private sector representatives.
- The FSAP assessed financial sector risks and vulnerabilities, evaluated the quality of financial sector regulation and supervision, and assessed financial safety net arrangements. Stress tests suggest that banks are well positioned to absorb a significant realization of key risks. The regulation and supervision framework of the financial sector is of a high caliber, but it needs to be updated and strengthened in some key areas. The authorities need to establish the planned independent insurance authority. Also, as a key priority, the authorities should push forward with their plans to establish a comprehensive framework for resolution.
- The FSAP team would like to thank the Hong Kong authorities for their excellent collaboration in carrying out the FSAP and generous hospitality.

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Glossary

AEs	Advanced Economies
AI	Authorized (deposit-taking) Institution
AML/CTF	Anti-money laundering / counter-terrorist financing
AMLO	Anti-Money Laundering and Counter-Terrorist Financing (Financial Institutions) Ordinance
BCPs	Basel Core Principles
BO	Banking Ordinance
BU	Bottom-up
CAR	Capital Adequacy Ratio
CCP	Central Clearing Counterparty
CMG	Crisis Management Group
CoB	Conduct of Business
DPB	Hong Kong Deposit Protection Board
DPS	Deposit Protection Scheme
DSR	Debt Servicing Ratio
EFO	Exchange Fund Ordinance
EMs	Emerging Market Economies
FMIIs	Financial Market Infrastructures
FRC	Financial Reporting Council
FRCO	Financial Reporting Council Ordinance
FS	Financial Secretary
FSB	Financial Stability Board
FSC	Financial Stability Committee
FSTB	Financial Services and the Treasury Bureau
G-SIB	Global Systemically Important Bank
G-SIFI	Global Systemically Important Financial Institution
HKEx	Hong Kong Exchanges and Clearing Limited
HKMA	Hong Kong Monetary Authority
HKSAR	Hong Kong Special Administrative Region
IA	Insurance Authority
ICO	Insurance Companies Ordinance
IIA	Independent Insurance Authority
LCR	Liquidity Coverage Ratio
LEERS	Linked Exchange Rate System
Local bank	Locally incorporated, licensed bank, including foreign-owned subsidiaries
LTD	Loan-to-deposit ratio
LTV	Loan-to-value
NSFR	Net Stable Funding Ratio
MA	Monetary Authority
MOU	Memorandum of Understanding

PFMIs	Principles for Financial Market Infrastructures
RBC	Risk-Based Capital
RMB	Renminbi
RWA	Risk-weighted asset
SCCA	Systemic Contingent Claims Approach
SRO	Self-Regulatory Organization
SFC	Securities and Futures Commission
TD	Top-down

EXECUTIVE SUMMARY

Hong Kong SAR's (HKSAR) financial sector is one of the largest and most developed in the world, ranking number one in the World Economic Forum Financial Development Index. The banking system, with assets of US\$2 trillion and equivalent to 705 percent of GDP, is highly capitalized, profitable, and liquid. The securities markets are deep, liquid, and efficient, with total stock market capitalization of 1,000 percent of GDP. The insurance sector has high penetration (now ranked the second in Asia after Japan), and is well capitalized.

The sector is very well regulated, with the capacity to withstand a diversity of shocks. While the financial sector faced significant stress during the early stages of the 2008 global financial crisis, market confidence recovered quickly, aided by the decisive measures adopted by the Hong Kong authorities to mitigate its impact.

The sector, however, faces major risks, which puts a significant premium on effective liquidity management, macroprudential oversight and microprudential supervision. The anticipated exit from unconventional monetary policy in the United States could increase capital market volatility and reduce system-wide liquidity. A correction of property prices, which now stand at historical highs, poses risks for both borrowers and banks. The increasing economic and financial integration between HKSAR and Mainland China offers considerable expansion opportunities, but, at the same time, generates significant spillover risks, especially if a significant financial disruption or economic slowdown were experienced.

Stress tests suggest that banks are well positioned to absorb a significant realization of risks. Banks' aggregate capitalization would remain well above the Basel III's minimum capital requirement, and the banking sector (including foreign branches) has sufficient liquidity to withstand large deposit and wholesale funding withdrawals. At the same time, the tests highlight that a few smaller banks might be slightly more vulnerable under a severe economic scenario, and, reflecting the nature of their businesses, foreign branches are relatively more sensitive to withdrawals of wholesale funding. This underscores the need for continued vigilance in these areas.

The authorities have actively deployed macroprudential policies to mitigate systemic risks. In particular, in the face of a doubling of house prices, the Hong Kong Monetary Authority (HKMA) introduced tighter limits on loan-to-value (LTV) and debt-servicing (DSR) ratios. Going forward, it will be important that the authorities strengthen their capacity for systemic risk analysis at both the Securities and Futures Commission (SFC) and Insurance Authority (IA) to complement the analysis undertaken by the HKMA. This would help ensure that cross-sectoral interconnections are adequately captured when considering systemic risks.

The regulation and supervision framework of the financial sector is of a high caliber, and displays a high level of compliance with international standards, but there remains scope for further strengthening, particularly in the insurance sector. In this sector, the authorities need to establish the planned independent insurance authority and enhance the associated legal framework to strengthen the regulatory regime for groups, implement a risk-based capital regime, and bolster supervision of intermediaries. In the securities area, the authorities need to strengthen regulation of markets, oversight of external auditors, and enforcement. The authorities should consider ways to strengthen further the de jure independence of the individual regulatory authorities.

Financial market infrastructures (FMIs) are highly sophisticated, but further enhancements are needed to fully comply with new international standards. To support Hong Kong's position as an international financial center, the authorities have developed a range of multi-currency financial market infrastructures (FMIs), all of which are systemic, and which are supported by effective oversight and supervision. The mission welcomes the authorities' commitment to ensuring that each FMI complies with the new Principles for FMIs.

The FSAP team welcomes the authorities' plans to establish a comprehensive framework for resolution. The authorities have powers to impose temporary management on a troubled institution, but lack many of the other powers set out in the Financial Stability Boards' Key Attributes of Effective Resolution Regimes for Financial Institutions. For instance, powers to override certain rights, and impose losses on shareholders and creditors are absent or limited. In this context, the authorities should move forward with the planned legislative process aimed at establishing a comprehensive regime with a robust legal framework, and develop further their recovery and resolution planning framework. This is especially important given the role the global systemically important institutions (G-SIFIs) play in HKSAR. In parallel with this work, the authorities could also consider some additional enhancements to their deposit protection scheme.

The authorities are actively engaged in managing cross-border challenges and should continue to be so. Given Hong Kong's role as host supervisor, continued active participation in the supervisory colleges and crisis management groups of G-SIFIs—both banks and insurance companies—is essential in managing risk. Similarly, sustained strong cooperation with regulatory counterparts is essential to manage risks associated with increased integration with the Mainland. Continued active participation in international regulatory fora is also needed to mitigate potential extra-territoriality effects from global regulatory developments.

Table 1. Key Recommendations	
Recommendations	Priority^{1/}
Banking sector	
Eliminate or specify the circumstances triggering the exercise of the legal authority of the Chief Executive of Hong Kong SAR to give directions to the Monetary Authority (MA), and provide for the public disclosure of the reasons for the dismissal of the MA in the Banking Ordinance (BO).	medium-term
Insurance sector	
Establish the proposed Independent Insurance Authority (IIA).	short-term
Update the Insurance Companies Ordinance (ICO) to better reflect current international best practices, including by: (i) extending the fit and proper regime to cover Senior Management and Key Persons in Control Function; (ii) establishing a clear definition of control and pre-determined control levels; (iii) updating risk management requirements; (iv) granting authority to remove or disqualify persons on fit and proper grounds; and (v) requiring insurers to implement contingency plans.	short-term
Amend the ICO to establish a regulatory regime for insurance groups.	short-term
Amend the ICO to implement a risk-based capital regime.	short-term
Strengthen conduct of business requirements and direct supervision of insurance intermediaries.	short-term
Securities market	
Strengthen secondary markets regulation by (i) expanding oversight regime of the HKEx; and (ii) further developing clear and transparent requirements for the recognition of exchanges and the authorization of automated trading services.	short-term
Strengthen auditors' oversight by (i) enhancing the independence of the auditor oversight body; (ii) strengthening the enforcement framework; and (iii) expanding the scope of oversight to all auditors of companies listed in Hong Kong.	short-term
Strengthen enforcement by (i) providing the scope for the SFC to take both punitive and remedial actions in cases where breaches of the Code of Conduct do not contravene the law; and (ii) improving the existing coordination arrangements for criminal enforcement.	short-term
Financial market infrastructures	
Develop a clear timetable for each FMI for compliance with the PFMIs.	short-term
Develop a recovery and resolution plan for each FMI (in line with the resolution regime).	medium-term
Crisis management and resolution	
Continue efforts to develop a comprehensive resolution regime, in line with emerging international good practices.	short-term
Review the modalities (target size; normal premium level; surcharge premiums for replenishment) for ensuring the deposit protection fund has the appropriate resources to meet its objectives without undue reliance on the Exchange Fund.	medium-term
1/ Short-term indicates within 18 months; medium-term indicates within 18 months to 3 years.	

FINANCIAL SYSTEM STRUCTURE

1. HKSAR has a large and well developed financial system, ranking number one in the World Economic Forum's Financial Development Index.¹ The quality of microprudential and macroprudential oversight—including the intensity of supervision, comprehensiveness of risk assessment, and active use of macroprudential policies—helped ensure the system's resilience to the 2008 global financial crisis.

- **The banking sector includes 201 institutions, with assets of US\$2 trillion, equivalent to 705 percent of GDP (Figure 1).** There are 156 licensed banks—135 foreign branches, 14 subsidiaries of foreign banks, and the remainder domestic banks. The Hong Kong operations of nine of the 29 global systemically important banks (G-SIBs) with banking activities in HKSAR² are sufficiently significant to warrant the HKMA's participation in their Crisis Management Group (CMG). The assets of the four largest banks account for almost half the consolidated assets of the banking system. Accounting for about 35 percent of total assets of the banking system, foreign branches operate a diversity of business models—some as group liquidity hubs, some as investment banks, while some are engaged in domestic activities, accounting for about 27 percent of domestic lending. The authorities strongly encourage foreign branches to subsidiarize if their HKSAR-based business becomes significant. The dominant presence of foreign-owned institutions puts a premium on the HKMA's role as a host supervisory authority.
- **The security markets are among the largest in the world.** As of June 2013, the total market capitalization of the stock exchange was US\$2.7 trillion, the sixth largest market capitalization worldwide, or 1,000 percent of GDP. The stock market lists about 1,567 companies, of which 743 are from the Mainland (representing 56 percent of the total capitalization), 722 from HKSAR, and the rest mainly from Asia. The total market value of outstanding debt issues was US\$154 billion across 355 issues.
- **The insurance sector is large and diversified.** In 2012, HKSAR was ranked 4th for insurance penetration (12.9 percent of GDP) and 7th for insurance density (US\$4,719 per capita). The insurance sector includes 155 licensed insurers and is dominated by foreign-owned insurers (about 72 percent of total assets). The long-term insurance industry (i.e., including life insurance and annuities) is highly concentrated,³ while the market share of the general insurance industry is more evenly distributed.

¹ See [World Economic Forum, 2012, Financial Development Report](#).

² As identified by the Financial Stability Board in November 2013.

³ As of end-2012, the assets of the top three long-term insurers accounted for 46 percent of the total assets.

Recent economic developments

2. Near-term economic prospects in HKSAR are positive. Real GDP grew by 2.9 percent in 2013, supported by consumption and investment. Inflation remained steady at around 4 percent due to a moderation in food prices and housing costs, while the budget surplus surpassed 3 percent of GDP. Medium-term economic prospects are also favorable given the favorable prospects and anticipated recovery of Hong Kong's main trading partners, including the Mainland and the United States.

3. The Linked Exchange Rate System (LERS) works well for HKSAR and the system is underpinned by significant buffers. As of December 2013, the Exchange Fund had US\$391 billion of assets, of which US\$174 billion back the monetary base with most of the rest representing accumulated fiscal surpluses available as flexible buffers.⁴ While the primary purpose of the Exchange Fund is to maintain currency stability, it also has the legal mandate to provide both liquidity and capital to the banking system to maintain the stability and integrity of the financial system.

Financial sector trends

4. Hong Kong banks appear healthy (see Figure 2 and Table 3). Capital adequacy ratios (CARs) remain robust at around 16 percent, with banks' Tier 1 capital ratio at over 13 percent. Net interest income has steadily improved since 2010, and, at 39 percent, the liquidity ratio remains well above the statutory minimum of 25 percent.

5. The insurance industry has seen strong growth over recent years. Premiums grew by a cumulative 54 percent between 2009 and 2012. Growth in long-term insurance is underpinned by increasing affluence and an aging population, while, in general insurance, expansion of the dominant accident and health insurance has been sustained by increased awareness of the need to plan for future healthcare.

6. The solvency of the insurance sector exceeds prescribed requirements. As at end-2012, long-term insurers recorded available capital resources of 1.9 times the prescribed capital requirement (of 1.5 times the minimum solvency requirement), while general insurers and reinsurers reported significantly higher ratios of 5.6 and 6.4 times respectively. To facilitate early intervention where required, the authorities closely monitor insurers with solvency less than 200 percent of the minimum solvency requirement. The current solvency regime is rules-based and largely modeled on the European Union's Solvency I.

7. Although a fully-fledged risk-based capital regime for insurers is not yet in place, the authorities pay close attention to insurers' risk profiles. In particular, to assess insurers' vulnerability, all insurers are subject to quarterly and ad hoc stress tests, while long-term insurers are

⁴ This implies a backing ratio of 107 percent.

subject to annual dynamic solvency testing. This analysis indicates that long-term insurers are vulnerable to a protracted period of low interest rates and volatile financial markets, while the key risk facing general insurers seems to be intense competition that could lower their profitability. Where management action is needed to address any identified vulnerability, this is closely monitored until fully implemented.

