4. Monetary and financial conditions

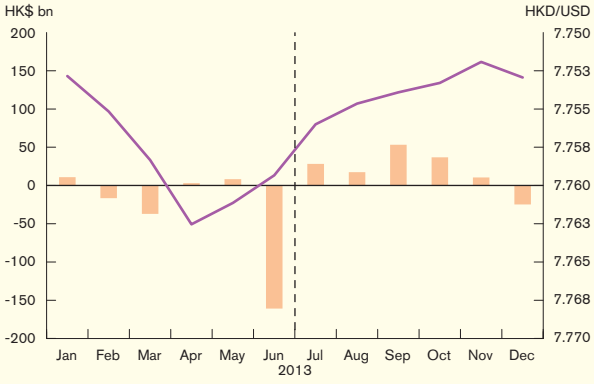
Exchange rate, capital flows and monetary developments

The Hong Kong dollar has remained stable despite volatile global financial conditions. Total loan growth reaccelerated prompting the HKMA to strengthen its prudential supervision of liquidity risk of dollar funding. It is expected that the uncertainty stemming from the normalisation of the US monetary policy will remain a major risk to fund flows and Hong Kong's monetary and financial stability.

4.1 Exchange rate and capital flows

The Hong Kong dollar remained stable during the second half of 2013 and the Linked Exchange Rate system (LERS) continued to command a high degree of market credibility, despite a sell-off in some emerging market currencies during the period. Specifically, the Hong Kong dollar spot exchange rate against the US dollar traded close to the strong-side Convertibility Undertaking within a tight range of 7.7515–7.7584. The strength of the Hong Kong dollar reflected mild inflow pressures in the non-bank private sector, as also evidenced by increases in the net spot foreign currency positions of the Authorized Institutions (AIs) in the five months to November (Chart 4.1). A pick-up in local stock market activities and reportedly some safe-haven demand amid the emerging market economies (EMEs) turmoil in the summer helped support the stronger demand for Hong Kong dollar assets. In December, although the US Federal Reserve announced its tapering plan, the Hong Kong dollar spot exchange rate softened only slightly. The net spot foreign currency positions of the AIs also posted a modest decline.

Chart 4.1
Fund flow indicator and exchange rate in 2013



Note: For the fund flow indicator, a positive value indicates inflows.
Sources: HKMA and staff estimates.

Behind the scene diverse patterns in portfolio flows largely reflected the market reactions to the emerging market turbulence in the summer of 2013 and the ongoing worries about the US Federal Reserve's tapering plan. According to the latest Balance of Payments (BoP) statistics[17], non-residents resumed their equity portfolio investments in Hong Kong in the third quarter, spurring a faster pick-up in the local stock market

[17] Note that at the time of writing the fourth-quarter BoP statistics are not yet available.

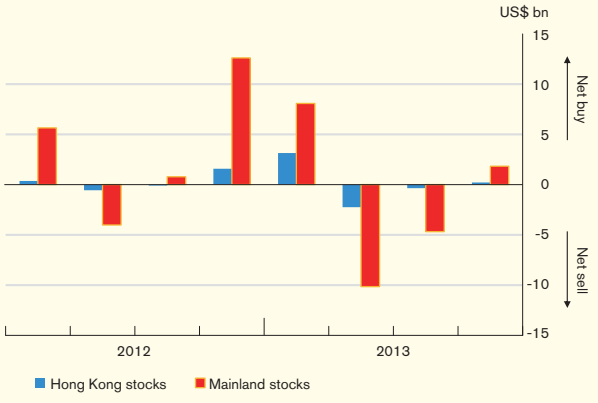
relative to that of the EMEs as a whole. A survey of global mutual funds also suggested some net buying of Hong Kong-listed stocks in the fourth quarter (Table 4.A and Chart 4.2). On the other hand, there was retrenchment in debt security investment in the second half of the year. The BoP statistics showed reduced debt security investments by non-residents in the third quarter, while survey data revealed that bond funds investing in Hong Kong debt instruments faced redemption throughout the second half, as opposed to the sizeable subscription in 2012 and early 2013 (Chart 4.3). Essentially, the outflows from bond funds have been a global phenomenon, partly because market participants reallocated their assets away from debt securities in view of potential monetary tightening in the US.

Table 4.A
Cross-border portfolio investment flows

	2011	2012	2013		
(HK$ bn)			Q1	Q2	Q3
By Hong Kong residents					
Equity and investment fund shares	-237.3	-159.6	24.8	-151.4	35.4
Debt securities	81.5	-151.3	-39.8	117.5	-214.7
By non-residents					
Equity and investment fund shares	47.1	224.5	46.2	-27.9	45.0
Debt securities	97.7	54.9	2.6	30.2	11.0

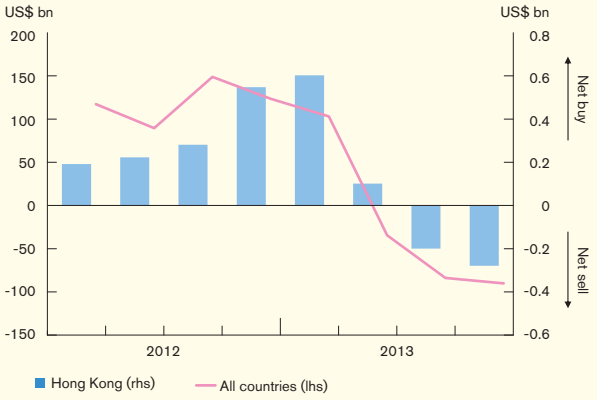
Note: A positive value indicates capital inflows.
Source: C&SD.

Chart 4.2
Market survey of equity-related flows



Source: EPFR Global.

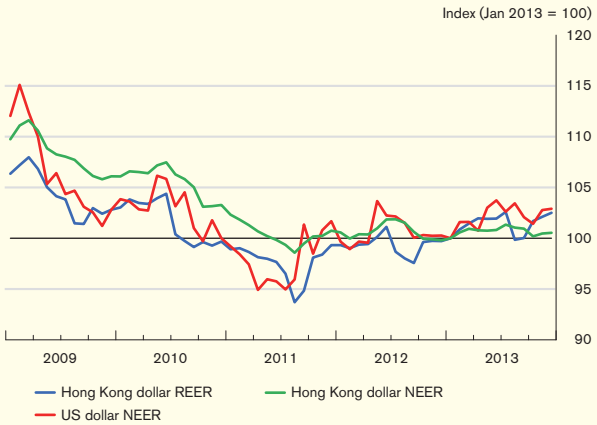
Chart 4.3
Market survey of bond-related flows



Source: EPFR Global.

From a broader perspective, the trade-weighted Hong Kong dollar nominal effective exchange rate index (NEER), which measures the relative value of the Hong Kong dollar to a basket of trading partner currencies, was largely stable in the second half of 2013 and in line with similar movement of the US dollar NEER (Chart 4.4). The Hong Kong dollar real effective exchange rate index (REER) showed similar patterns, but with more fluctuations in the third quarter due to the artificial swings in Hong Kong's headline inflation rate as a result of the phasing-out of some one-off relief measures.

Chart 4.4
Nominal and real effective exchange rates



Note: Real effective exchange rate index is seasonally adjusted.
Sources: C&SD, CEIC and HKMA staff estimates.

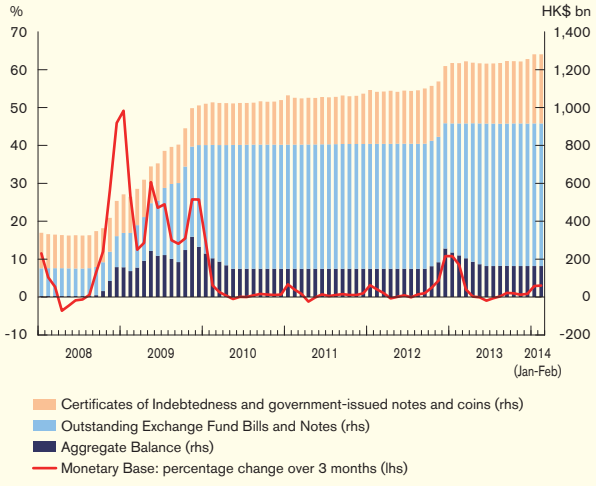
Going forward, the US Federal Reserve's decision to exit quantitative easing, coupled with the still-uncertain pace and scale of tapering and interest rate normalisation, could increase the volatility in fund flows and the risk of fund flow reversals for Hong Kong. Episodes of large Hong Kong dollar inflows in the fourth quarter of 2012 and of outflow pressures in May and June 2013 demonstrated that a shift (or just a hint of a possible shift) in the US monetary policy would have non-negligible impact on risk appetite and capital flows. Turbulence in some vulnerable EMEs, seen for example in early 2014, could also threaten adverse spillovers to Hong Kong through various financial channels. In addition, Mainland China factors such as further reforms in the financial sector and the recurrent macro-financial concerns could heighten volatility in the local money and currency markets. Indeed, the Hong Kong dollar spot exchange rate softened to the 7.76 level in January 2014, alongside the broad-based weakness in Asian currencies and equities, although increased US dollar demand from the note-issuing banks for seasonal issuance of banknotes ahead of the Chinese New Year holidays and repatriation of initial public offering (IPO) proceeds also contributed to the softening.