Credit developments

8. Supported by low interest rates, credit has grown strongly since 2010 (Figure 3). Credit grew by 16 percent in 2013. Credit in foreign currency—mostly for use outside HKSAR—has grown by double digits, and a significant portion of lending for use outside HKSAR is to the Mainland corporate sector. To mitigate foreign currency risk, the HKMA carefully monitors how banks match foreign currency credit exposure to customers with foreign currency sources of funding.⁵ Credit in Hong Kong dollars—mostly for use in HKSAR—has grown at a steadier pace of around 8 percent year-on-year.

9. Despite robust deposit growth, credit growth has caused the loan to deposit (LTD) ratio to increase. This reached 72 percent in June 2013. This increase has been especially pronounced in foreign currencies (excluding the renminbi, RMB) (Figure 3). The loan portfolio in RMB however remains small, with the RMB LTD ratio remaining below 16 percent.

10. Customer deposits dominate banks' funding (around 55 percent of total liabilities in December 2012) (Figure 1). Interbank funding comprises around 25 percent of total liabilities, while debt instruments comprise over 5 percent. Foreign branches are most dependent on interbank funding, with this comprising just over 50 percent of their liabilities, but most of this comes from abroad. Deposits account for just over 30 percent of foreign branches' liabilities. Time deposits have recovered to pre-crisis levels, although their share remains around its trough of 45 percent (compared to 65 percent at the beginning of 2007) (Figure 3). Saving deposits, which are also relatively sticky, have seen stronger growth, while demand deposits remain relatively small, despite strong growth. These developments are welcome given this overall funding structure will mitigate liquidity risks and insulate banks' funding costs against interest rate shocks.

11. Corporate sector lending has increased to record highs, reaching about 151 percent of GDP in December 2013.⁶ This is high relative to regional peers (e.g., Korea at about 110 percent, and Singapore at about 70 percent). However, median leverage ratios for companies do not appear out of line with international peers, and profitability and interest coverage ratios remain robust (Figure 4). Construction and real estate lending accounts for 25 percent of loans for use in HKSAR, and the median leverage of the sector appears particularly high. However, credit growth to this sector has slowed recently (to about 3 percent yoy in 2012–13).

⁵ On aggregate banks' maintain a net long position in foreign currency.

⁶ With corporate sector lending defined as loans for use in HKSAR plus trade finance but excluding loans to the personal sector,

12. Household debt has reached its highest levels (at 62 percent) in many years, though remains relatively low compared to international peers (Figure 4). About one-third of loans for use in HKSAR are to households, with mortgages accounting for the bulk of household debt (about 45 percent of GDP).

13. Despite a higher level of debt, lower interest rates imply a low overall debt service ratio (Figure 4). With best lending rate-based mortgage rates currently around 2.3 percent, debt service ratios are low compared to the early 2000s. According to the 2011 census, only about 10 percent of households with mortgages pay more than 40 percent of their income to service mortgages compared to about 25 percent in 2001. Nevertheless, these households could be vulnerable to changes in mortgage rates or household income.

KEY RISKS

14. The operating environment for financial institutions has become more challenging.

- The anticipated withdrawal of monetary stimulus by the United States would be expected to lead to tighter financial conditions in HKSAR, including for mortgages that typically carry adjustable rates. A disorderly unwinding could lead to disruptive capital outflows and pressures on liquidity.
- The increasing integration of HKSAR with the Mainland, including through trade and banks' exposure to nonbank corporates and HKSAR's role as the principal offshore RMB center, could pose significant risks. A significant financial disruption, coupled with a sharp economic slowdown, in the Mainland would spill over to HKSAR, with a tightening of RMB liquidity conditions also adversely affecting liquidity in the RMB offshore center. This increasing integration, combined with continuing capital controls in the Mainland potentially exposes HKSAR to unrecorded cross-border financial activities.
- A significant downturn in property prices could constrain the ability of households and small firms to borrow, reflecting the reduction in collateral values, and prompt banks to tighten their lending standards hindering growth. HKSAR could be adversely affected by a deterioration of the situation in the Euro area.

RESILIENCE TO RISKS

A. Stress Tests

15. Stress tests quantify the possible impact of identified key risks, and show a high degree of resilience of the banking sector. While all large banks are well-capitalized and able to withstand a severe deterioration in economic conditions—a drop in economic growth, a rise in unemployment, a decline of property prices, and increasing funding pressures—without any aggregate capital

shortfall over a five-year stress horizon, the solvency of a marginal number of smaller institutions appears slightly vulnerable.⁷

16. The positive results reflect banks' current strong solvency conditions. Moreover, high collateralization of mortgages and declining LTV ratios (reflecting the authorities' active use of macroprudential measures (Table 2)) help absorb the impact from even severe shocks to property prices.

Solvency risk

17. Solvency stress tests (based on mid-2013 data) assess the capacity of the banking sector to absorb downside deviations from a baseline macroeconomic scenario. The three-pronged approach to solvency stress testing covered about 50 to 60 percent of total assets of the domestic banking sector (and 99 percent of all locally incorporated banks) (Figure 5):⁸

- *A bottom-up (BU), balance sheet stress test* conducted by banks themselves in collaboration with the mission and HKMA staff ("BU exercise"); and
- *A cross-validation of results by two top-down (TD), balance sheet stress tests* conducted in collaboration with HKMA staff ("IMF TD exercise") and a modified implementation of the HKMA's supervisory stress test ("HKMA TD exercise");⁹ and
- *A cross-validation of results by a top-down, market-based stress test* using the Systemic Contingent Claims Approach (Jobst and Gray, 2013) to generate a measure of capital adequacy for the occurrence of joint tail risks from market-implied expected losses of banks ("SCCA").¹⁰

18. The tests examine banks' solvency under three different macroeconomic scenarios.¹¹

These include: (i) a baseline scenario with macroeconomic projections based on the WEO of April 2013 and the Article IV staff report for People's Republic of China of June 2013; (ii) a "slow growth (SG)" scenario, leading to a cumulative loss of GDP of roughly 9 percent over five years, underpinned

⁷ The stress test undertaken for the FSAP differ from typical supervisory stress tests in that the findings typically do not require any management action by financial institutions; rather, they serve to inform policy discussions with country authorities about frameworks in place to deal with systemic shocks.

⁸ The BU and IMF TD exercise assume a static balance sheet with constant credit growth in line with nominal GDP growth, whereas the HKMA TD exercise and SCCA assume the absence of credit growth. No asset disposals / divestments after cut-off date are considered, and defaulted loans are not replenished.

⁹ The shocks assumed in the HKMA TD exercise are more condensed within the two-year stress period, with the magnitude of shocks being similar to those assumed in the BU and IMF TD balance sheet exercises over a five-year forecast horizon.

¹⁰ Jobst, Andreas A. and Gray, Dale F., 2013, "Systemic Contingent Claims Analysis (Systemic CCA) – Estimating Market-Implied Systemic Risk," IMF Working Paper No. 13/54.

¹¹ The scenarios used in the HKMA TD exercise were based on those internally adopted by the HKMA in its regular TD solvency stress test over a two-year horizon, and were slightly different from those adopted in other solvency stress tests considered in FSAP.

by a broad-based slowdown of global economic growth, including in the Mainland, triggered by an increase in U.S. interest rates; and (iii) a “severe adverse (SA)” scenario where the contraction in growth is further aggravated by an intensification of capital outflows, generating a cumulative loss of just over 12 percent over five years (Figure 6 and Table 4).^{12,13} Property prices also decline significantly under the adverse scenarios by 30 and 40 percent, respectively, and equity prices decline by 50 and 65 percent, respectively. The severity of these shocks is broadly consistent across the various approaches with FSAP stress tests conducted in other systemically important jurisdictions.

19. The solvency stress tests evaluate vulnerabilities based on several transmission channels. These include: (i) impairment charges (e.g., credit losses) and mark-to-market valuation changes of fixed income securities (financial and government bonds) in both the trading and banking book;¹⁴ (ii) changes in pre-impairment income, including changes in funding costs; and (iii) changes in risk-weighted assets (RWAs). The stress tests also took account of external developments (such as changes in valuation of foreign fixed income securities due to increased sovereign risk and exchange rate fluctuations).

20. The stress tests indicate that the banking sector remains sufficiently capitalized under the current solvency regime (Figure 7). The results are consistent across the various different approaches, in particular with the aggregated BU findings. Although all capital adequacy measures (CAR, Tier 1 capital and common equity Tier 1 capital) are materially affected by both adverse scenarios, there is no aggregate capital shortfall, even under a market-implied measure of capital adequacy (SCCA). All capital adequacy measures (CAR, Tier 1 capital and CET1) are materially affected by both adverse scenarios, but there is no aggregate capital shortfall. The results suggest a high sensitivity of sample banks to rising impairment losses, valuation haircuts on investment assets, and the impact of both regulatory changes to the definition of capital and rising default probabilities on RWAs under stress;¹⁵ however, the impact of interest rate risk remained limited.

21. While large banks exhibit very solid capital buffers, a few smaller banks show some vulnerability during the final years of the SA scenario. In two out of the three TD approaches, stresses would translate into a marginal capital shortfall of less than 0.2 percent of system-wide Tier 1 capital relative to the Basel III capital requirements—the only hurdle rate breached—for a small number of local banks.¹⁶ The SCCA approach points to a more significant decline in market-implied capitalization were the stress scenario to materialize. This may reflect a temporary increase in equity

¹² The severe adverse scenario also includes a more significant slowdown in growth in the Mainland.

¹³ The mission also assessed the impact of an alternative path for GDP with the equivalent cumulative loss in output, but with the relative changes calibrated to the Asian financial crisis. The results show that the sector remains resilient to the alternative specification of the GDP shock, with no aggregate capital shortfall over the stress horizon. However, there is a marginal deterioration in capital ratios relative to the severe adverse scenario

¹⁴ For the bottom-up stress test, valuation changes of credit and interest rate derivatives are also taken into account.

¹⁵ The impact of regulatory changes on risk-weighted assets (RWAs) and capital under stress was relatively small for the BU exercise.

¹⁶ None of the tested banks failed in two of the three TD approaches at the same time.

price volatility (due to rumors of potential mergers and acquisitions), but a case could be made for these banks to build additional capital buffers over the medium term.

Liquidity Risk

22. Banks have low liquidity risks, although funding structures vary. Stricter liquidity regulations by the HKMA, which also apply to foreign branches, have helped improve liquidity risk management.¹⁷ Stress test shows that banks exceed—and in most cases by a large margin—minimum liquidity ratios due to high cash balances and large holdings of liquid assets. The tests also point to varying risk drivers across different types of institutions in a liquidity shock scenario. Given the nature of their funding base, local banks are most vulnerable to a shrinking deposit base, while foreign branches are more dependent on wholesale funding¹⁸ and vulnerable to outflows from related-party lending and contingent claims.

23. Stress tests show that all banks are able to support a short-lived shock to cash outflows (Figure 9).¹⁹ The liquidity stress tests aimed to capture the risk that a bank fails to generate sufficient funding due to scheduled and unscheduled net cash outflows (“market liquidity risk”) and a restricted ability to access funding markets (“funding liquidity risk”). Results suggest that banks have sufficient liquid assets to withstand week-long net cash outflows (on a solo basis) due to a large deposit run and wholesale funding outflow. Extending the risk horizon to one month shows no liquidity shortage at either the aggregate or individual bank level. Again, these results cover foreign branches.

24. The Basel III standard liquidity measures (Liquidity Coverage Ratio, LCR, and Net Stable Funding Ratio, NSFR) have been examined on a limited sample of larger local banks and foreign branches. The average LCR and NSFR remain above the 100 percent threshold on both a combined and consolidated basis, and most institutions clear the threshold with ease (for end-June 2013 positions). However, on a combined basis, a few banks show insufficient liquidity buffers to meet net cash outflows over a 30-day horizon on the LCR measure. This shortfall largely reflects banks’ holding of securities not qualified as high quality liquid assets under the LCR definition—for instance, debt securities issued by financial institutions. Given the transition timetable, it is expected that banks will adjust their portfolio holdings over time to address this shortfall. Even so, most banks report LCR ratios above 60 percent (and some close to 100 percent), the initial minimum LCR

¹⁷ Apart from the use of the Enhanced Liquidity Stress Test to monitor the resilience of individual banks and the whole banking sector to liquidity shocks, in the second half of 2011 the HKMA introduced a matched term funding requirement where banks experiencing high credit growth were required to obtain matched term funding to support their lending. A new stable funding requirement would be introduced in January 2014 to further enhance the resilience of the banking sector in this regard.

¹⁸ As noted earlier, just over 50 percent of foreign branches’ liabilities come from the interbank market.

¹⁹ The liquidity test were: (i) the HKMA 7-day/LOLR cash flow test; (ii) the HKMA Enhanced Liquidity Stress Test (ELST); (iii) the Wong-Hui (2009) market risk-contingent liquidity assessment; (iv) the IMF cumulative five-day implied cash flow (ICF) test; and (v) the IMF non-cumulative 30-day implied cash flow (ICF) test.

requirement set out in the Basel III transition schedule.²⁰ In addition, most of the sample banks report NSFR values of 100 percent or higher, indicating a stable funding profile to support long-term lending. Although banks' foreign currency liquidity position is closely matched, overall maturity mismatches increase significantly beyond short tenors (Table 5). This reflects the high proportion of residential mortgages in banks' portfolios largely backed by retail deposits, which are relatively sticky.