In the near to medium term, it appears that the pull factors which have attracted capital flows into the EMEs (e.g. stronger growth) are slowing while the push factors that have driven capital out of the advanced markets (e.g. ultra-loose monetary conditions in the US) are fading. The relative strength of these factors will inevitably affect the scale and volatility of fund flows in Hong Kong.

4.2 Money and credit

The monetary conditions remained accommodative in the second half of 2013, with the money supply growing faster and interest rates still hovering at low levels. The Hong Kong-dollar Monetary Base increased modestly by 1.9% between June and December to HK$1,255.8 billion at the end of the year, driven by rises in Certificates of Indebtedness (Chart 4.5). On the other hand, the Aggregate Balance was virtually unchanged in the absence of any triggering of the Convertibility Undertaking or any monetary operations by the HKMA. The outstanding amount of Exchange Fund paper also showed very little change.

Chart 4.5
Monetary Base components

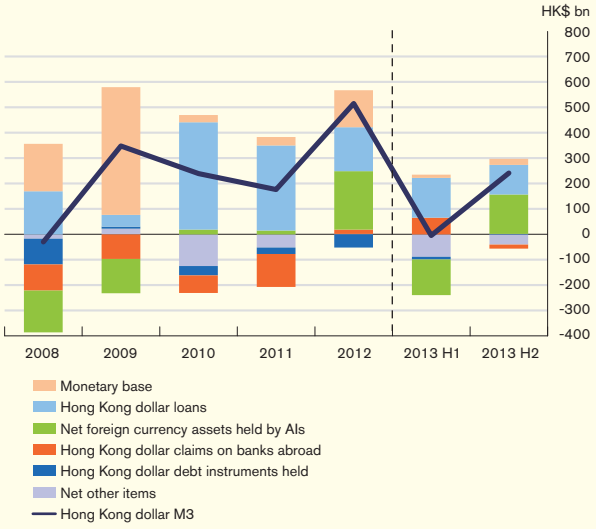


Source: HKMA.

Despite modest growth in the Monetary Base, the Hong Kong-dollar broad money supply (HK$M3) picked up faster at 5.5% in the second half as a result of a stronger increase in bank customers'

deposits and negotiable certificates of deposit held by the non-bank sector. Analysis by the asset-side counterparts under the framework of monetary survey suggested that growth in bank loans and AIs' net foreign currency assets, the latter reflecting inflow pressures into the non-bank private sector, was expansionary on broad money supply (Chart 4.6).

Chart 4.6
Changes in the HK$M3 and the asset-side counterparts

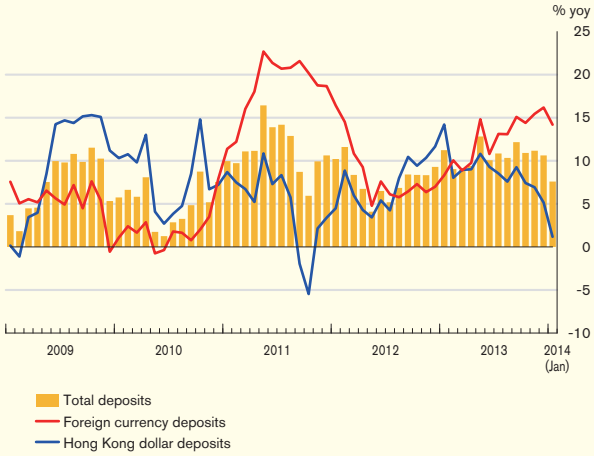


Note: The HK$M3 in the monetary survey has been adjusted to include foreign currency swap deposits and to exclude government deposits and Exchange Fund deposits with licensed banks.

Source: HKMA staff estimates.

As the main component of HK$M3, Hong Kong dollar deposits rose at a quicker pace in the second half after staying flat in the first half. The rebound was largely driven by increased demand for Hong Kong dollar assets alongside more buoyant stock market activities. But compared with the 11.7% growth in 2012 that was in large part driven by fund inflows, Hong Kong dollar deposits only increased by 5.1% in 2013 (Chart 4.7). Foreign currency deposits also increased faster in the second half, and this brought the full-year growth to a solid 16.2%. Renminbi deposits were a main driver and their recent developments are discussed in further detail later in this section. Overall, total deposits with the AIs grew by 10.6%, roughly the same pace as in previous two years.

Chart 4.7
Deposit growth

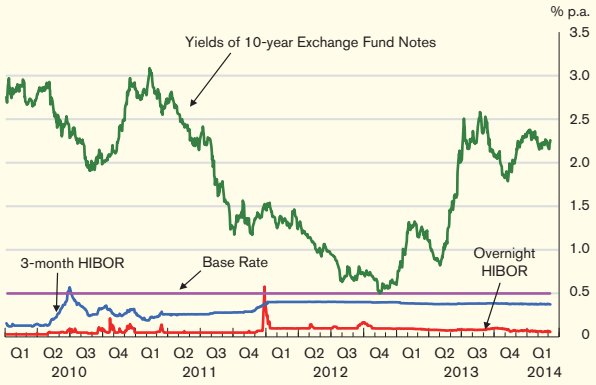


Source: HKMA.

Largely reflecting the abundant liquidity conditions, the wholesale funding costs of the banking sector continued to stay at low levels throughout the second half of 2013. The overnight and 3-month HIBOR fixing rate hovered at 0.08% and 0.38% respectively, only with occasional fluctuations stemming from banks' funding demand for quarter-end liquidity and equity fund-raising activities (Chart 4.8).

The long-dated Hong Kong dollar yields however increased gradually along with the US dollar counterparts on market concerns about the US Federal Reserve's plan of tapering its asset purchase programme. For example, the yield of the 10-year Exchange Fund Notes climbed to 2.31% from 2.00% between June and December. The low wholesale funding cost also diffused to the retail interest rates. The savings deposit rate continued to stay close to zero, while the mortgage interest rate for new loan applications remained roughly stable at 2.2–2.3%, compared with an average of around 5.3% in the past 20 years.

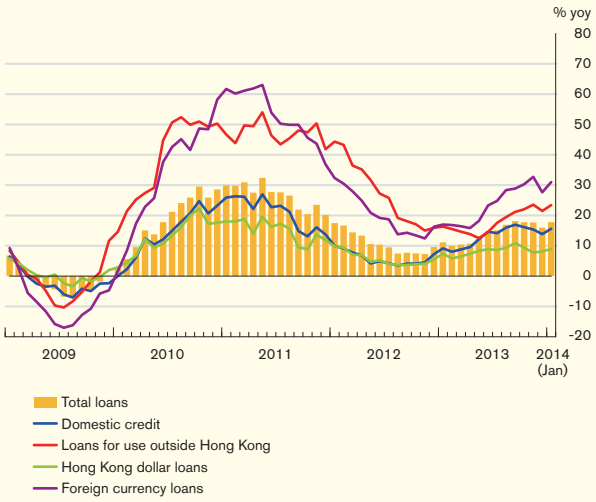
Chart 4.8
Hong Kong dollar interbank interest rates and yield of 10-year Exchange Fund Notes



Sources: CEIC and HKMA.

Against the backdrop of accommodative monetary conditions and the low interest rate environment, the risks of rapid credit expansion continue to warrant attention. Despite signs of moderation in the fourth quarter, growth in total loans accelerated to 16.0% in 2013 from 9.6% in 2012, largely reflecting a sharp increase in foreign currency lending and loans for use outside Hong Kong due to stronger cross-border liquidity demand (Chart 4.9). Meanwhile, Hong Kong dollar lending and domestic credit also grew somewhat faster.

Chart 4.9
Loan growth

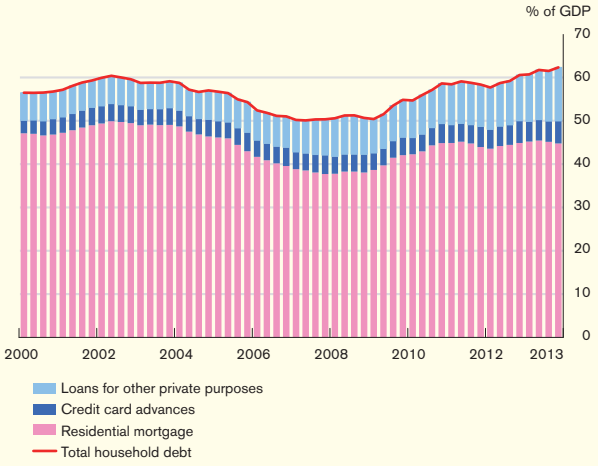


Source: HKMA.

Within domestic credit, trade finance saw a sizeable expansion of 43.8%, while lending to sectors of wholesale and retail trade, manufacturing, and financial concerns and stockbrokers also posted solid double-digit growth. On the other hand, there was only tepid growth in residential mortgage due to sluggish property market activities and the accumulating effect of the prudential measures. However, with personal loans (which comprise credit card advances and loans for other private purposes) increasing at a hefty 16.8%, total household indebtedness rose to a record level of 62% of GDP at the end of 2013 (Chart 4.10). In view of such developments, the HKMA issued a circular in January 2014 to require the AIs to review the underwriting standards for their personal lending business and enhance their risk management practices.[18]

[18] Specifically, these practices involve prudent uses of instruments such as debt-servicing ratio limit, maximum loan tenor, portfolio-based limit structure, and internal stress testing.

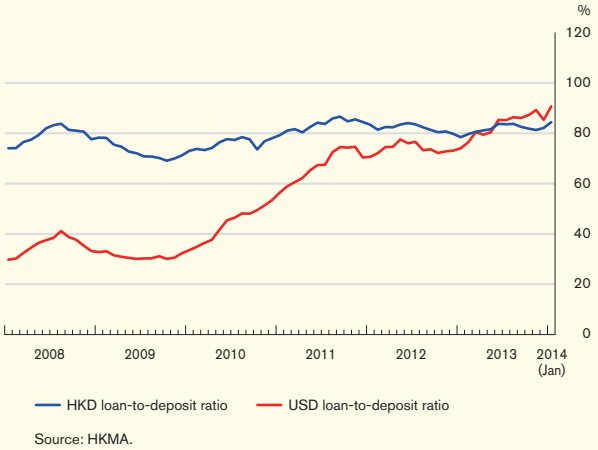
Chart 4.10
Household debt-to-GDP ratio and its components



Note: Only borrowings from AIs are covered.
Source: HKMA.

Rapid growth in US dollar loans has led to a surge in the US dollar loan-to-deposit ratio to 85.4% at the end of 2013 (Chart 4.11). The Hong Kong dollar loan-to-deposit ratio also hovered around the 80% level in recent years. To prevent further build-up of funding vulnerability, the HKMA introduced the Stable Funding Requirement which came into effect from January 2014, under which AIs with total loan growth exceeding 20% are required to maintain specific level of stable funds.

Chart 4.11
Loan-to-deposit ratios



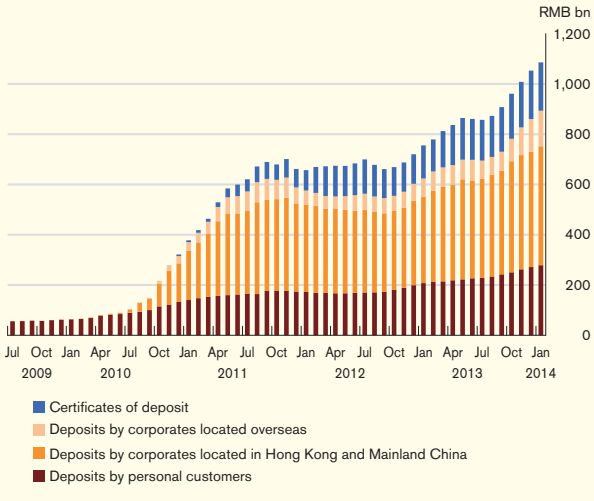
Source: HKMA.

In the face of prudential requirements for stable funding and the risks associated with the normalisation of the US monetary policy, banks' credit stance could turn slightly more conservative going forward. Moreover, the average funding cost of retail banks, as shown in the composite interest rate, has also edged up gradually. Therefore, credit access for the non-bank private sector could become slightly more constrained while the borrowing costs would face upward pressures.

Offshore renminbi banking business

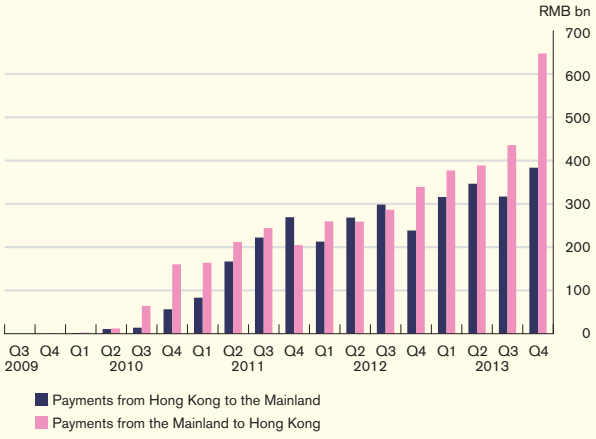
Renminbi business of Hong Kong banks gained further momentum in the second half of 2013. The total outstanding amount of renminbi deposits and certificates of deposit (CDs) rose at a quickened pace of 22.3% between June and December. This brought the full-year growth rate to 46.2% for 2013 as a whole (Chart 4.12, Table 4.B). The remarkable growth largely reflected more popular use of renminbi in trade settlement (particularly inward remittances to Hong Kong) (Chart 4.13), and to a lesser extent, stronger renminbi demand due to higher interest rates against other currencies and expectations for currency appreciation. Meanwhile, the outstanding amount of renminbi bank lending grew notably by 46.3% from a year ago.

Chart 4.12
Renminbi deposits and CDs in Hong Kong



Source: HKMA.

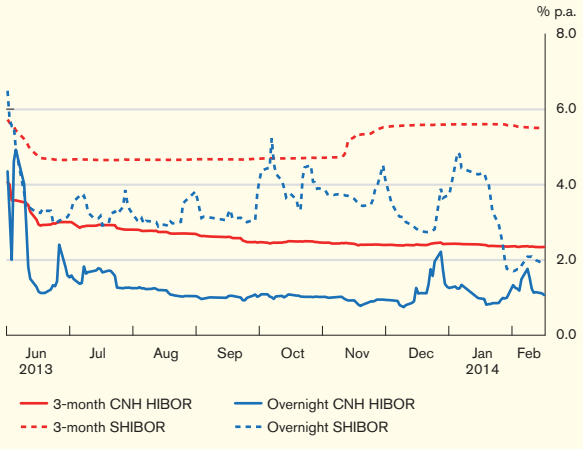
Chart 4.13
Flows of renminbi trade settlement payments



Source: HKMA.

The Hong Kong offshore renminbi exchange rate (CNH) tracked closely with the onshore counterpart (CNY) and generally traded at a premium that widened to 57 pips on average in the second half of 2013. The CNH interbank interest rates remained relatively stable, even though a tightening in the CNY liquidity conditions led to sizeable fluctuations in the onshore market in the fourth quarter (Chart 4.14). Forward-implied yields in the CNH market, however, were more volatile. Box 3 discusses interactions between the onshore and offshore deliverable forward markets.

Chart 4.14
Onshore and offshore renminbi interbank interest rates



Sources: TMA and CEIC.

There are also indications that Hong Kong has continued to strengthen its position as a global hub for offshore renminbi business. There has been vibrant growth in the turnover of the renminbi real time gross settlement (RTGS) system, with 90% of its transactions conducted purely in the offshore markets in 2013. Also, the amounts due to and due from overseas banks have grown at a solid pace (Table 4.B), suggesting a key role played by Hong Kong banks in the offshore renminbi market.

Table 4.B
Offshore renminbi banking statistics

	2012	2013
Renminbi deposits and certificates of deposit (CDs) (RMB bn)	720.2	1,053.0
Renminbi deposits (RMB bn)	603.0	860.5
Of which:		
Personal customer renminbi deposits by non-Hong Kong residents (RMB bn)	4.4	19.0
Share of renminbi deposits in total deposits (%)	9.1	12.0
Renminbi certificates of deposit (CDs) (RMB bn)	117.3	192.5
Renminbi trade settlement in Hong Kong (RMB bn)	2,632.5	3,841.0
Of which:		
Inward remittances to Hong Kong (RMB bn)	1,144.2	1,848.9
Outward remittances to Mainland China (RMB bn)	1,017.8	1,362.9
Ratio of inward to outward remittances to Mainland China	1.1	1.4
Outstanding renminbi loans (RMB bn)	79.0	115.6
Number of participating banks in Hong Kong's renminbi clearing platform	204	216
Turnover in Hong Kong's RMB RTGS system (Daily average during the period; RMB bn)	213.7	395.4
Amount due to overseas banks (RMB bn)	99.1	166.0
Amount due from overseas banks (RMB bn)	117.1	164.5

Source: HKMA.

Box 3
Interactions between CNY and CNH deliverable forward markets

Since the introduction of a series of landmark policies in 2010[19], Hong Kong's RMB offshore market, also known as the CNH market, has seen a proliferation of a wide range of financial products including dim sum bonds and foreign exchange deliverable forward contracts. As a result of these developments, there has been growing interest in understanding the interactions of the CNH market with the Mainland market.

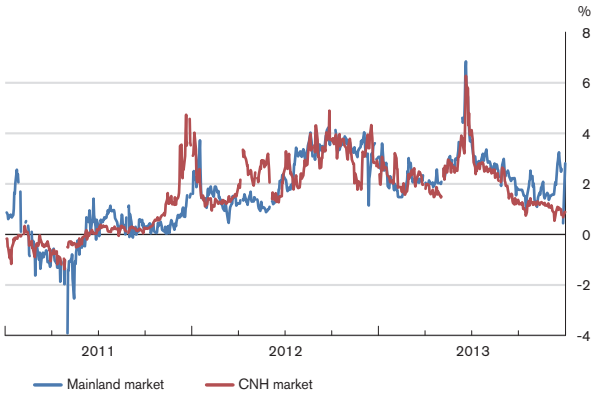
Against this backdrop, this Box highlights the key findings of a quantitative analysis we conducted on the RMB forward exchange rates in Mainland China and the CNH market. The analysis focuses on two issues, namely, cross-market spillovers between the two markets and the functioning of these markets in the price discovery process.