B. Spillover Analysis

25. Network analysis is used to explore further cross-border interbank vulnerabilities.²¹

Given the relatively limited interbank activities of local banks, this principally captures the role of foreign branches operating as group liquidity hubs (Figure 1). The relative prominence of exposures to the Mainland is confirmed by the simulation of two extreme tail events—a credit shock triggered by the default of a foreign banking system's interbank obligations (with a loss given default of 80 percent), and a funding shock triggered by the distress of a foreign banking system that leads to a liquidity squeeze (35 percent of lost funding is assumed to be irreplaceable) and associated fire sale losses (with a loss of 80 percent of value) (Figure 10). The extreme tail event of simulated losses on the Mainland interbank exposures would entirely wipe out capital in Hong Kong's banking system. This is not surprising given the rapid expansion in banks' exposure in recent years (Figure 8). Singapore, Japan, the United Kingdom, Korea and the United States represent the second tier of risks. Compared with a credit shock, funding vulnerabilities are much smaller, with a maximum capital loss of less than 18 percent under the illustrative scenario, reflecting banks' relatively small dependence on offshore funding. Japan, the United States, and the Mainland represent the biggest risks from a funding shock. This analysis complements the stress tests by providing some insight into the potential vulnerability of banks, particularly foreign branches, to both credit and funding shocks. The stress tests provide comfort regarding the resilience of banks to a significant credit shock, including from the Mainland.

26. Network analysis also illustrates the outward spillover effect of a credit or funding shock originating in HKSAR. As in the case of inward spillovers, the impact of a funding shock is smaller than that of a credit shock. Macao SAR is most exposed to shocks originating in HKSAR (Figure 10).

²⁰ The HKMA plans to follow the Basel phase-in arrangement introduced in January 2013. Under the transitional arrangement, the initial regulatory minimum LCR is set at 60 percent in 2015 followed by an annual increase of 10 percentage points to 100 percent by 2019.

²¹ Based on Espinosa, Marco A. and Juan Solé, 2010, "Cross-Border Financial Surveillance: A Network Perspective," IMF Working Paper No. 10/105. The analysis captured 31 banking systems, using BIS data on cross-border interbank exposures. Given the implied focus on foreign branches, an imputed capital is added by scaling up local bank's reported capital by foreign branches' share of total banking system assets.

FINANCIAL SYSTEM OVERSIGHT

27. HKSAR has in place complementary structures for macroprudential and microprudential oversight to identify risks in the banking system. The HKMA Macro-Surveillance Committee identifies bank-intrinsic and system-wide risks. To facilitate timely supervisory action, the HKMA requires AIs (including foreign branches) to report when they are close to, or have breached a series of trigger ratios, including liquidity ratios. For example, the HKMA imposes an additional capital trigger ratio (on an institution specific basis and currently at least 0.5 percentage points over the total minimum CAR) to help mitigate the systemic risks posed by the exceptionally large banking system and major AIs. In moving to Basel III, the authorities will introduce a capital surcharge on domestic systemically important banks. Legislative changes to enable these measures, which will also include the counter-cyclical capital and capital conservation buffer, are planned for 2014, in time to meet the Basel III timetable. The Financial Stability Committee provides a broader consideration of key systemic risks, while integrating the views from the HKMA, SFC, and IA.

A. Macroprudential Oversight

28. To strengthen the resilience of banks to house price corrections and interest rate increases, the HKMA has made extensive use of macroprudential policies (Table 2). The HKMA has introduced six rounds of macroprudential measures since October 2009 to mitigate the risks of mortgage lending. Principally among these measures are limitations on the maximum LTV and limits on the debt servicing (DSR) ratio. The HKMA has also required banks to perform stress tests on borrowers as part of the loan approval. These policies have helped reduce the average LTV at origination from 64 percent in 2009 to 55 percent in the first half of 2013. In conjunction with the introduction of various new stamp duties and a doubling of the regular stamp duty, these policies have helped reduce mortgage lending growth, halt the rapid increase in house prices, and moderate property sales. As discussed with the HKMA, priority would be placed on safeguarding financial stability in considering any relaxation of macroprudential policies. This would require clear evidence of a substantial downward correction of property prices, and, possibly, some moderation of pressure on household debt servicing capacity, especially given the inevitable normalization of mortgage rates over the medium term.

29. The authorities are actively monitoring lending to non-bank corporates in the Mainland. The HKMA has recently enhanced reporting requirements on these exposures; this will help determine whether any macroprudential policies are needed to mitigate the associated risks. Overall, the HKMA should continue to make surveillance and supervision of these exposures a key supervisory priority.

B. Microprudential Oversight

Banking Sector

30. HKSAR has a very high level of compliance with the strengthened Basel Core Principles for Effective Banking Supervision (BCPs). The HKMA was assessed against the 2012 revised methodology, which strengthened the requirements for supervisors, approaches to supervision, and supervisors' expectations of banks. Reflecting the status of HKSAR as a major international financial center, the expectations applied to the assessment were high. HKMA practices in the area of corporate governance are particularly strong. These include the close and continuing attention to "fit and proper" standards, and to the role of the Board in the governance of an authorized institution.

31. The HKMA has maintained its commitment to the international regulatory reform agenda and is an early adopter of many standards. Despite the demanding pace, the authorities continue to consult the industry on emerging international standards on capital, liquidity and risk management, and implement them in a timely manner. Given the legislative process that must be followed, Hong Kong's ability to meet the international timetable reflects HKMA's successful communication with the legislature on policy needs and effective coordination with regulatory partners. And although HKMA is following the agreed international timetable, banks are moving fast to meet the new standards.

32. The HKMA enjoys clear de facto but not de jure operational independence. In practice the HKMA has autonomy over its day-to-day operations and in the methods it uses to pursue its public policy objectives. However, the Chief Executive of HKSAR has a reserve power in the Banking Ordinance (BO) to give directions to the MA. This reflects the government's responsibility for the formulation of monetary and financial policies and supervision of financial markets as enshrined in the Basic Law. The Chief Executive has not used this power. In addition, there is no statutory provision that specifies the circumstances under which the MA can be removed from office, or to publicly disclose the reasons for the dismissal of the MA. Overall, there is much evidence of good practice, and important safeguards are in place, such as the potential for judicial review of decisions taken by government authorities, which mitigates the risk of any abuse of power. Nonetheless, the independence of the HKMA could be more fully protected and the authorities should consider taking further steps as appropriate, through legal requirement or otherwise, to specify the circumstances that trigger the exercise of the legal authority of the Chief Executive to give directions to the MA and provide for public disclosure of the reasons for the dismissal of the MA.

33. There are minor regulatory gaps in respect of the HKMA's powers and regulatory definitions. At present the good practices surrounding lending to parties connected to an authorized institution, including Directors, controllers, officials responsible for credit approval, do not apply to other senior management; consequently, the definition of related party should be expanded. In relation to external auditors, the HKMA does not have the explicit power to remove the auditor of an authorized institution or to have access to the external auditor's working papers. The HKMA has been able to work around these restrictions as the existing framework enables the HKMA

to convey concerns on the capability of the external auditors, request remedial actions, and access the audit working papers of listed AIs with the support of the Financial Reporting Council (FRC). Nevertheless, to address this gap, amendments to the appropriate legislation should be made.

34. HKSAR has strengthened its AML/CTF framework. The introduction of the Anti-Money Laundering and Counter-Terrorist Financing (Financial Institutions) Ordinance (AMLO) and issuance of guidelines has strengthened the supervisory framework. The HKMA has demonstrated a high degree of commitment to enhanced practices, increased specialist resources, and strongly promoted awareness of AML/CTF concerns. The effectiveness of these measures will be assessed by the Financial Action Task Force, tentatively scheduled for 2017.

Insurance Sector

35. IA is responsible for regulating and supervising the insurance sector. It is supported by the Office of the Commissioner of Insurance, a government department. A self-regulatory system is used to supervise the conduct of business (CoB) of intermediaries. Currently, three self-regulatory organizations (SROs) supervise insurance intermediaries in accordance with non-statutory codes approved by the IA. In practice, the IA supervises the SRO's oversight of intermediaries, and conducts spot checks and independent inspections of insurance intermediaries for quality assurance on the effectiveness of the SROs.

36. The regulatory regime for the insurance sector, supported by the IA's robust supervisory practices, has a high level of observance of the Insurance Core Principles (ICPs). The IA is highly regarded by the industry. IA staff also has a good understanding of the industry and markets, facilitated by open communication and close dialogue with directors and management of insurers. Established internal procedures and checklists promote the consistency and effectiveness of supervision. The strong and robust supervisory practices compensate for many of the legal regulatory gaps noted by the assessors.

37. The ICO needs to be updated to better reflect current international best practices. The key areas for updating include: (i) extending the fit and proper regime to cover Senior Management and Key Persons in Control Function; (ii) establishing a clear definition of control and pre-determined control levels; (iii) updating risk management requirements; (iv) granting authority to remove or disqualify persons on fit and proper grounds; and (v) requiring insurers to implement contingency plans. In addition, the list of entities exempted from authorization should be reviewed, and there are merits for clarifying the priority of claims of long-term policyholders. A number of guidance notes could also be updated and to more clearly differentiate minimum requirements from supervisory guidance.

38. The authorities are advancing in their plans to establish an independent IA (IIA), scheduled to be implemented in 2015. The IIA would enhance the legal capacity, and financial and operational independence of the existing Insurance Authority. The new IIA would have more explicit powers to carry out its regulatory role. The IIA would also establish a transparent system of accountability, in line with international best practice. It would have the explicit legal authority for

inspections, investigation, and prosecution, as well as broader sanction powers. In addition, direct licensing and supervision of intermediaries by the proposed IIA would replace the current self-regulatory regime. The IA now exercises effective oversight of the SROs, which has provided a safety net and critical quality assurance on the SRO regime. However, this oversight involves significant duplication of efforts, the industry codes and standards issued by the SROs are not legally binding, and the SROs are not full-fledged supervisors.

39. The proposed IIA could be further strengthened in a number of areas. In particular, the proposed IIA could benefit from: (i) granting delegated authority to issue enforceable rules via administrative means; (ii) requiring public disclosure of the reasons for removing the head of the agency; and (iii) granting clear authority to establish and supervise public disclosures by insurers. The authorities are also advised to consider eliminating the legal authority of the Chief Executive to give directions to the IA, or at least specifying the circumstances under which such directions are allowed. In addition, the circumstances for the powers of the Chief Executive to exempt or vary the provisions of the ICO for individual insurers should be specified.

40. It is timely for the IA to formulate and implement a clear and comprehensive regulatory regime for insurance groups. Key elements of the regime should cover the scope of the group to be subjected to group-wide supervision, as well as prudential and market conduct requirements at the group level. Going forward, it is advised that the authorities: (i) ensure adequate supervisory resources to effectively supervise insurance groups; and (ii) consider legal authority to take measures at the level of the holding company, in line with emerging international best practices. Notwithstanding that the ICO does not have explicit provisions on groups, the IA has assumed the role of group-wide supervisor for a Hong Kong-based insurance group, and is responsible for leading a supervisory college that monitors all issues related to the group and its companies.

41. The IA's plan to move towards a risk-based capital (RBC) regime is welcome, and a structured process for macroprudential surveillance is recommended. The RBC regime should establish a clear and consistent valuation standard and risk sensitive capital requirements. As a stop-gap measure, the IA is advised to establish solvency margin requirements for all classes of long-term business, and provide supervisory guidance on insurers' obligations to meet policyholders' reasonable expectations. Pending the introduction of explicit enterprise risk management requirements, the current dynamic solvency tests could be enhanced.

Securities Market

42. HKSAR has developed a sound framework for the regulation of securities markets, which exhibits a high level of implementation of the IOSCO Principles. Both the SFC and the HKMA are sophisticated regulators, and have leveraged domestic and international expertise to develop sound supervisory practices. Further, the Lehman minibond experience has led to material

improvements in conduct supervision that have permeated both the SFC and the HKMA.²² Continuing efforts by the SFC to build its capacity to identify and monitor emerging risks should increase its ability to react in a timely manner to an evolving landscape, marked by an increased interconnection with the Mainland, an active presence by international players, and increased regional competition as an international financial center.

43. Three areas where the regulatory and supervisory framework needs to be strengthened:

- **Regulation and supervision of markets.** As recognized by the SFC, the evolution in the business model of the Hong Kong Exchanges and Clearing Limited (HKEx) makes it critical for the SFC to continue implementing a stronger oversight regime, including a review of the governance of the HKEx, as well as of the composition of the HKEx risk management committee—the latter to ensure an arm’s length relationship between the regulatory authorities and the HKEx. Also, while the SFC has been open in its discussions with applicants, it should further develop and make public a comprehensive regulatory framework for all types of trading platforms.
- **Auditors’ oversight.** In light of its geographic position and open architecture, HKSAR is a preferred venue for listings from the Mainland and increasingly from other jurisdictions. As such it requires robust disclosure practices. A key challenge arising from this environment is the need to ensure robust disclosure by issuers from jurisdictions that have different legal traditions, governance and accounting frameworks. Reasonably, the SFC (and the HKEx) has relied on expert gatekeepers, including auditors, to verify and attest to the quality of issuers’ information. However the current framework does not ensure the independence of the Hong Kong Institute of Certified Public Accountants, the body in charge of the supervision of auditors, nor provide it with powers to oversee foreign auditors of companies listed in HK, nor establish a strong enforcement framework.
- **Enforcement of securities regulation.** Enforcement is a critical component of a robust supervisory regime, as it allows regulators to provide clear signals to the market about the practices that are not tolerated. While the SFC can use different avenues to pursue enforcement actions, it cannot easily impose both punitive action and secure compensation for clients (remedial action) when breaches of the Code of Conduct do not contravene the law, which generates difficult trade-offs. Also, the coordination between the SFC and the Director of Public Prosecutions on issues of enforcements could be further strengthened. The openness of HKSAR makes it extremely dependent on international cooperation, in particular from the Mainland, and the SFC has actively sought to build strong cooperation arrangements that are bearing fruit. However, in light of the many practical challenges that remain, this requires a further commitment of the international community to cooperate on this front.