Overview of RMB forward exchange markets

The implied yields of RMB deliverable forward (DF) contracts traded in the Mainland and CNH markets in 2011-13 are used for this analysis, computed on the condition that covered interest rate parity holds.[20] Given the active trading of DF in both markets, DF implied yields should be able to capture RMB forward premium dynamics.

The one-month DF implied yields for the two markets on a daily basis are plotted in Chart B3.1. It is noteworthy that the two series moved more or less in tandem, except for occasional periods of disparities.[21] This suggests a close relationship between the two markets, and statistical tests confirmed such a cointegrated relationship.[22] Another feature is that the DF implied yields are not subject to the lower zero bound, and they were negative in some periods of time.[23]

Chart B3.1
One-month forward implied yields



Source: HKMA staff estimates using data from Bloomberg.

Cross-market spillovers

The analysis on cross-market spillovers is to assess the impacts of a shock originating from one market on the volatilities of the other market. A shock could be a policy surprise or unanticipated changes in supply/demand conditions. As a first step, we used the technique of variance decomposition to attribute the volatilities of the two markets to shocks from

19 For details, see Box 3 in the HKMA Half Yearly Monetary and Financial Stability Report, September 2010.

20 The implied yield is backed out by the covered interest rate parity as follows: $F=S(1+r_{RMB})/(1+r_{USD})$, where F is DF rate, S is RMB/USD spot exchange rate, r_{RMB} is the implied yield and r_{USD} is US dollar interest rate (LIBOR).

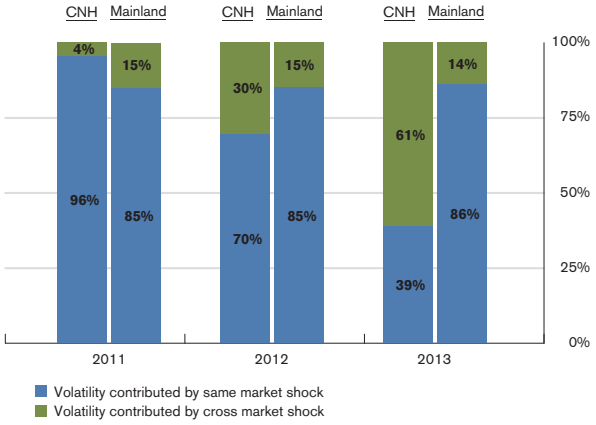
21 For a discussion of the disparities of Mainland and CNH RMB forward exchange rates, see K.F. Li, C.H. Hui and T.K.Chung (2012) "Determinants and dynamics of price disparity in onshore and offshore renminbi forward exchange rate markets", Hong Kong Institute for Monetary Research Working Paper.

22 The results of Engle-Granger test and Philips-Ouliaris test suggested that the onshore and offshore RMB DF implied yields are co-integrated.

23 For a discussion that DF implied yields could be negative, see G. Ma and R. McCauley (2008) "Efficacy of China's capital controls: evidence from price and flow data", *Pacific Economic Review*, 12:1 pp.104-123.

either one of these markets.[24] As shown in Chart B3.2, the results suggest that for the CNH market, Mainland shocks have played an increasingly important role in driving volatilities – for example, up to 61% of the average volatilities of DF implied yields in 2013, compared with 4% in 2011. For the Mainland market, such pattern is not apparent, and same market shocks consistently played a leading role in driving the forward premium.

Chart B3.2
Breakdown of volatility in the Mainland and CNH implied yields



Source: HKMA staff estimates using data from Bloomberg.

To further assess cross-market linkages, a bivariate generalised autoregressive conditional heteroscedasticity (GARCH) model is constructed and estimated. In the mean equation of this model, S&P VIX Index is included so that global shocks affecting both markets are controlled for.[25] Given the co-integration between the Mainland and CNH implied yields, a vector error correction (VEC) form is specified in the mean equation. As shown in Table B3.A, our findings suggest very limited cross-market spillovers during 2011-12 as most of the pairs of estimated coefficients are not statistically significant, and the patterns are not clear-cut. During 2013, spillovers from onshore towards offshore were found to be larger than spillovers in the opposite direction in most of the cases. This probably reflects the fact that the CNH market, though rapidly growing, is small compared to the Mainland market, and possibly more subject to onshore influences. Furthermore, the increasing use of RMB in cross-border trade and other transactions might have allowed more room for Mainland RMB market to affect the CNH market since 2013.

Table B3.A
Cross-market shock spillover coefficients under the VECM-BEKK model

	Maturity of DF implied yields			
	1-month	3-month	6-month	12-month
2011				
Mainland-to-CNH	0.000	0.004	0.000	0.024*
CNH-to-Mainland	0.003	0.000	0.003	0.003**
2012				
Mainland-to-CNH	0.002	0.003	0.004	0.006
CNH-to-Mainland	0.000	0.094***	0.006	0.179***
2013				
Mainland-to-CNH	0.447***	0.056***	0.480***	0.103***
CNH-to-Mainland	0.110***	0.048***	0.224***	0.173***

Notes:
1. Larger the coefficients, stronger the cross-market shock spillover.
2. ***, ** and * denote significance at 1%, 5% and 10% levels respectively.

Source: HKMA staff estimates using data from Bloomberg.

Price discovery

Price discovery refers to the process in which new information about the fundamentals of an asset is incorporated into its market price. For identical or similar assets traded in multiple markets, two methods have been commonly used in the research literature to assess the price discovery of respective markets. The first one, proposed by Gonzalo and Granger, focuses on the speed of adjustment to measure price discovery.[26] The second, proposed by Hasbrouck, focuses on the information shares of the two markets in price variance.[27] These two methods

[24] For details, see F.X. Diebold and K. Yilmaz (2012) "Better to give than to receive: predictive directional measurement of volatility spillovers", *International Journal of Forecasting*, 28 (1), 57-66.

[25] The S&P VIX index is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices and has been widely regarded as a major indicator of investor sentiment and market volatility.

[26] For details, see J. Gonzalo and C.W.J. Granger (1995) "Estimation of common long memory components in cointegrated systems", *Journal of Business and Economic Statistics*, 13:1, 27-36.

[27] For details, see J. Hasbrouck (1995): "One security, many markets: Determining the contributions to price discovery", *Journal of Finance,* Vol.50, 1175–1199.

are used in this study, based on a VEC model that is part of the GARCH model for the analysis of cross-market spillovers.

In short, the two methods found that neither market played a leading role in the price discovery of forward exchange rates, suggesting that the two markets contributed to different aspects of the price discovery process (Table B3.B). On the one hand, as the CNH market is subject to fewer regulations than the Mainland market, it is probably more flexible to reflect supply and demand conditions in the offshore market itself, which may also be affected by global financial conditions. On the other hand, to the extent that market movements are driven by changes in policies or financial conditions in the Mainland domestic market, market participants located in the Mainland might be in a better position to incorporate such information into the market price.

Table B3.B
Price discovery between Mainland China and CNH markets

	Maturity of DF implied yields			
	1-month	3-month	6-month	12-month
Gonzalo and Granger	0.302	0.548	0.832	-0.149
Hasbrouck MID	0.309	0.579	0.832	0.081
Leading role in price discovery	CNH	Mainland	Mainland	CNH

Note: Both Gonzalo and Granger, and Hasbrouck MID provide a relative measure of price discovery across multiple markets instruments. Measure less than 0.5 here represents a leading role of the CNH market in the price discovery process.

Source: HKMA staff estimates using data from Bloomberg.

Implications

In summary, this study found evidence of two-way cross-market spillovers in 2013 but influences from the onshore market to the offshore market were on average much larger than in the opposite direction. At the same time, the two markets were found to contribute to the price discovery process of RMB forward exchange rates in different aspects. The results suggest that these markets have interacted with and influenced each other through various channels. Understanding how these channels work is also useful. It appears that the major channel is based on cross-market information disparity.[28] To illustrate, participants in one market might perceive that prices in the other market are more effective in reflecting certain types of information. Then, the price movements of the other market could serve as useful indicators, prompting them to follow suit. For example, CNH market participants might interpret forward rate movements in the onshore markets as a proxy of, say, Mainland monetary conditions. On the other hand, Mainland market participants might perceive that forward rate movements in the CNH market better reflect global market conditions due to its openness and connectedness with global financial markets.

Finally, it is useful to take a broader perspective by examining similar cases of onshore-offshore market spillovers in other countries. In this regard, the historical experiences of the Eurodollar market might provide us some food for thought. Applying the econometric methods of this study to the weekly data of the offshore US dollar market in London during 1964-1995, our results show that the magnitude of the volatility spillover increased since 1980 when Regulation Q interest rate ceiling imposed by the Federal Reserve and other capital control measures were removed. Also, the spillover from the offshore market to the onshore market became more tangible than before. Similarly, for the case of the Mainland and CNH markets, spillovers between these two markets are expected to become increasingly two-way as the Mainland liberalises interest rate regulations and capital control measures. Nevertheless, the onshore markets are expected to continue to play a leading role in onshore-offshore money and foreign exchange market interactions since these markets will be ultimately dominated by the monetary policy stance of the onshore authorities.