²² This involved sales of a relatively complex derivatives product, based on underlying Lehman obligations, to retail investors. This ultimately resulted in distributing agents compensating certain investors.

44. Finally, it is important that the operational independence the regulators have enjoyed translates also into stronger de-jure independence. This will require improvements in the current legal governance arrangements for both SFC and HKMA. The authorities have noted that the current arrangements allow the maximum-level of operational and de-jure independence of the regulators, while enabling the government to perform its duties with respect to financial markets policy formulation.

Financial Market Infrastructures

45. The oversight and supervision of FMIs appears effective. To ensure financial stability and consolidate Hong Kong's position as an international financial center, the authorities have fostered the development of sophisticated and multi-currency FMIs, with extensive domestic and overseas system linkages.

46. Nevertheless, further steps are needed to bring the FMIs into compliance with the new Principles for Financial Market Infrastructures (PFMIs). This involves assessing the changes required for each FMI and addressing remaining gaps, which will, in particular, necessitate changes in financial risk management at the clearing houses. The authorities' firm commitment to achieve full compliance of the FMIs with the PFMIs is welcome, and they should keep to the announced timetable.²³ They should also continue with their efforts to draft legislation establishing a comprehensive resolution regime that also includes the FMIs. In parallel, recovery and resolution plans for each FMI should be prepared.

CRISIS MANAGEMENT AND BANK RESOLUTION

47. The MA has the powers to intervene in respect of a problem bank as defined in Section 52 of the BO. The MA, in consultation with the FS, has powers to (i) require an authorized institution (AI) to take any action in relation to its affairs, business and property; (ii) direct an AI to seek advice in relation to the management of its affairs, business and property from an "Advisor" appointed by the MA; and (iii) appoint a temporary "Manager" to manage the affairs, business and property of the AI, specified in a direction given by and in accordance with an objective specified by the MA. The MA can use these powers when, among other reasons, the AI is carrying on its business in a manner detrimental to the interests of its depositors and creditors, or when the AI is insolvent or likely to become unable to meet its obligations. Outside of Section 52, under certain conditions, the MA has the ability to withdraw consent from (and thereby effect the removal of) the chief executive and executive officers of an AI, and, in respect of a locally incorporated AI, directors, and to suspend, impose conditions on or revoke the authorization of an AI.

48. The MA has means and procedures under which he can provide liquidity or capital support to banks for systemic crisis management. Such assistance, which has been provided in

²³ HKMA has set a deadline of end-December 2015 for the FMIs under its purview to generally comply with the PFMIs.

the past, is supported by resources from the Exchange Fund. The HKMA's lender-of-last-resort policy is transparent and in line with best international practices, such as limiting emergency liquidity assistance to solvent banks and to circumstances where the failure to provide liquidity may result in a systemic threat to financial or monetary stability. Other forms of assistance, including capital support, may also be provided to protect financial or monetary stability. Although there is no requirement to do so by law, the MA would, in practice, seek the FS's approval of any decision to provide capital support (and other funding support in circumstances where the LOLR criteria are not met).

49. The authorities are encouraged to continue efforts to develop a comprehensive resolution regime for financial institutions, in line with international practices.²⁴ While the MA's current powers facilitate the taking of remedial actions or measures to protect depositors of a troubled AI, there is no comprehensive resolution framework in place that would allow the MA (or other public authority) to stabilize and restructure some or all of a nonviable institutions' business. As a result, many of the powers considered necessary under the Financial Stability Board's Key Attributes of Effective Resolution Regimes for Financial Institutions (including powers to override certain rights, and impose losses on shareholders and creditors) are absent or limited.

50. In designing the resolution regime, the authorities should give attention to a number of features. For example, the need to strike an appropriate balance between the role the government plays in financial stability matters, reflecting the constitutional framework, and ensuring, in line with good practice, the resolution authority has operational independence in carrying out this role. In addition, the resolution authority will need to have the capacity to act promptly and decisively, which could prove challenging if the legislative framework for the regime is bound by overly complex procedures. Finally, the resources of the Exchange Fund should not limit the imperative to ensure the private sector bears an appropriate share of any costs.

51. The HKMA is developing formal requirements for AIs in relation to local recovery and resolution plans. After the ongoing consultative process, the HKMA expects to implement the relevant requirements in phases. The first group of AIs will have to submit recovery plans in the third quarter of 2014 and resolution plans will follow. The HKMA participates in the crisis management groups for the G-SIBs which have significant operations in HKSAR, where much of the work towards recovery and resolution planning for these entities is being undertaken. The HKMA proposes to allow local AIs that are part of cross-border groups to draw on their group plan as appropriate to satisfy local requirements.

52. The deposit protection scheme is transparent and trusted, but steps should be taken to reduce reliance on the Exchange Fund and enhance the efficiency of pay-outs. The scheme was introduced in 2006 and has never been triggered. The Hong Kong Deposit Protection Board (DPB) uses a variety of channels to enhance the public's awareness of the scheme and surveys indicate a high level of awareness. The scheme is pre-funded through risk-based levies imposed on institutions

²⁴ The authorities launched a first-stage consultation paper in January 2014.

covered by the scheme.²⁵ However, in light of the relatively limited target size of the fund and normal premium levels, the DPB should review the surcharges to replenish the fund after a payout to ensure the private sector assumes appropriate responsibility for costs associated with problem banks.²⁶ To make swifter pay-outs, the DPB should also consider changing the present rule of covering deposits net of depositors' liabilities (as opposed to gross). In addition, the DPB should seek to formalize the arrangement with the HKMA to make available early warning indicators that provide the DPB with timely notification of bank distress.

CROSS-BORDER REGULATORY COORDINATION

53. HKSAR's role as an international financial center generates important cross-border challenges—in particular its position as host supervisor. Active engagement with the supervisory colleges and CMGs of systemically important institutions—both banks and insurance companies—plays a key role in managing this risk, which is particularly salient given the dominant role G-SIBs play locally, including their insurance subsidiaries. The authorities also have robust bilateral arrangements in place to facilitate cooperation in the event of any required intervention against a foreign-owned AI; in particular, these provide the legal basis for exchange of confidential information. While these engagements are important, modes of cross-border oversight and, in particular, resolution, are still evolving, and the authorities should remain active in developing best practice in this area.

54. Effective cooperation with supervisory authorities in the Mainland is also essential to mitigate risks of increased integration. While cooperation continues to strengthen, reliance on the Mainland supervisors will be increasingly required as opportunities for cross-selling financial products develop. Work underway to deepen the understanding of banks' Mainland exposures are also welcome as it will facilitate a more comprehensive risk assessment.

55. To mitigate potential extra-territoriality effects of global regulatory developments, active participation in international fora and strong bilateral engagement should be continued.²⁷ This is an immediate issue in the context of central counterparty (CCP) regulation, which may create potential conflicts of law (between and across the European Market Infrastructure Regulation and Dodd-Frank, and Hong Kong's Securities and Futures Ordinance) or impact some Hong Kong market participants more negatively than others (e.g., branches of European banks).

²⁵ The scheme is prefunded by a yearly fee levied on member banks. The premium varies between 0.0175 percent and 0.0490 percent of the total amount of covered deposits, depending on the risk profile of each bank as measured by the CAMEL framework of the HKMA.

²⁶ Although the target size of the fund may seem low relative to some international peers, it is comparable to the target size of fund in Singapore (0.30 percent of covered deposits) and has been determined taking into account the estimated likelihood of bank failure, loss given bank failure, and the expected short time-frame to recover funds from liquidators.

²⁷ For instance, the HKMA participates actively in international regulatory fora and in supervisory colleges and crisis management groups of G-SIBs.

Table 2. Timeline of Selected Macprudential and Other Property Measures

October 2009	<ul style="list-style-type: none"> • The LTV ratio is capped at 60 percent for residential properties valued at HK\$20 million or more. • For residential properties valued below HK\$20 million, the 70 percent LTV cap continues to apply, but the maximum loan amount is capped at HK\$12 million.
August 2010	<ul style="list-style-type: none"> • The LTV ratio is capped at 60 percent for residential properties with a value of HK\$12 million or more, and for non-owner occupied residential properties. • For residential properties valued below HK\$12 million, the 70 percent LTV ratio continues to apply, but the maximum loan amount is capped at HK\$7.2 million. • The limit on DSRs of mortgage applicants is standardized to 50 percent from a range of 50 to 60 percent. • Banks are required to stress-test mortgage applicants' repayment ability with an increase in mortgage rates of at least two percentage points, and limit the stressed DSR to 60 percent.
November 2010	<ul style="list-style-type: none"> • The LTV ratio is lowered to 50 percent for residential properties with a value of HK\$12 million or more. • The LTV ratio is lowered from 70 percent to 60 percent for residential properties with a value between HK\$8 million and HK\$12 million, and the maximum loan amount is capped at HK\$6 million. • The LTV ratio of 70 percent continues to apply to residential properties with a value below HK\$8 million, but the maximum loan amount is capped at HK\$4.8 million. • The LTV ratio is lowered to 50 percent for all non-owner-occupied residential properties, properties held by a company and industrial and commercial properties regardless of property values. • A Special Stamp Duty of 15 percent is imposed on residential properties resold within 6 months of purchase, 10 percent on residential properties resold between 6 months and 12 months, and 5 percent on residential properties resold between 12 months and 24 months.
June 2011	<ul style="list-style-type: none"> • The LTV ratio of 50 percent is applied to all residential properties with a value of HK\$10 million or more. • The LTV ratio is lowered to 60 percent for residential properties with a value between HK\$7 million and HK\$10 million, with the maximum loan amount capped at HK\$5 million. • The LTV ratio is lowered to 40 percent from 50 percent for properties under the net worth-based mortgage. • The LTV ratio of 70 percent continues to apply to residential properties with a value below HK\$7 million, but the maximum loan amount is capped at HK\$4.2 million. • The applicable LTV ratio is lowered by at least 10 percentage points regardless of property types or values if the principal income of the mortgage loan applicant is not derived from Hong Kong.

Table 2. Timeline of Selected Macprudential and Other Property Measures (concluded)

September 2012	<ul style="list-style-type: none"> • For those mortgage applicants who have already borrowed or guaranteed outstanding property mortgage loans for one or more properties at the time of the loan application. <ul style="list-style-type: none"> ➤ The maximum LTV ratio is lowered to 30 percent from 40 percent for mortgage loans assessed based on the net worth of a mortgage applicant. ➤ The applicable cap on the LTV ratio is lowered by 20 percentage points regardless of property types or values for mortgage applicants whose principal income is from outside HKSAR. ➤ The DSR is lowered to 40 percent from 50 percent for applicants who already have an outstanding mortgage on residential, industrial or commercial properties. ➤ Accordingly, the maximum stressed DSR is lowered to 50 percent from 60 percent. • The maximum loan tenor of all new property mortgage loans is limited to 30 years
October 2012	<ul style="list-style-type: none"> • The Special Stamp Duty is raised to 20 percent for residential properties resold within 6 months of purchase, 15 percent for residential properties resold between 6 and 12 months and 10 percent for residential properties resold between 12 and 36 months, • A Buyer's Stamp Duty of 15 percent is introduced for buyers of residential properties (except for permanent residents).
February 2013	<ul style="list-style-type: none"> • The LTV ratio is lowered by 10 percentage points for all commercial and industrial properties from existing applicable levels. • The LTV ratio of mortgage loans for standalone car park spaces is set at 40 percent and the maximum loan tenor at 15 years. • The LTV applicable to commercial and industrial property mortgage loans is also applied to standalone car park space mortgage loans. • In calculating the stressed DSR, banks are required to assume a mortgage rate increase of 300 basis points for all types of properties, including residential, commercial and industrial properties. • The DSR and stressed DSR applicable to commercial and industrial property mortgage loans is also applied to standalone car park space mortgage loans. • A risk weight floor of 15 percent is introduced on all new residential mortgages secured on Hong Kong properties granted by banks using the internal ratings-based approach. • The existing ad valorem stamp duty (AVD) rates on both residential and non-residential properties are doubled across the board to a maximum of 8.5 percent (except for permanent residents who do not own any other residential property in HKSAR at the time of the acquisition).

Table 3. Hong Kong SAR: Financial Soundness Indicators of the Banking Sector, 2007–13
(In percent unless otherwise indicated)

	2007	2008	2009	2010	2011	2012	2013H1
Earnings and profitability 1/							
Return on average assets	1.4	0.6	0.8	0.9	0.8	0.9	1.2
Return on average equity 2/	23.2	13.4	15.4	15.2	15.8	15.3	15.1
Interest margin to gross income	42.8	57.5	47.7	44.0	45.2	47.9	44.2
Noninterest income to gross income	57.4	46.4	52.8	56.7	55.4	52.9	56.3
Noninterest expenses to gross income	46.1	55.7	57.5	57.1	54.8	54.1	46.1
Cost/income ratio	46.7	55.6	58.0	58.1	55.4	54.8	46.5
Structure of assets 1/							
Total assets (in percent of GDP) 8/	627.0	629.8	641.0	691.7	709.8	727.7	704.8
<i>Of which</i> (in percent of total assets):							
Loans to credit institutions	43.6	37.4	35.3	33.7	32.5	29.6	26.2
Loans to customers	28.6	30.6	30.9	34.4	37.0	37.5	39.9
<i>Of which</i> (in percent of total loans):							
Residential real estate loans	19.0	18.0	19.7	17.6	15.8	15.7	14.8
Commercial real estate loans	7.6	8.0	8.1	7.0	6.8	6.6	6.4
FX loans	26.2	28.3	27.0	33.2	37.8	40.1	42.8
<i>Note:</i> FX liabilities (in percent of total liabilities)	55.0	59.6	56.0	59.0	61.1	59.7	60.7
Debt securities	17.2	17.8	23.1	22.5	21.3	21.7	23.1
Equity instruments	1.3	0.9	1.1	1.1	0.9	1.1	1.1
Other assets	9.2	13.3	9.6	8.4	8.3	10.2	9.7
Funding and liquidity (in percent of total assets) 1/							
Debts to credit institutions	28.6	27.4	27.1	30.0	29.3	26.7	26.0
Bank bonds and other debt securities	2.8	1.9	1.2	1.9	3.4	5.1	5.8
Customer deposits	56.7	56.3	60.0	55.8	55.2	55.8	55.5
<i>Of which:</i> Demand deposits 6/	7.9	7.9	11.1	11.7	11.6	13.2	13.3
Saving deposits	27.9	32.3	42.5	42.6	38.4	41.0	39.7
Time deposits	64.2	59.8	46.4	45.8	50.0	45.8	47.0
Liquid assets	29.6	25.9	28.5	24.2	22.3	23.6	21.6
Liquid assets to short term liabilities	53.5	49.9	50.1	43.0	44.0	46.4	43.4
Net open position in foreign exchange to capital 2/ 3/	5.6	7.8	5.6	3.1	2.5	6.6	3.5
Asset quality							
Sectoral distribution of loans (in percent of total loans) 2/ 3/							
HK financial corporations	9.1	8.9	6.0	6.0	5.6	5.3	5.3
HK nonfinancial corporations	64.4	64.9	66.1	63.9	60.8	59.5	60.3
HK other domestic sector	9.4	8.6	8.3	7.3	6.6	6.7	6.4
Non-residents	17.0	17.5	19.5	22.8	27.0	28.5	28.0
Non-performing loans (NPL) as percent of gross loans 5/ 7/	0.7	1.2	1.6	0.8	0.7	0.6	0.5
NPL net of provisions as percent of capital 2/ 5/	2.8	3.8	3.6	1.9	1.6	1.4	1.5
Capital adequacy							
Regulatory capital to risk-weighted assets 2/ 4/	13.4	14.7	16.8	15.8	15.8	15.7	15.9
Regulatory Tier 1 capital to risk-weighted assets 2/ 4/	10.4	11.0	12.9	12.2	12.4	13.3	13.1
Capital to assets 2/ 5/	8.5	7.5	8.8	8.6	8.1	8.7	8.8

Sources: HKMA, Bankscope, IMF staff calculations.

1/ Calculated for all authorized institutions on HK office basis, unless otherwise indicated.

2/ Locally incorporated authorized institutions.

3/ HK office basis.

4/ Consolidated basis.

5/ Combined basis.

6/ In percent of total customer deposits. Calculated for licensed banks.

7/ All authorized institutions.

8/ GDP numbers are based on IMF WEO

Table 4. Hong Kong SAR: Economic Activity Under Different Scenarios
(annual percentage change, unless otherwise indicated)

	Baseline Scenario						Slow Growth (SG) Scenario					Severe Adverse (SA) Scenario				
	2013 (est.)	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Economic activity and labor market																
Real GDP	2.96	4.39	4.37	4.46	4.46	4.51	1.78	2.66	2.70	2.99	2.95	1.32	0.63	2.38	2.91	2.84
Nominal household income	4.49	4.67	5.13	4.56	4.69	4.82	1.53	2.62	2.33	1.82	2.06	0.88	0.14	1.38	1.33	1.48
Unemployment rate (% of labor force)	3.30	3.46	3.57	3.70	3.82	3.84	4.15	4.78	5.54	6.18	6.75	4.32	5.54	6.43	7.09	7.69
Price and cost developments																
Consumption prices (average CPI)	3.95	3.67	3.57	3.54	3.53	3.53	3.09	2.21	1.81	1.65	1.58	3.04	1.59	0.82	0.91	1.05
Residential house prices	7.97	-1.68	-0.70	-1.20	-1.49	3.28	-9.54	-6.10	-6.51	-6.24	-1.84	-11.97	-12.58	-7.06	-5.98	-1.97
Commercial real estate prices	-1.15	-9.35	-0.26	2.03	1.98	7.95	-17.05	-7.19	-4.99	-3.69	1.20	-19.26	-14.47	-6.96	-3.47	1.02
Equity market index (Hang Seng index)	7.00	8.06	7.94	8.00	8.00	8.04	-13.95	-9.13	-9.39	-7.89	-8.32	-16.42	-20.00	-11.13	-8.28	-8.89
Interest rates																
3-month U.S. Treasury rate	0.10	0.17	0.13	0.26	0.46	0.57	0.10	0.20	0.90	2.10	3.10	0.35	0.53	1.23	2.43	3.90
Time deposit rate (%)	0.15	0.22	0.18	0.31	0.51	0.62	0.15	0.25	0.95	2.15	3.15	0.40	0.58	1.28	2.48	3.95
3-month HIBOR rate (%)	0.38	0.41	0.51	0.62	0.72	0.82	0.66	1.10	2.24	3.39	4.53	0.66	1.10	2.24	3.39	4.53
12-month HIBOR rate (%)	0.87	1.00	1.10	1.20	1.30	1.40	1.25	1.68	2.84	3.99	5.15	1.25	1.68	2.84	3.99	5.15
Best lending rate (%)	5.00	5.00	5.10	5.20	5.30	5.40	5.20	5.57	5.94	6.31	6.68	5.12	5.41	5.71	6.00	6.30
<i>Memo item</i>																
Real GDP (P.R. China)	7.80	7.70	7.60	7.50	7.50	7.50	5.60	5.52	6.96	7.50	7.44	5.23	3.73	6.32	7.32	7.27

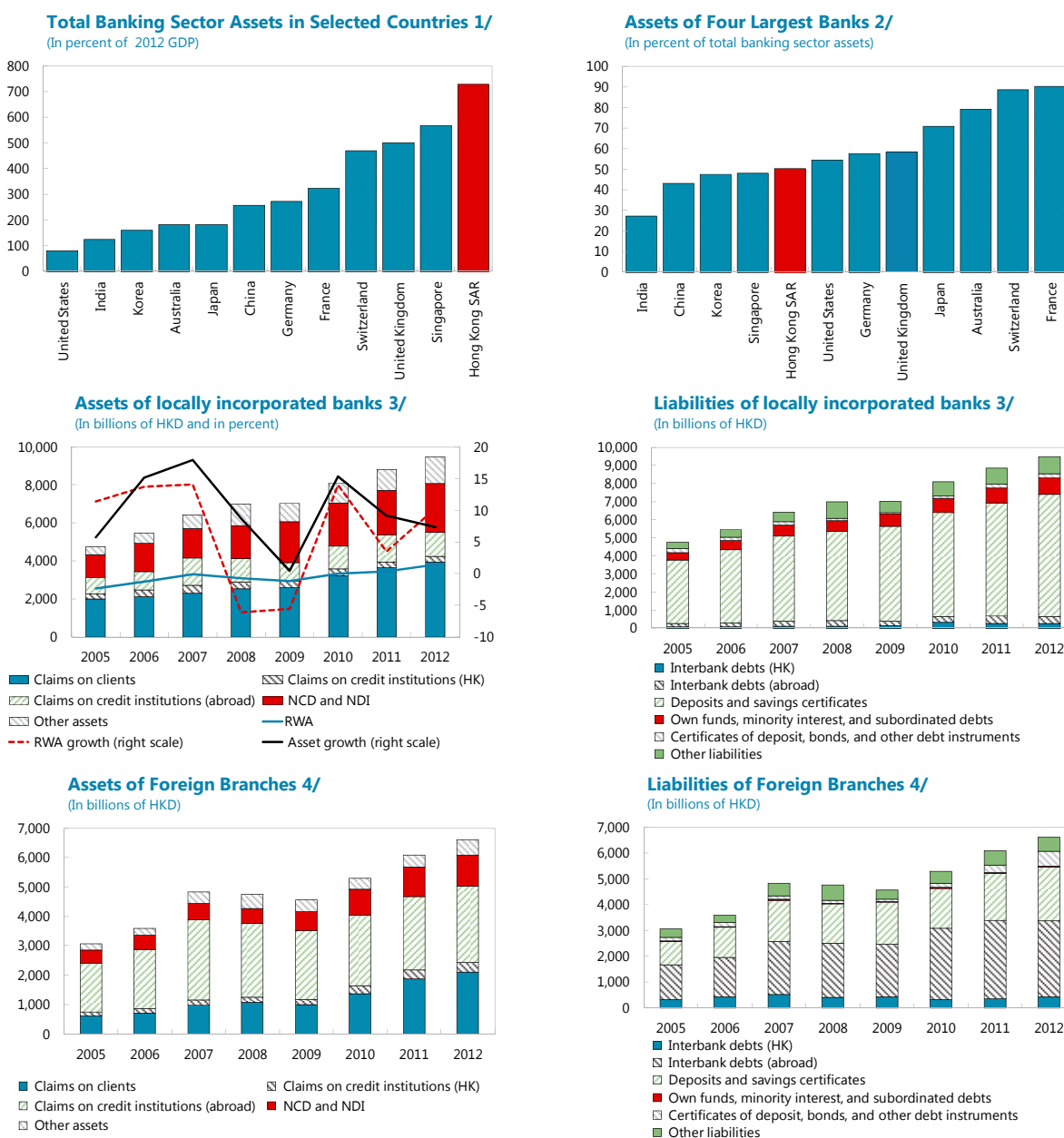
Source: HKMA and IMF staff estimates and calculations.

Note: Interest rates shown for 2013 above are recorded as of end-June 2013.

Table 5. Hong Kong SAR: Liquidity Stress Test: Maturity Mismatch Analysis

Maturity tenor	Maturity Mismatch					
	(In percent of assets in each "maturity term bucket")					
	less than 1 week	more than 1 week but less than 1 month	within 1-3 months	within 3-6 months	between 6-12 months	after 12 months
	Total Balance Sheet (All Currencies)					
All sample firms (27)	—	10.59	12.1	13.0	20.5	67.7
Local banks (Group 1) (19)	—	15.75	19.7	16.9	31.0	82.8
Foreign branches (Group 2) (8)	—	—	—	—	—	—
	FX Balance Sheet					
All sample firms (27)	0.81	13.97	14.4	5.7	11.3	15.6
Local banks (Group 1) (19)	1.03	20.41	21.3	9.2	20.1	25.6
Foreign branches (Group 2) (8)	—	—	—	—	—	—
Source: HKMA and IMF staff estimates and calculations.						

Figure 1. Hong Kong SAR: Structural Features of Hong Kong's Banking Sector



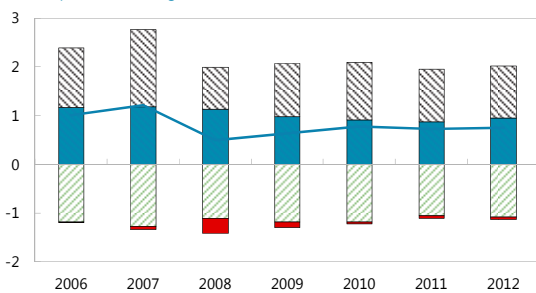
Sources: Bankscope, HKMA, Australian Prudential Regulation Authority, Bank of England, China Banking Regulatory Commission, European Central Bank, Financial Supervisory Service of Korea, Japanese Bankers Association, Monetary Authority of Singapore, Reserve Bank of India, United States Federal Reserve Board, and IMF staff calculations.

- 1/ The number for Hong Kong includes all authorized institutions on a Hong Kong office basis.
- 2/ On a consolidated basis. The "consolidated basis" covers the combined basis (i.e., the position of the bank's Hong Kong office plus its overseas branches) plus the bank's overseas subsidiaries.
- 3/ Locally incorporated banks on a combined basis. The "combined basis" of a bank means the position of the bank's Hong Kong office plus its overseas branches.
- 4/ Foreign branches on a Hong Kong office basis.

Figure 2. Hong Kong SAR: Banking Sector Developments

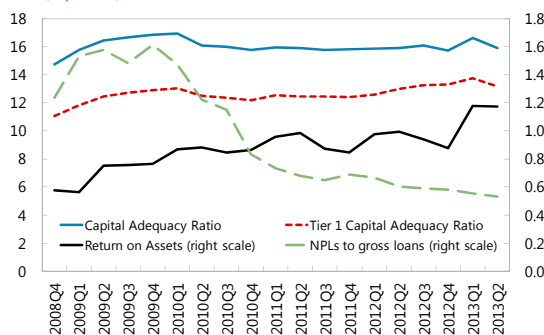
Income and Expenses 1/

(In percent of average assets; all authorized institutions)



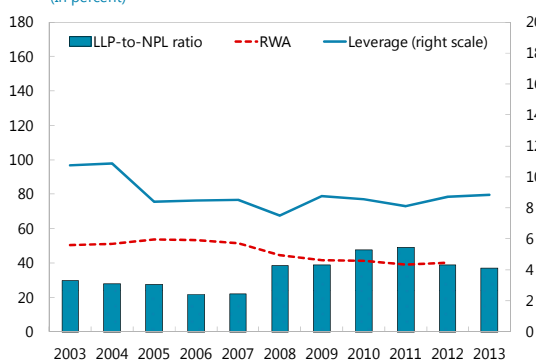
Banking Sector Soundness 2/

(In percent)



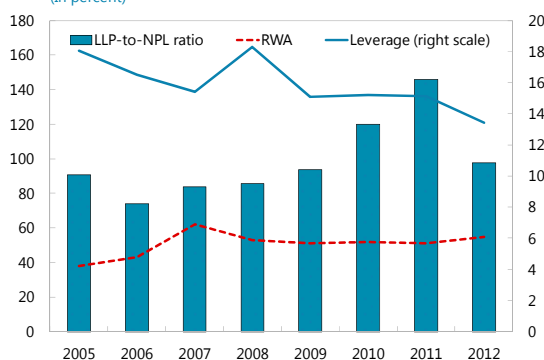
LLP/NPL ratio, RWAs and Leverage 3/

(In percent)



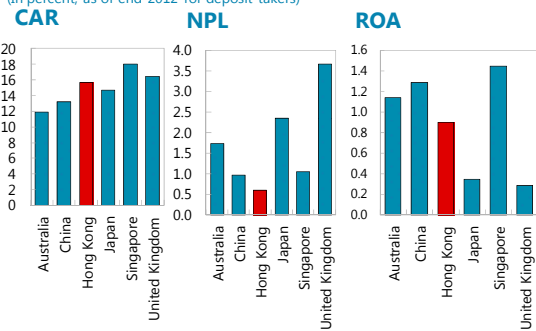
Top 4 banks: LLP/NPL ratio, RWAs and Leverage 4/

(In percent)



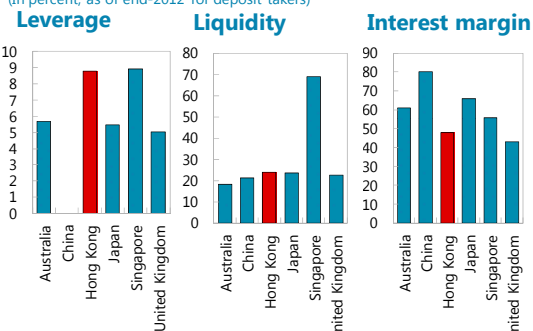
Banking Sector Indicators 5/

(In percent; as of end-2012 for deposit takers)



Banking Sector Indicators 6/

(In percent; as of end-2012 for deposit takers)



Sources: HKMA, IMF Financial Soundness Indicators (FSI) database, and IMF staff calculations.