[28] In theory, cross-market arbitrage could be a channel for spillovers. However, given the effectiveness of Mainland's capital control measures, this channel appears to play a much more limited role in cross-market spillovers compared with the information channel.

Asset markets

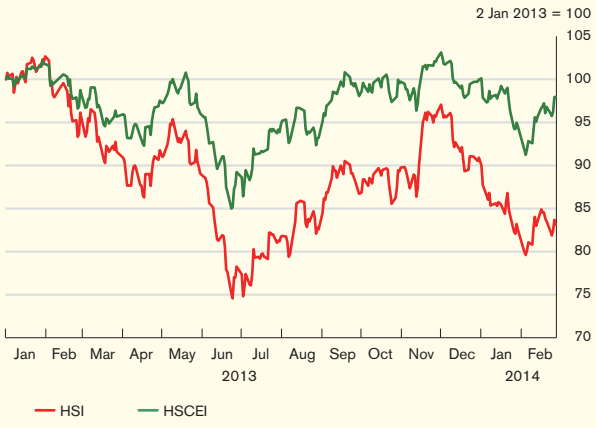
Hong Kong equities have been heavily influenced by external market conditions over the past six months. With the commencement of the Fed's QE tapering, the market is expected to remain volatile in 2014. By contrast, the domestic debt market was resilient despite reduced investor appetite. In particular, the offshore renminbi debt market continued to grow rapidly with increased product and issuer diversity. Property prices faced some downward pressure amid concerns over the Fed's tapering and the dampening effect of policy measures. With highly-stretched valuation, the property market could be sensitive to interest rate hikes and reversal of fund flows.

4.3 Equity market

In contrast with the sharp rally in major equity markets around the world, the performance of the Hong Kong market has been relatively lacklustre over the past six months. Local stocks have remained susceptible to external market conditions, particularly the US monetary policy outlook and the prospect of Mainland China's economy. Reiterating its stance on keeping interest rates low in its forward guidance after the December FOMC meeting, the Fed successfully convinced financial markets that tapering asset purchases and raising interest rates are separate policy actions. Global equities rebounded sharply as a result. However, the equity market in Hong Kong barely improved as optimism was partially offset by growing concerns over the liquidity condition in the Mainland, as reflected by a surge in the 7-day SHIBOR in late December. Market sentiment deteriorated further in early 2014 amid a massive selloff in emerging market currencies and renewed concerns over the global economy.

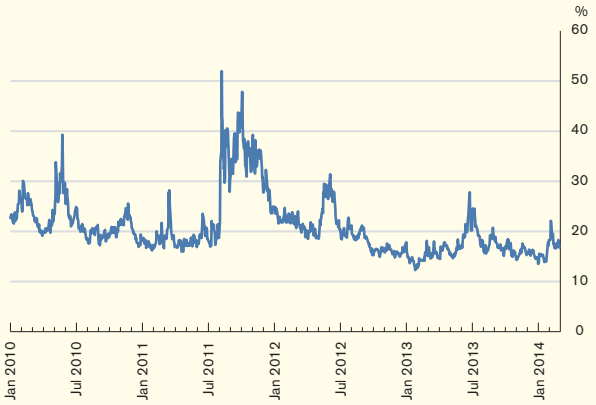
Overall, the Hang Seng Index (HSI) increased by 5.1% from September 2013 to February 2014, whereas the Hang Seng China Enterprises Index (HSCEI), also known as the H-share index, edged up slightly by 0.7%, suggesting that fears of a slowdown of the Mainland economy and the tight funding conditions continued to put pressure on the H-share market (Chart 4.15). Meanwhile, the implied volatilities of HSI jumped to a six-month high in February (Chart 4.16).

Chart 4.15
The Hang Seng Index and Hang Seng China Enterprises Index



Source: Bloomberg.

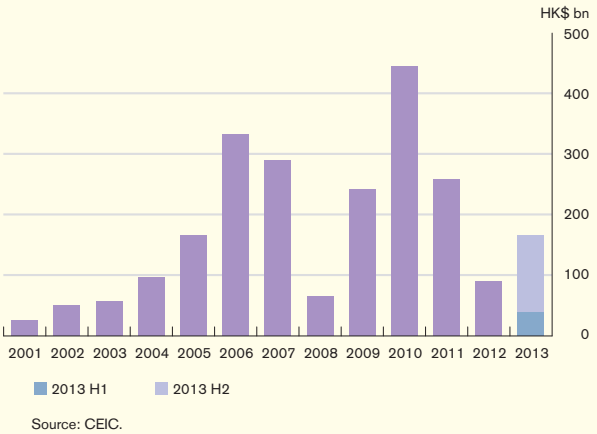
Chart 4.16
Option-implied volatility of the HSI



Source: Bloomberg.

In the primary market, despite more volatile market conditions, fund-raising activities in Hong Kong picked up strongly in the second half of 2013 (Chart 4.17). The listings of Chinese companies rose particularly sharply in December on the back of improved sentiment following the Third Plenum, which helped the city secure second place among global markets in terms of IPO volume in 2013. Throughout the year, funds raised from IPOs amounted to HK$166.5 billion, an 85.6% increase from 2012.

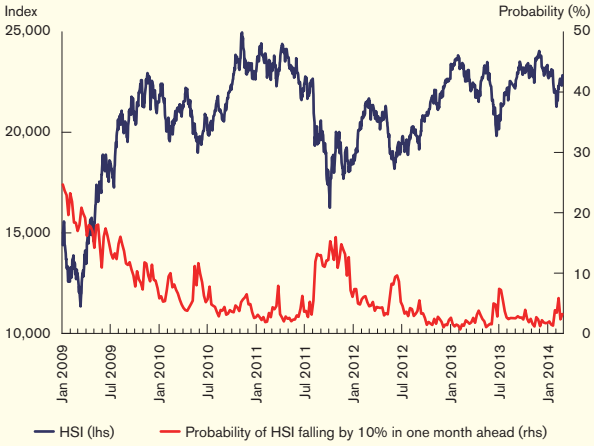
Chart 4.17
The IPO market in Hong Kong



Source: CEIC.

Looking ahead, the downside risk to the local equity market, as measured in terms of the option-implied probability of a 10% fall in HSI in one-month ahead, appears limited, given that the low interest rate environment still provides support to asset prices (Chart 4.18). That said, the market will remain clouded by uncertainties over the pace of the Fed tapering for quite some time and, should the resulting capital outflow eventually materialise, whether the exit will be an orderly one. The reactions of international investors will also depend on the performance of major economies, especially the Mainland, in the period ahead.

Chart 4.18
The Hang Seng Index and its option-implied probability of falling by 10% in one-month

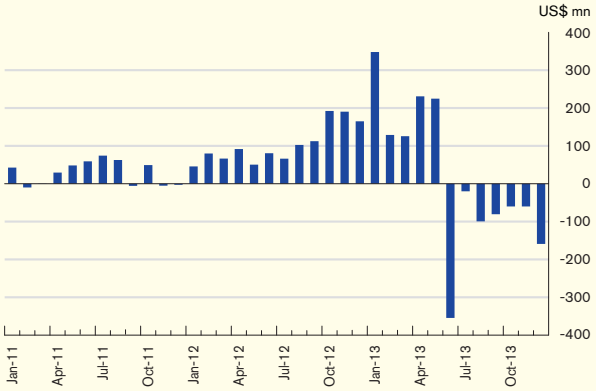


Sources: Bloomberg and HKMA staff estimates.

4.4 Debt market

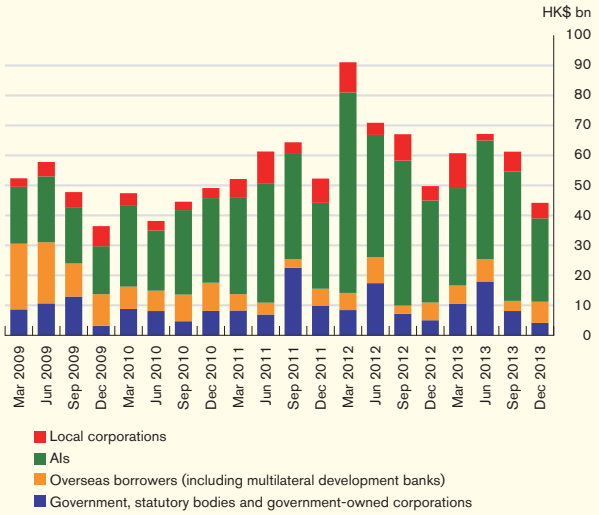
The Hong Kong dollar debt market grew steadily despite the volatility in global bond markets. Amid uncertainties over the course of the Fed's QE tapering and its potential impact on emerging markets, investor appetite for bonds receded in the local market in the second half of 2013, as reflected in significant bond fund outflows and a surge in the yields of Exchange Fund Bills and Notes (Charts 4.8 and 4.19). Against this backdrop, the public sector was the main driver of growth for the domestic debt market, issuing HK$274.5 billion or 14.5% more debt than the previous year (Chart 4.20).[29] New debt issued by the local private sector, which comprises AIs and local corporations, declined considerably.[30] As the increase in public sector debt issuance more than offset the decline in new debt issued by the local private sector, total issuance in 2013 grew by 10.6% year on year to HK$2,356.8 billion.