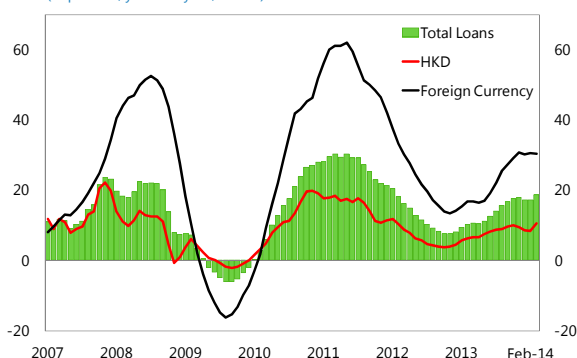
- 1/ All authorized institutions (AIs) on a Hong Kong office basis.
- 2/ Capital adequacy ratio and tier 1 capital adequacy ratio for locally incorporated AIs on a consolidated basis. Return on assets for all AIs on a Hong Kong office basis; NPLs to gross loans for all AIs on a combined basis.
- 3/ Locally incorporated licensed banks on a combined basis. Leverage refers to capital divided by total assets.
- 4/ Consolidated basis.
- 5/ CAR for all locally incorporated AIs on a consolidated basis; NPLs for all AIs on a combined basis; ROA for all AIs on a Hong Kong office basis. Data is based on the position as of end-2012 except for United Kingdom (Q2 2012) and Japan (Q1 2013).
- 6/ Leverage for all locally incorporated AIs on a combined basis; liquidity and interest margin for all AIs on a Hong Kong office basis. Liquidity refers to the ratio of liquid assets to total assets. Interest margin is expressed in percent of gross income.

Figure 3. Hong Kong SAR: Credit and Deposit Developments

Credit growth has been strong post global financial crisis...

Credit Growth 1/

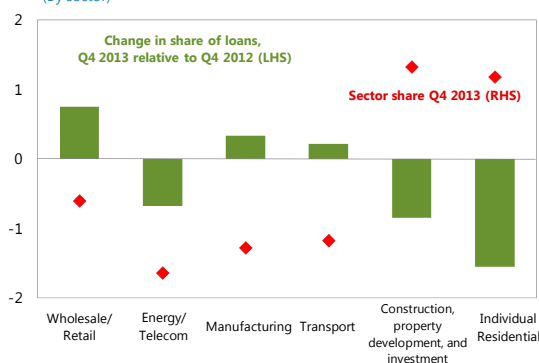
(In percent, year-on-year, 3mma)



Although loans in real estate sector account for a large share of total loans, growth has slowed recently.

Loans Outstanding for Use in Hong Kong SAR 1/

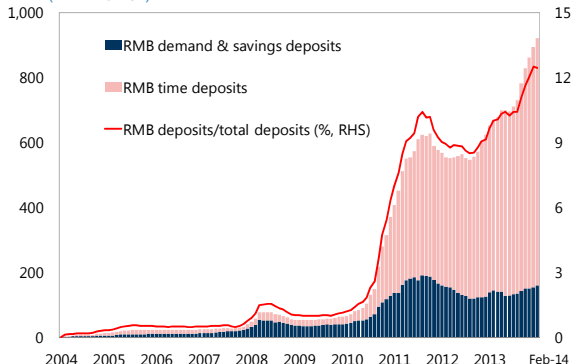
(By sector)



Part of the growth in foreign currency deposits is attributed to strong RMB deposits.

Renminbi Deposits in Hong Kong SAR 1/

(In RMB billion)



Sources: HKMA and IMF staff calculations.

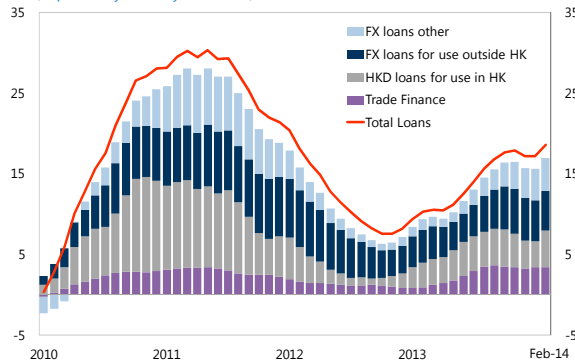
1/ All authorized institutions (AIs) on a Hong Kong office basis.

2/ Licensed banks; Hong Kong office basis.

...especially for FX loans for use of outside Hong Kong SAR

Contribution to Credit Growth 1/

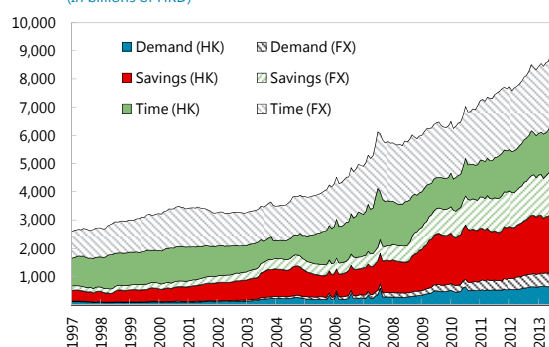
(In percent, year-on-year, 3mma)



Deposits have recovered from 2009 with robust growth in saving deposits.

Customer deposits by type 2/

(In billions of HKD)



Strong credit growth has strongly pushed up the LTD ratio in foreign currency.

Loan-to-Deposit Ratios 1/

(By currency denomination)

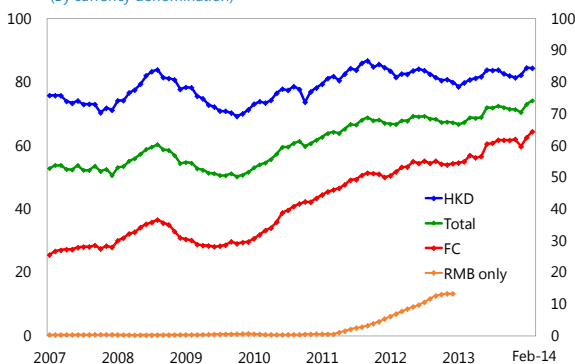
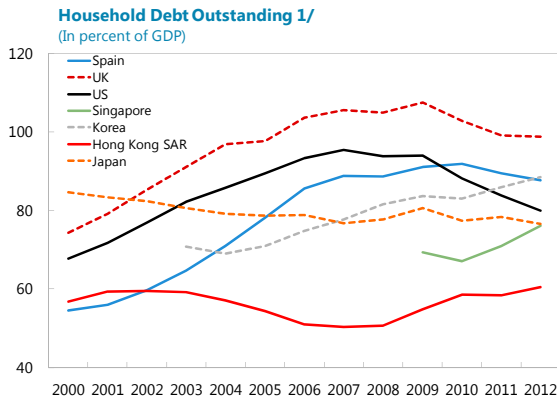
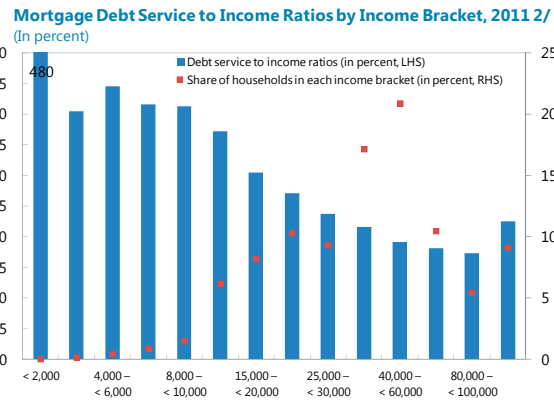


Figure 4. Hong Kong SAR: Debt and Property Market Conditions

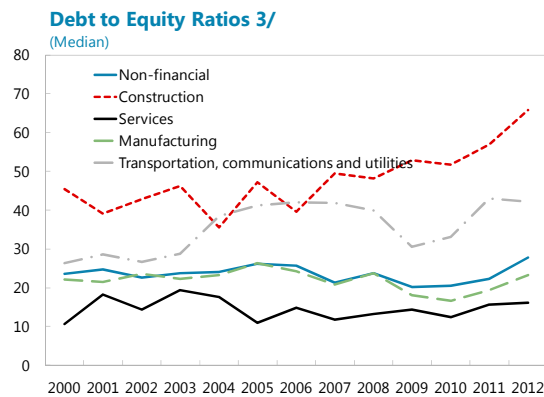
Household debt has increased to historic highs, but remains low compared to AEs.



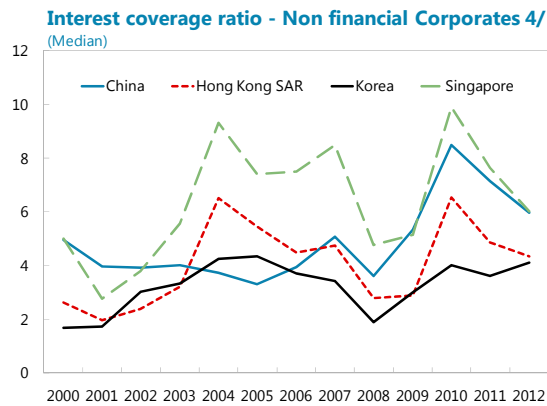
Debt service ratios remain manageable with only about 10 percent of households having higher than 40 percent DSR.



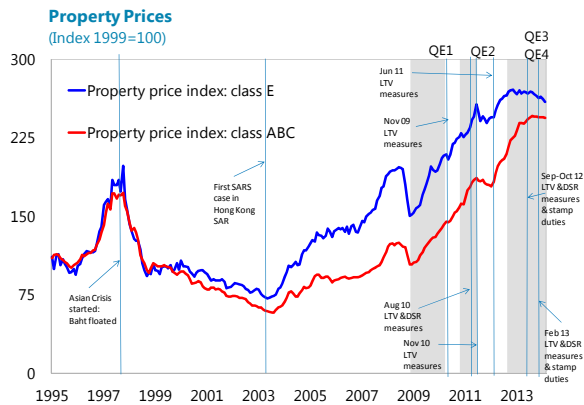
Corporate leverage has increased recently especially for the construction sector.



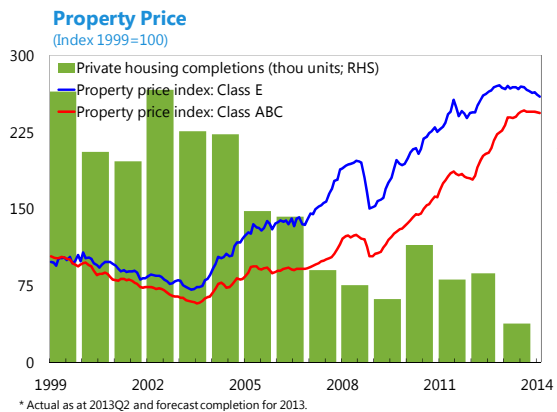
Interest coverage ratio has deteriorated in the last 2 years but remains low relative to regional peers.



Property prices accelerated rapidly with the onset of QE



... with constrained supply clearly a factor



Sources: CEIC, Haver, Central Statistics, IMF corporate vulnerability database and staff estimates.

- 1/ Households for Singapore and HKSAR, and households and nonprofit institutions serving households for others.
- 2/ Income brackets are based on monthly household income in Hong Kong Dollar. Share of households in each income bracket only includes those households that have mortgages.
- 3/ Data covers all publicly listed firms in HKSAR.
- 4/ Data covers all publicly listed firms in each country. Interest coverage ratio is defined as the ratio of Earnings Before Interest and Tax (EBIT) to interest expense.