Chart 4.19
Bond fund flows into Hong Kong



Source: EPFR Global.

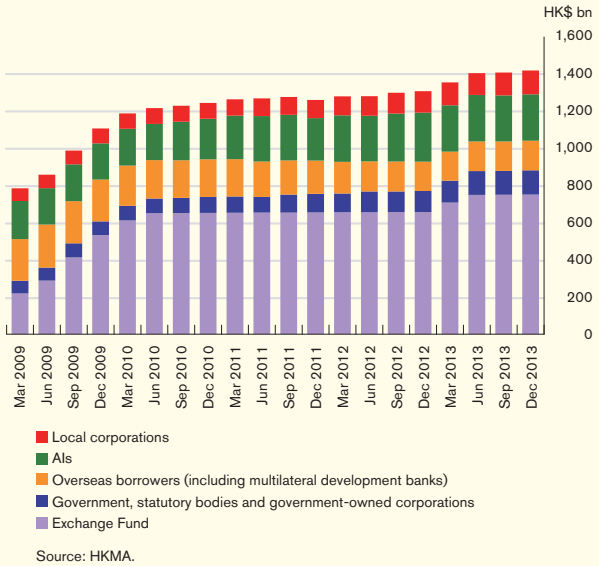
Chart 4.20
New issuance of non-Exchange Fund Bills and Notes Hong Kong dollar debt



Source: HKMA.

With the sizeable growth in total issuance, the outstanding amount of Hong Kong dollar debt surged by 8.5% year on year to a record level of HK$1,419.4 billion as at end-December 2013 (Chart 4.21).[31] The rapid growth in issuance pushed public sector debt outstanding higher by 14.5%. Among the local private sector, the outstanding amount of debt issued by AIs dropped by 5.1%, while local corporations saw its debt outstanding rise by 10.1% despite its reduced activity in the primary market.

Chart 4.21
Outstanding Hong Kong dollar debt



Source: HKMA.

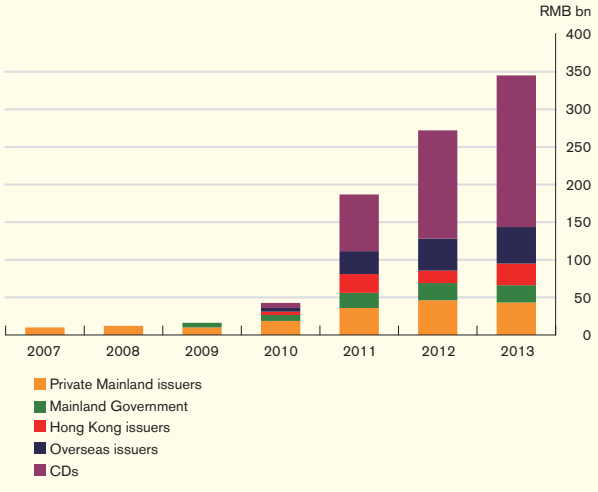
[29] Exchange Fund paper issuance accounted for 90.1% of total issuance in 2013. A total amount of HK$30.0 billion worth of debt securities were issued under the Government Bond Programme, up by 15.4% from the previous year. Debt issued by statutory bodies/ government-owned corporations, however, dropped by 11.3% to HK$10.7 billion.

[30] In 2013, new issuance by AIs and local corporations declined by 24.8% and 7.6% to HK$143.0 billion and HK$25.6 billion respectively.

[31] This was equivalent to 29.5% of the Hong Kong dollar M3 or 24.5% of Hong Kong dollar denominated assets of the entire banking sector.

The offshore renminbi debt market in Hong Kong also expanded tremendously in 2013. Although reduced investor appetite kept issuance subdued in the third quarter of 2013, primary activity rebounded sharply towards the end of the year. Overall, total issuance in 2013 amounted to RMB344.3 billion, up by 26.9% from the preceding year (Chart 4.22). Private Mainland issuers accounted for the majority of non-CD debt issuance prior to 2012, but overseas issuers have since increased substantially. In 2013, the proportion of debt issued by overseas issuers in total issuance excluding CDs rose to 33.9%, surpassing the share of debt issued by private Mainland issuers (Chart 4.22). The strong growth in issuance pushed the outstanding amount of offshore renminbi debt securities in Hong Kong sharply higher by 42.7% year on year to a record level of RMB522.2 billion as at end-December 2013 (Chart 4.23).

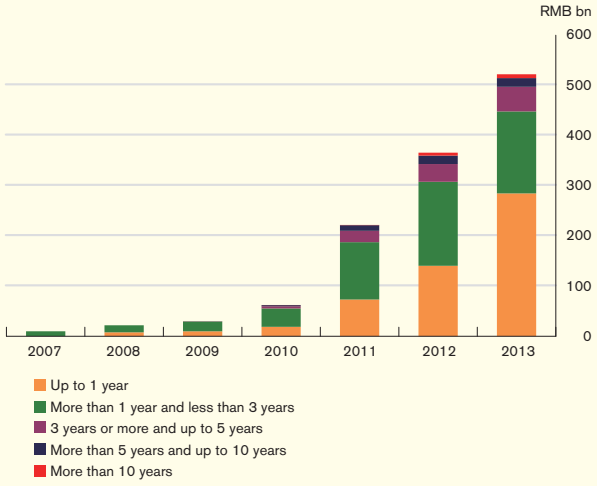
Chart 4.22
New issuance of offshore renminbi debt securities



Sources: Newswires and HKMA staff estimates.

Apart from the strong growth and issuer mix, the market also saw two other positive developments, namely, the issuance of the first floating-rate bond priced with reference to the CNH HIBOR and the first foreign provincial government bond. On 13 November 2013, the China Development Bank issued the first

Chart 4.23
Outstanding amount of offshore renminbi debt securities by remaining tenors



Sources: Newswires and HKMA staff estimates.

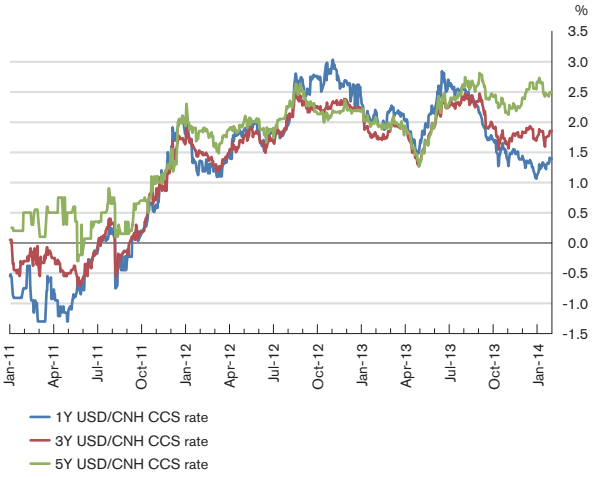
offshore RMB floating-rate bond priced with reference to the CNH HIBOR fixing, which was launched on 24 June 2013. On the same day, the Province of British Columbia also issued the first foreign provincial government bond. These bonds certainly marked another step forward of the market towards greater product and issuer diversity.

Looking ahead, the market is expected to grow further in view of a promising primary market. Firstly, the increase in refinancing need is likely to help sustain the pace of issuance. As at end-December 2013, the outstanding debt maturing within one year amounted to RMB284.8 billion, more than double the RMB140.6 billion at end-December 2012 (Chart 4.23). Secondly, liquidity conditions are likely to remain more favourable in the offshore market, hence allowing bond issuers to raise renminbi funds at relatively lower costs. Lastly, a rising USD/CNH cross-currency swap (CCS) rate, together with greater product diversity in the CCS market, may add momentum to swap-based issuance by issuers seeking USD funds. Box 4 analyses the driving forces behind the rising CCS rate over the past two years and discusses its outlook.

Box 4
What has been driving the USD/CNH cross-currency swap rate?

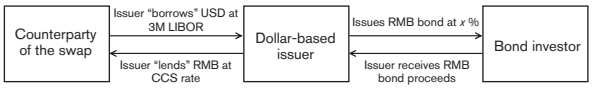
The offshore RMB bond market has grown remarkably over the past few years. Excluding bonds issued by the Mainland Government, issuance of non-CD debt securities reached RMB135.3 billion in 2013, more than four times the amount recorded in 2010. Meanwhile, the market also saw greater issuer diversity, with the proportion of non-CD debt securities issued by overseas issuers rising from 17.9% in 2010 to 40.6% in 2013.[32] The rapid growth of the market, in particular the issuance by overseas issuers, was reportedly attributable to an increase of swap-based issuance amid a rising USD/CNH cross-currency swap (CCS) rate quoted as a fixed rate for the CNH leg over the past two years. For instance, the 3-year USD/CNH CCS rate increased by more than 250bps over the period from 2011 to 2012 (Chart B4.1). The pick-up in the USD/CNH CCS rate provided an opportunity for companies to issue RMB bonds and obtain USD funding at lower costs (compared with issuance of USD bonds) by swapping their RMB bond proceeds into USD (Chart B4.2).[33] The counterparties of the USD/CNH CCS are mostly investors interested in gaining RMB exposure but do not have access to the CNH capital market. Indeed, the USD/CNH CCS market has also become increasingly popular, with a number of market participants seeing an increasing trading volume over the past two years. In light of these developments, this Box analyses the driving forces behind the rising CCS rate in order to gauge the prospects for the swap-based bond issuances.

Chart B4.1
USD/CNH CCS rates



Source: Bloomberg.

Chart B4.2
Swapping RMB bond proceeds into USD funding



What determines the USD/CNH CCS rate?

In theory, CCS involves only a pure exchange of cash flows between two parties. This implies that the present values of all the payments made by the two parties should be the same at inception. In other words, the initial value of the swap to both parties should be zero. Nevertheless, after the contract begins, the value of the swap to each party may become positive or negative depending on market conditions, including changes in the exchange rate and interest rates. Hence, an appropriate swap rate should be one that will lead to a zero value of the swap at inception after taking into account future

[32] Overseas issuers include multilateral development banks, financial and non-financial corporations with headquarters located outside Hong Kong and Mainland China.

[33] An example of swap-based issuance in the offshore RMB debt market was the bond issued by the Export-Import Bank of Korea in July 2012. The bond proceeds of RMB1.75 billion were swapped into US$280 million through the USD/CNH CCS market. This has allowed the bank to raise USD funding at a cost of 10bps lower than direct bond issuance in the USD market. For details, see the press release by the Export-Import Bank of Korea at http://www.koreaexim.go.kr/en/bbs/noti/view.jsp?no=10963&bbs_code_id=1316753474007&bbs_code_tp=BBS_2&req_pg=20.

movements in interest rates and exchange rate over the life of the contract. In light of this, we postulate that the USD/CNH CCS rate is a function of the US interest rate, the future volatility in the US interest rate, the offshore RMB interest rate and the expectation of RMB appreciation against the USD.

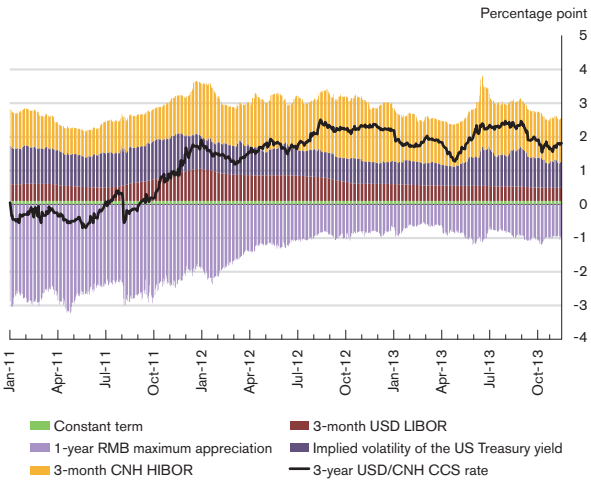
An econometric model is estimated based on daily data covering the period from January 2011 to November 2013. As the USD/CNH CCS market is most active at the 3-year tenor, the 3-year CCS rate is used as the dependent variable. Given the abovementioned factors, we regress the CCS rate on four explanatory variables, namely, (1) the 3-month USD LIBOR which is used as a measure of the US interest rate; (2) the Merrill Option Volatility Expectations Index which is used to proxy the future volatility in the US interest rate; (3) the 3-month CNH HIBOR which is used to control for the cost of funds in the offshore RMB market; and (4) an estimated 1-year maximum appreciation of the RMB which proxies the expected appreciation of the RMB against the USD.[34, 35 & 36]

Results

All the explanatory variables are found to have the expected signs: the maximum appreciation of the RMB is significantly negative and the other three variables significantly positive. This suggests that, other things being equal, the USD/CNH CCS rate would rise when (1) the US interest rate goes up; (2) the future volatility of the US interest rate increases; (3) the cost of offshore RMB funds increases; or (4) the expected appreciation of the RMB against the USD declines.

The results of the above estimation are then used to identify the factors that contributed to the increase in the USD/CNH CCS rate over the sample period. Chart B4.3 presents the decomposition of the increase in the USD/CNH CCS rate into various contributing factors. In the first half of 2011, the USD/CNH CCS rate generally remained negative given the high expectation of RMB appreciation. Reduced expectation of RMB appreciation, together with the pick-up in both the level and future volatility of the US interest rate, pushed the USD/CNH CCS rate sharply higher since late 2011. Although the level and uncertainty in the US interest rate declined subsequently, the USD/CNH CCS rate remained relatively stable as the expectation of RMB appreciation accounted for most of its changes over this period after controlling for the cost of funds in the offshore RMB market.

Chart B4.3
Decomposition of the USD/CNH CCS rate



Sources: Bloomberg and HKMA staff estimates.

34 The Merrill Option Volatility Expectations Index is developed by Merrill Lynch to reflect a market estimate of future Treasury bond yield volatility. The index used in this study, which is constructed based on 3-month options on Treasury securities in a wide range of tenors, measures the uncertainty about long-term yields over a 3-month horizon. Thus, it could be used to proxy the volatility in short-term interest rates in the distant future.

35 Prior to the launch of CNH HIBOR fixing on 24 June 2013, the 3-month CNH HIBOR refers to the 3-month CNY(HK) Interbank Offered Rate contributed by the Bank of China (Hong Kong).

36 Hui, C.H., Lo, C.F., Chung, T.K., 2008. "Market Expectation of Appreciation of the Renminbi". Working Paper no. 03/2008, Hong Kong Monetary Authority.

Conclusion

To sum up, reduced expectation of RMB appreciation has been the main driving force behind the rising USD/CNH CCS rate over the past two years. This provided a favourable condition for institutions seeking USD funds to tap the offshore RMB bond market as they could "lend" their RMB bond proceeds at higher rates through the CCS market to investors who are keen on gaining RMB exposure but do not have access to the CNH capital market. Looking ahead, the market for swap-based issuance is likely to remain favourable for two reasons.

First of all, the USD/CNH CCS rate is likely to remain attractive to issuers in the foreseeable future. On the one hand, a strong USD – on the back of the recovery of the US economy and the QE tapering of the Fed – will likely contain market expectation of RMB appreciation, thus pushing the USD/CNH CCS rate up. On the other hand, the USD/CNH CCS rate may also be subject to greater upward pressure stemming from higher volatility of the US interest rate given greater uncertainty over the course of QE tapering.

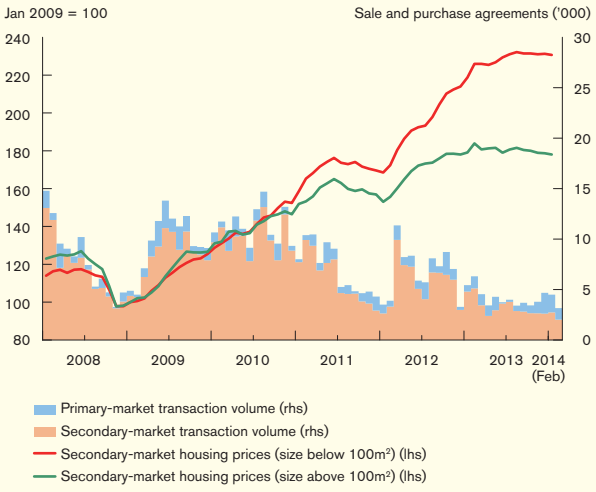
Apart from pricing, the attractiveness of the CCS also depends on product diversity. While the tenor of the USD/CNH CCS swap is available up to 10-year, the market becomes less liquid beyond 5-year tenor, partly due to the lack of a reliable pricing benchmark. Greater issuance of long-dated offshore RMB bonds by the Mainland Government could foster the development of a benchmark yield curve at the longer end and thus facilitate the liquidity of the CCS market at longer tenors. Meanwhile, with the launch of CNH HIBOR fixing on 24 June 2013, the swap volume of the USD/CNH CCS market may increase if the fixing can evolve into a reliable benchmark for pricing floating-for-floating CCS, offering market participants an alternative to the fixed-for-floating CCS. Greater product diversity in the CCS market opens more options for institutions to hedge against interest rate and exchange rate risks, rendering swap-based issuance more attractive.

4.5 Property markets

Residential property market

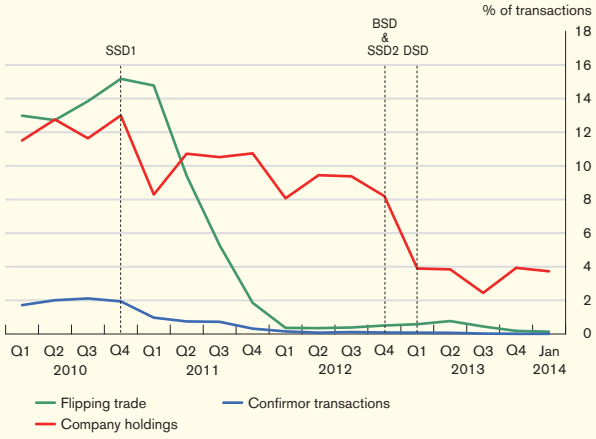
Residential property market activities remained weak in the second half of 2013 and recent months, with transaction volume shrinking considerably and housing prices facing some downward pressure. The new rounds of stamp duty measures and prudential measures introduced since February 2013 have dampened housing demand, while the weak property market performance was also partly attributable to concerns over the Federal Reserve's tapering of the asset purchase programmes and rising expectation of future interest rate hikes. The number of residential transactions fell by 37.7% to a total of 50,676 in 2013, the lowest on record (Chart 4.24). In recent months, secondary-market transactions remained sluggish but primary-market transactions revived as developers offered more discounts and concessions. Speculative and investment activities remained subdued, and there has been a sharp decline in confirmor transactions, flipping trade and company purchasers (Chart 4.25).