Figure 5. Hong Kong SAR: Macroeprudential Stress Tests of Banking Sector

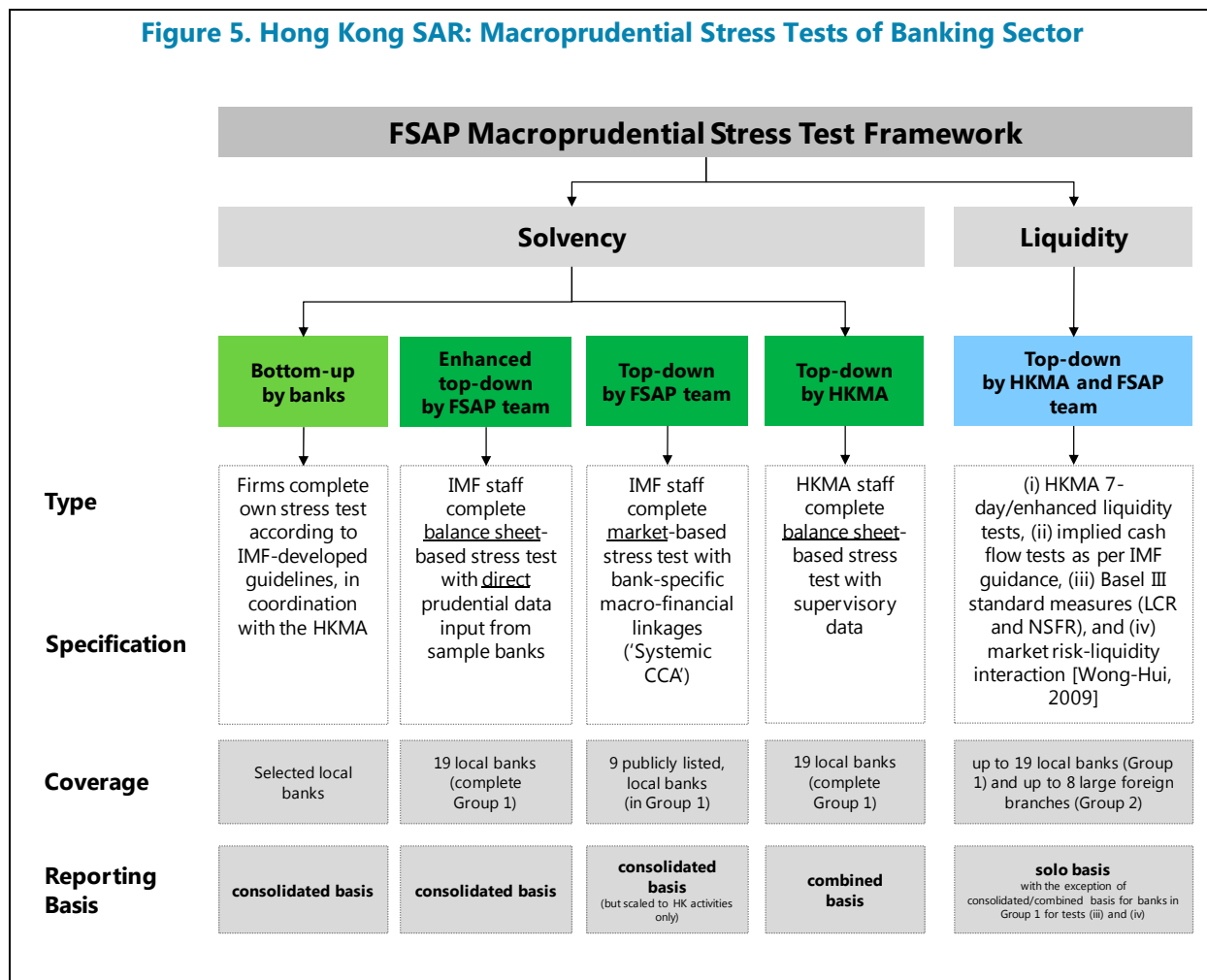
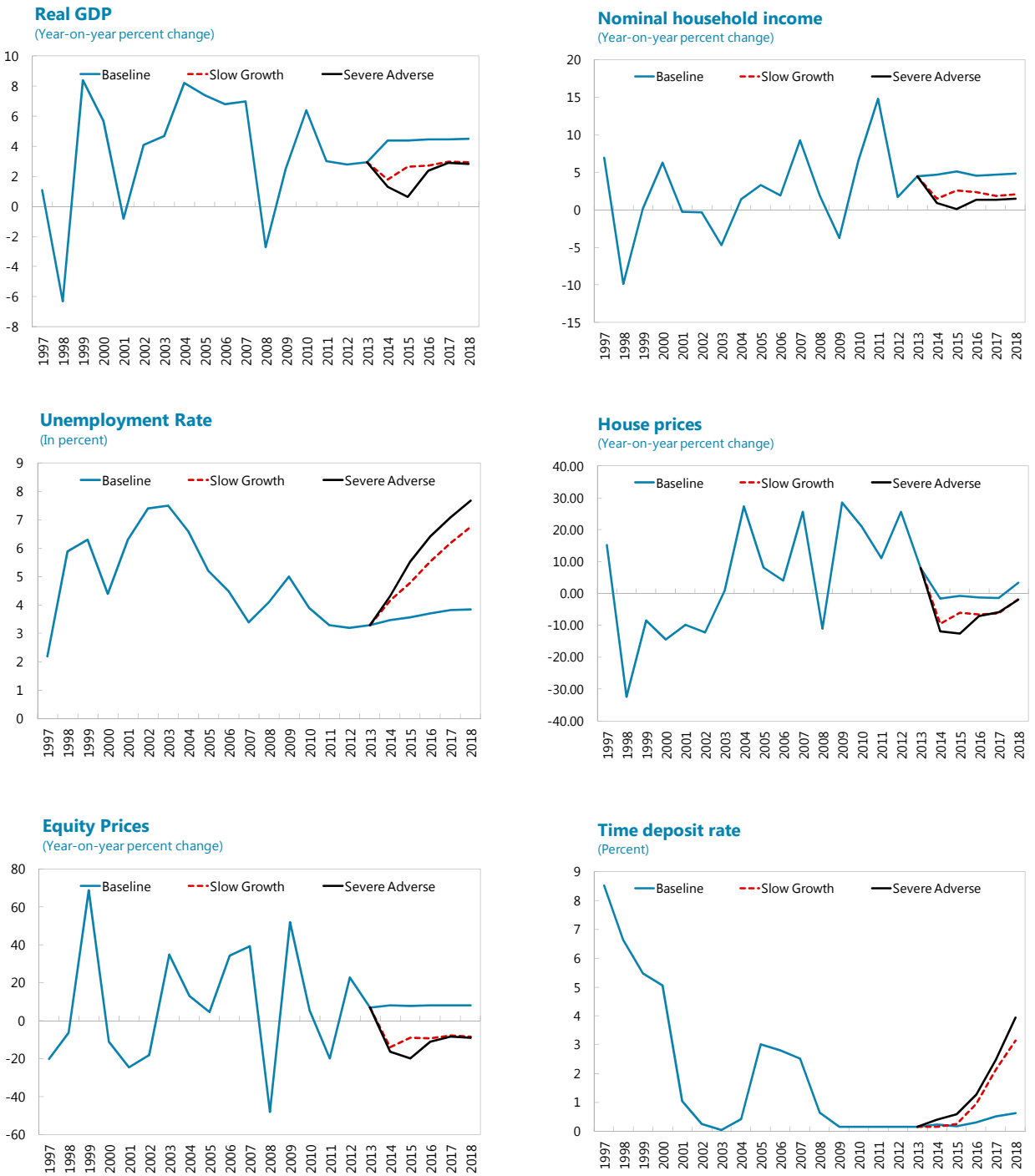


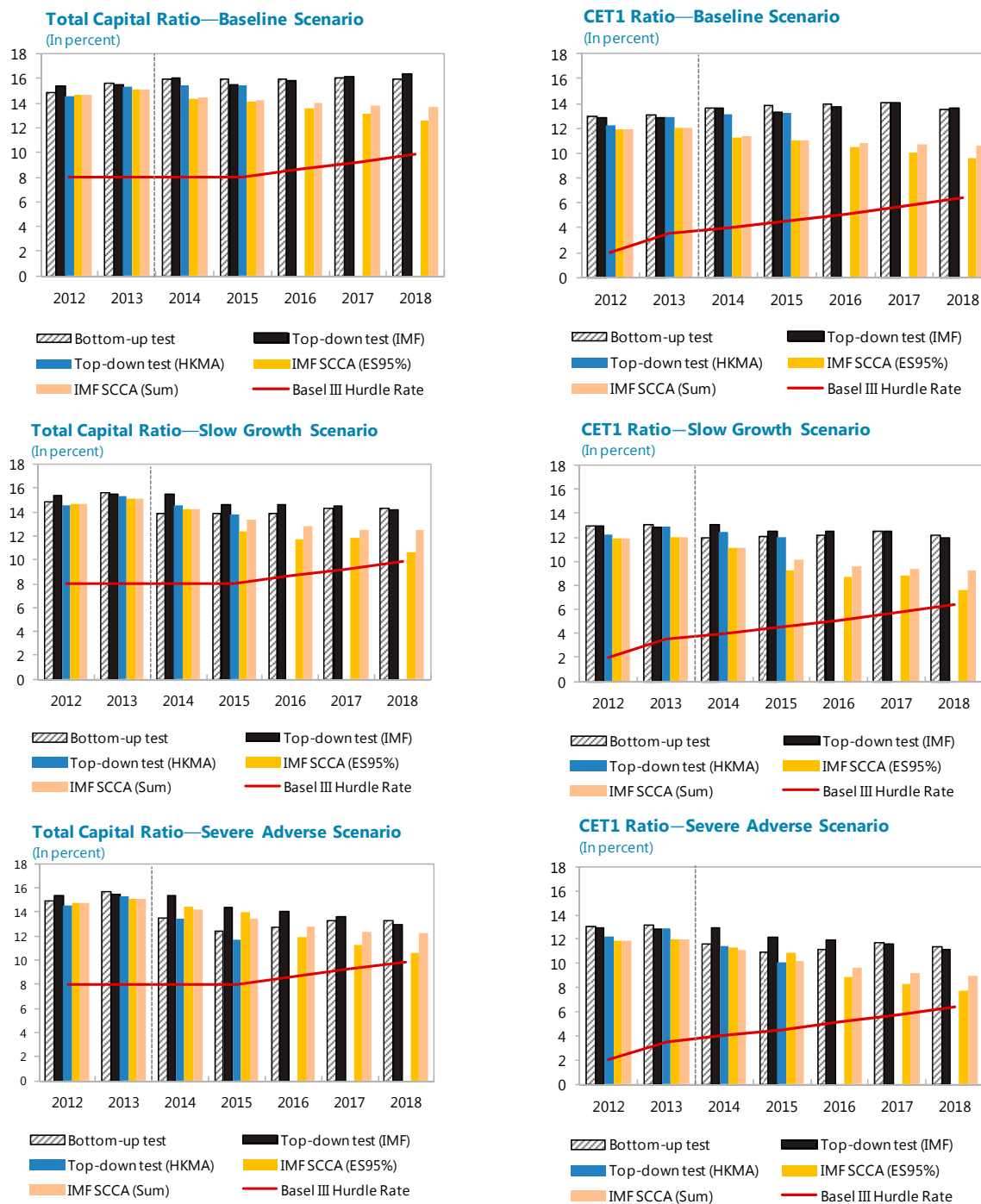
Figure 6. Hong Kong SAR: Macroeconomic Assumptions Under Different Stress Test Scenarios



Sources: HKMA and IMF staff estimates and calculations.

Notes: For the bottom-up stress test, both commercial real estate and residential house prices are used. The chart above refers to the residential house prices index; the commercial real estate index is assumed to behave similarly in the stress test.

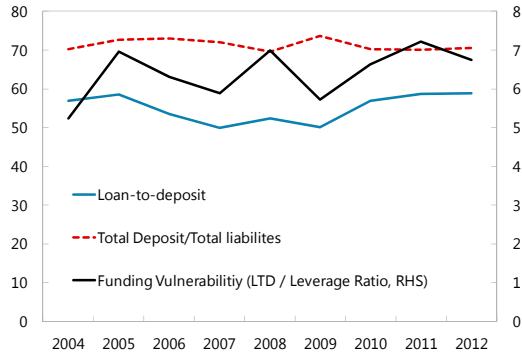
Figure 7. Hong Kong SAR: Evolution of Aggregate Capital Ratios in Solvency Stress Tests



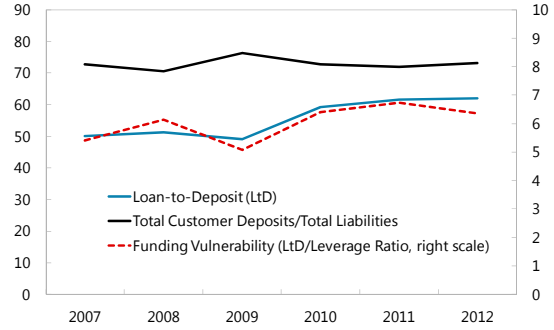
Sources: HKMA and IMF staff estimates. Notes: Only the total capital ratio and the common equity Tier 1 (CET1) ratios are shown given the small portion of non-CET1 capital in Tier 2 capital reported by banks. The sample of banks included in the stress test differs among the various approaches. The balance sheet-based, top-down (TD) exercises include all Group 1 (fully licensed local) banks on a consolidated (IMF) and combined (HKMA) basis, representing 63.0 and 58.0 percent of the banking sector's total assets, respectively, whereas the bottom-up (BU) exercise covers selected local banks, which together represent about 50 percent of total consolidated assets in the banking sector. The Systemic CCA analysis considers only the HK activities of 9 publicly listed local banks, covering 53.8 percent of the sector (on a consolidated basis). The results of the HKMA TD solvency stress test reflect two adverse scenarios, namely "severe" and "more severe" scenarios (Table 6), which differ slightly from the "slow growth (SG)" and "severe adverse (SA)" scenarios adopted in the BU and IMF TD tests. The capital ratios prior to the forecast horizon are based on reported prudential data. For the balance sheet-based TD test of the HKMA and IMF, the end-2012 CET1 capital ratio is set equal to the Tier 1 capital ratio as a proxy (both on a combined (HKMA) and consolidated (IMF) basis).