Chart 4.24
Residential property prices and transaction volumes



Sources: R&VD and Land Registry.

Chart 4.25
Confirmor transactions, flipping trade and company purchasers



Note: SSD1 and SSD2 refer to the measures of Special Stamp Duty introduced in November 2010 and October 2012, respectively; BSD refers to the measure of Buyer Stamp Duty introduced in October 2012; DSD refers to the doubling of the *ad valorem* stamp duty rates introduced in February 2013.

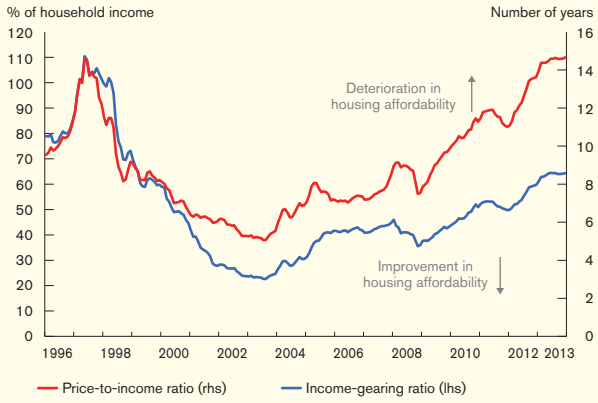
Source: Centaline Property Agency Limited.

While facing some downward pressure, housing prices remained relatively resilient in the secondary market, only edging down on average by less than 1% after hitting a high in August. The modest price adjustment in the secondary market reflected a relatively strong holding power of home owners, with the prevailing mortgage interest rate staying low and the labour market environment still broadly favourable. However, there are signs in recent months that a few more home owners are willing to lower their asking prices while banks become relatively more conservative on home appraisal. In the primary market, the effective sales prices of new projects after discounts and concessions have fallen quite noticeably, and are getting closer to the prices in the secondary market.

Despite the modest downward adjustment in the prices, property valuation is still highly stretched relative to household income and the fundamentals. Housing affordability remains

low, with the price-to-income ratio reaching 14.6 in the fourth quarter, a level comparable to the 1997 peak and the income gearing ratio staying high at 64.1% compared with its long-term average of 50% (Chart 4.26).[37] The income gearing ratio is sensitive to mortgage interest rates. If mortgage interest rates move higher, say by 300 basis points, to a more normal level, the income gearing ratio would soar to 83%.

Chart 4.26
Indicators of housing affordability



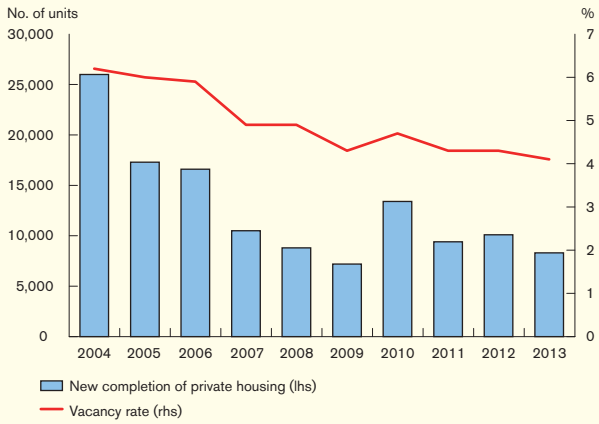
Sources: R&VD, C&SD and HKMA staff estimates.

Private-sector analysts now generally envisage further consolidation in housing prices in 2014. While the low interest rate environment has fuelled the rapid upsurge in housing prices in the past few years, such favourable conditions may reverse earlier and sharper than expected. The long-dated interest rates in Hong Kong have recently increased along with the US Treasury yields. Mortgage interest rates are expected to move higher, particularly when the Fed eventually raises the Fed Funds target rate. Should the mortgage interest rate return to a more normal level, it could lead to a sharp rise in mortgagors' debt repayment and servicing burden. Our in-house estimates show that under a 20-year mortgage, a 300-basis-point increase in the mortgage interest rate can lead to a 30.2% rise in mortgage repayment. Moreover, a rise in the long-dated interest rates relative to a rental yield of just around 2-3% has made property investment less attractive, and this could also exert downward pressure on the property market.

Uncertainties over the pace of the Federal Reserve's tapering and the interest rate normalisation path could increase financial market volatility and affect market sentiment. Should there be a significant reversal of fund flows, it could exacerbate downward adjustments in property prices and severely hit the broader economy.

The demand-supply imbalance of the property market will however likely remain in the near term. Actual completion of new private residential units dropped by 17.8% to 8,300 units in 2013, while the vacancy rate fell to 4.1% at the end of the year, the lowest since 1997 and well below the long-term average of 5.0% in the past twenty years (Chart 4.27). With the Government proactively boosting land supply, supply of private flats (including stock of unsold flats) is expected to increase to a total of 71,000 units in the next three to four years.

Chart 4.27
Private flat completion and vacancy rate



Sources: Transport and Housing Bureau and R&VD.

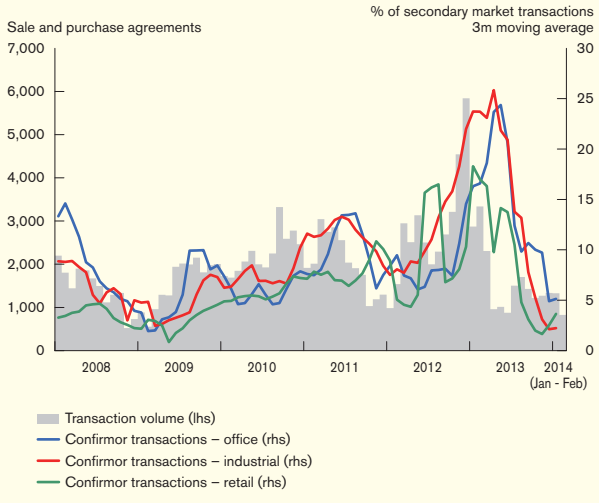
[37] The price-to-income ratio measures the average price of a typical 50 square-metre flat relative to the median income of households living in private housing. The income-gearing ratio compares the amount of mortgage payment for a typical flat of 50 square metres (under a 20-year mortgage scheme with a 70% loan-to-value ratio) with the median income of households living in private housing. It is not the same as a borrower's actual debt-servicing ratio, which is subject to a maximum cap by the HKMA prudential measures.

The prudential measures implemented so far have helped bring down the actual loan-to-value ratio for new mortgage from an average of 64% before policy measures to 55% recently, and the debt-servicing ratio from an average of over 40% to a low of 35% in December. Banks should continue to strengthen their risk management in mortgage lending business and maintain a conservative credit stance to mitigate the risks of interest rate hikes and the rapidly changing macro-financial conditions. Meanwhile, home buyers should stay vigilant on property market and interest rate developments and avoid stretching themselves with excessive borrowing.

Commercial and industrial property markets

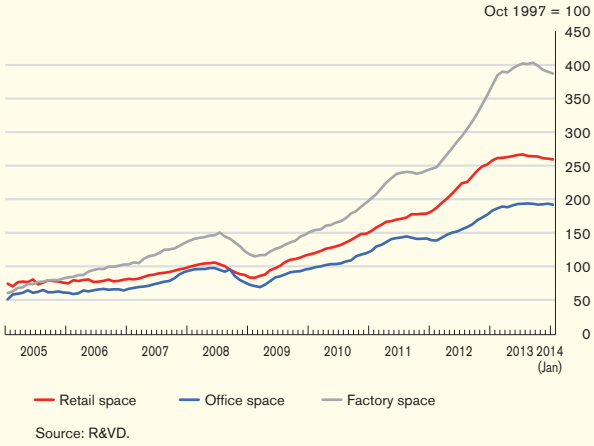
The non-residential property markets were also under consolidation. Investment demand weakened as a result of the lingering worries about future interest rate hikes and the stamp duty measures (particularly the doubling of the stamp duty rates), with the total number of transactions falling by 42.0% to a four-year low of 19,827 units in 2013. Confirmor transactions, as an indicator of speculative activities, dropped even more sharply in recent months (Chart 4.28). Prices only saw moderate downward adjustments of around 1-4% (Chart 4.29), while rentals softened mildly by less than 1%.

Chart 4.28
Transactions in non-residential properties



Sources: Land Registry and Centaline Property Agency Limited.

Chart 4.29
Non-residential property price indices



Source: R&VD.

Potential overvaluation risks in the non-residential property market however remain a key concern. As rental earnings have softened, the trend of higher long-dated interest rates could bring down the capital values and exert further downward pressure on non-residential property prices. Investment sentiment would also continue to be dented by uncertainties surrounding the Fed's tapering of asset purchases and interest rate normalisation process. In terms of banking and financial stability, it remains critically important that banks should restrain their exposure to property-related lending and maintain a prudent stance when granting new mortgages and asset-backed loans.