Figure 8. Hong Kong SAR: Banking Sector Vulnerabilities

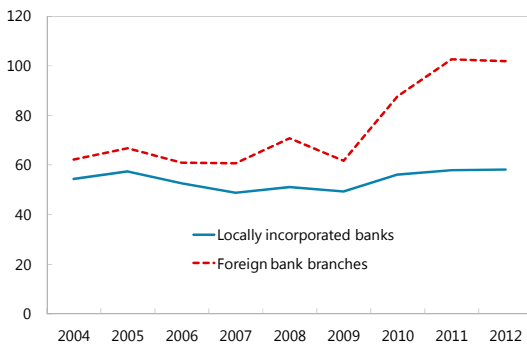
Structural Funding Conditions 1/
(In percent)



Top 4 banks: Structural Funding Conditions 2/
(In percent)

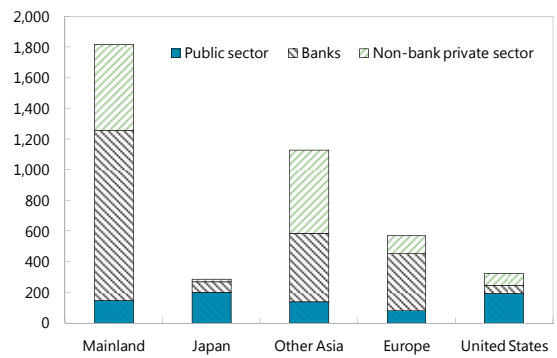


Loan-to-deposit ratio, by institution type 3/
(In percent)



Cross-border Claims 1/

(In billions of HKD; locally incorporated, authorized institutions)



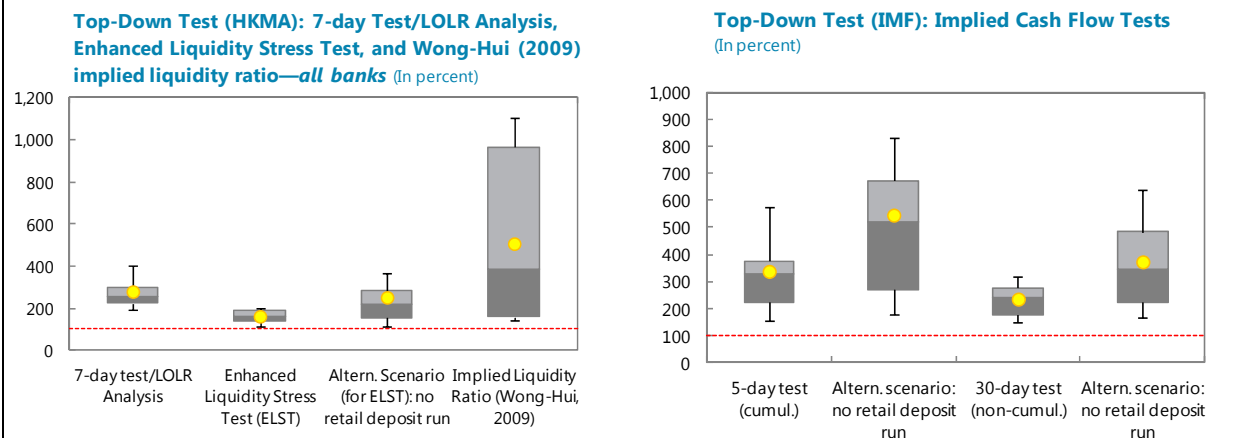
Sources: HKMA and IMF staff calculations.

1/ All locally incorporated AIs on combined basis.

2/ Consolidated basis.

3/ Locally incorporated licensed banks on combined basis; foreign branches (licensed banks) on a Hong Kong office basis.

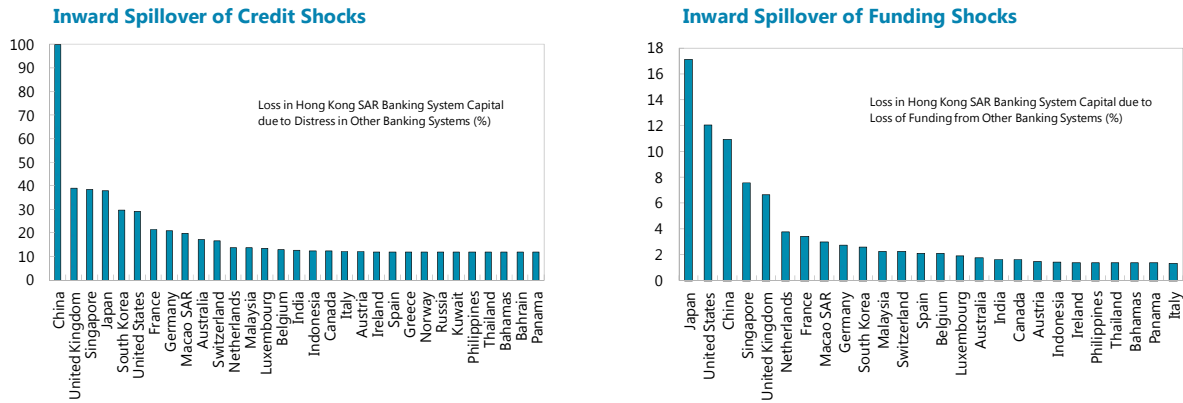
Figure 9. Hong Kong SAR: Liquidity Stress Test Results



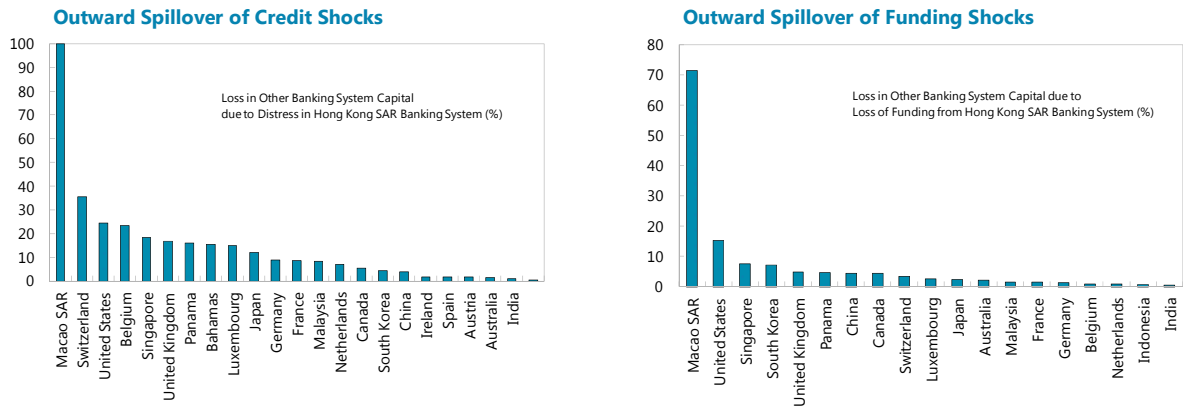
Sources: HKMA and IMF staff estimates. Note: The sample of banks included in both HKMA and IMF top-down implied cash flow (ICF) stress tests comprise 19 fully licensed local banks and 8 foreign branches on a Hong Kong office basis, representing 71 percent of the banking sector's total assets. The sample of banks included in the Wong-Hui (2009) implied liquidity ratio comprises 16 fully licensed local banks on a consolidated basis representing 63 percent of the banking sector's total consolidated assets.

Figure 10. Hong Kong SAR: Network Analysis

Inward spillovers are dominated by Mainland...



While Macao SAR is most vulnerable to outward spillovers...



Source: BIS, staff estimates

Appendix I. Risk Assessment Matrix

Source of Main Threats	Likelihood of Realization of Threats in the next 1-3 Years	Expected Impact on Financial Stability of Threat if Realized
<p>Protracted economic and financial volatility, triggered by prospective exit from unconventional monetary policies in advanced economies, particularly the United States, and resulting in increased risk premia and interest rates.</p>	<p>High (short-term)</p>	<p>Medium</p> <p>This could lead to capital outflows and a tightening of liquidity. Higher interest rates would require borrowers to allocate an increasing proportion of their income to service debt obligations, and encourage banks to tighten credit standards. The resulting contraction in financial intermediation and investment would adversely affect economic growth.</p>
<p>Sharp slowdown in growth, coupled with significant financial disruptions, in Mainland, in the context of the increasing integration between HKSAR and the Mainland</p>	<p>Medium (short to medium-term)</p>	<p>High</p> <p>Economic growth in HKSAR would weaken significantly as a result of a sharp economic slowdown in Mainland. This would have severe consequences for the Hong Kong financial sector.</p> <p>The quality of Hong Kong banks' assets could be adversely affected as lower growth adversely affect borrowers'—both Hong Kong and Mainland—capacity to repay. This pressure might be further aggravated if the recovery of collateral in Mainland were impeded.</p> <p>Liquidity in the offshore RMB market would be negatively affected by a tightening of liquidity in Mainland.</p>

Source of Main Threats	Likelihood of Realization of Threats in the next 1-3 Years	Expected Impact on Financial Stability of Threat if Realized
Significant decline in property prices	Medium (medium-term)	High This would reduce the collateral value of mortgages, which would curtail the ability of households and small firms to borrow. In the context of a tightening of banks lending standards, this could have severe macroeconomic consequences and affect banks.

Appendix II. Summary Stress Testing Matrix (STeM)²⁸

	Solvency Stress Test	Liquidity Stress Test
Types of tests	Three complementary approaches: (i) bottom-up (BU); (ii) top-down (TD); and (iii) market-based (MB)	Five complementary approaches: (i) Basel III LCR and NSFR (B3); (ii) HKMA 7-day / LOLR analysis (7-day); (iii) enhanced liquidity stress tests (ELST); (iv) IMF implied cash flow tests (CF); and (v) credit liquidity interaction (based on Wong-Hui, 2009) (WH). ²⁹
Who performs the stress test	BU: selected local banks TD: HKMA and FSAP team MB: FSAP team	HKMA (incl. the IMF CF, for which HKMA uses an IMF template)
Coverage	BU: selected local banks; about 50 percent of banking sector assets (consolidated basis) TD (FSAP team): 16 banks; 63 percent of banking sector assets (consolidated basis) TD (HKMA): 19 banks; 58 percent of banking sector assets (combined basis) MB (FSAP team): 9 banks; 54 percent of banking sector assets (consolidated basis)	B3: selected local banks and foreign branches (solo basis); about 60 percent of banking sector assets (solo basis) 7-day, ELST and CF: 19 local banks and 8 selected foreign branches; 71 percent of banking sector assets (solo basis) WH: 19 banks; 63 percent of banking sector assets (consolidated basis).
Description of shocks	Two alternative macro scenarios: ³⁰ (i) "slow growth" scenario where growth deteriorates to an annual average of 2.6 percent (relative to 4.4 percent in the baseline), residential property prices decline by 30 percent and equity prices decline by 50 percent. Under this scenario, economic growth in the Mainland is assumed to decline to an annual average of 6.6 percent; and (ii) "severe adverse" scenario where growth deteriorates to an annual average	7-day: Bank run, taking into account valuation haircuts to liquid assets. ELST: Bank run and dry up of retail / wholesale funding markets, taking into account valuation haircuts to liquid assets and related party lending/ borrowing. CF: Bank run and dry up of retail/wholesale funding markets, taking into account valuation haircuts to liquid assets, amortization of outstanding assets, related party lending, and contingent claims/liabilities

²⁸ A more detailed description is available on request.

²⁹ Wong, Eric, and Cho-Hoi Hui, 2009, "A Liquidity Risk Stress-Testing Framework with Interaction between Market and Credit Risks," Working Paper 06/2009 (Hong Kong SAR: Hong Kong Monetary Authority), available at <http://www.bis.org/bcbs/events/cbrworkshop09/wonghui.pdf>.

³⁰ The scenarios used in the HKMA TD exercise were based on those internally adopted by the HKMA in its regular top-down solvency stress test, and were slightly different from those adopted in other solvency stress tests considered in the FSAP.

	<p>of 2.0 percent, broadly similar to the Asian financial crisis experience, and residential property prices decline by 40 percent and equity prices decline by 65 percent. Under this scenario, economic growth in the Mainland is assumed to decline to an annual average of 6.0 percent.</p> <p>The scale of these shocks is similar to other FSAPs.</p>	
Risk horizon	<p>BU, TD (FSAP team) and MB: 5 years</p> <p>TD (HKMA): 2 years</p>	<p>B#: 30-day and 1-year</p> <p>ELST: 7-day</p> <p>CF: 5-day and 30-day</p> <p>WH: 1-year</p>
Risk factors	<p>Credit (including non-default incremental credit risk), counterparty (of off-balance sheet exposures), funding risk, and market risk (including sovereign risk)</p>	<p>Market liquidity, funding, maturity mismatch, rollover and FX funding risk</p>
Metrics	<p>Basel III (Common Equity Tier 1, Tier 1, Total Capital, conservation buffer) for each year of the risk horizon</p>	<p>B3: LCR and NSFR standard metrics (according to BCBS guidance of Jan 2013 and Dec 2012 respectively)</p> <p>7-day, ELST and CF: Hurdle metrics: distribution of ratios, number of failed banks (i.e., ratio < 100 percent), liquidity shortfall relative to unencumbered assets</p> <p>WH: Expected first cash shortage time (CST), probability of cash shortage (CSP), expected default time due to liquidity problems (LFT), and probability of default due to liquidity problems (LFP)</p>
Data sources	<p>BU: Individual bank's data</p> <p>TD (FSAP team): Individual bank data collected directly from the banks</p> <p>TD (HKMA): Supervisory data</p> <p>MB: Individual bank data and capital market data</p>	<p>7-day, ELST, and CF: Supervisory data</p> <p>B3 and WH: Individual bank's data</p>
Methodology	<p>BU: Banks' models</p> <p>TD (HKMA): HKMA model</p> <p>TD (FSAP): Balance sheet ST approach</p> <p>MB: Systemic CCA (Jobst and Gray, 2013)</p>	<p>B3: Based on BCBS guidance</p> <p>7-day and ELST: HKMA model</p> <p>CF: FSAP team model (Jobst, <i>forthcoming</i>)</p> <p>WH: Wong-Hui (2009)</p>