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# HKMA Research Letter

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## HOW DO WE MONITOR FUND FLOWS AND FOREIGN EXCHANGE MARKET PRESSURES IN HONG KONG?<sup>1</sup>

There has been much talk about fund inflows in Hong Kong, especially since the market started anticipating in the third quarter of 2010 that the Federal Reserve of the United States would launch its second asset purchase programme, commonly known as QE2. Despite such strong interest, there is often confusion about the nature and scale of fund inflows that have affected Hong Kong. In this article, we explain how economists at the Hong Kong Monetary Authority (HKMA) monitor fund flows: the concepts and the indicators we use in our daily work, which help us form a judgment about the risks associated with such flows.

### 1. What are fund inflows?

It helps to be very clear about what we mean by fund flows, since they could mean different things to different observers. At the Research Department of the HKMA, we analyse fund flows as part of the exercise to monitor *foreign exchange market pressures*. We define *inflow pressure* as an increased demand for Hong Kong dollar assets, including deposits, stocks, bonds, properties and other assets *accompanied by a conversion of currencies*, and *outflow pressure* as a decreased demand for Hong Kong dollar assets. Inflow pressures will lead to changes in both the *price* and the *quantity* of Hong Kong dollars. In terms of the price impact, the Hong Kong dollar exchange rates will tend to appreciate. In terms of the quantitative impact, the net Hong Kong dollar liabilities of Hong Kong banks, and/or the net Hong Kong dollar liabilities of the HKMA (“the Monetary Base”), may also increase. As an example, the rest of this article focuses on the concept and indicators of fund inflows, and the reverse will be true in the case of fund

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outflows.

Key to the concept of fund flows is the role of the foreign exchange market. The foreign exchange market is the market for exchanging *bank liabilities* of different currencies. For example, when an American investor is interested in buying stocks listed on the Hong Kong stock exchange, she needs first to convert her US dollar deposits into Hong Kong dollar deposits if she does not already have sufficient funds in Hong Kong dollars, and then uses those Hong Kong dollar deposits to pay whoever is willing to sell her the stocks that she is interested in buying. In other words, when there is an increased demand for Hong Kong dollar assets by firms and individuals, they first need to convert their holdings of foreign currency deposits into Hong Kong dollar deposits in the foreign exchange market, whatever type of Hong Kong dollar asset the investor is ultimately interested in buying.

For the non-bank sector as a whole, the counterparty from whom they can buy Hong Kong dollar deposits is banks in Hong Kong. Hong Kong banks “create” Hong Kong dollar deposits by exchanging such deposits for foreign currency deposits. This will lead to an increase in banks’ net Hong Kong dollar liabilities, or equivalently, their net foreign currency assets.

When the non-bank sector sells US dollar deposits, and when banks buy such deposits from the non-bank sector, they may incur an open position in

foreign exchange, meaning that their US dollar assets and liabilities, or their US dollar long and short positions, do not match. Typically, these open positions are covered through the use of the foreign exchange swap market: when the American investor buys Hong Kong dollar deposits on the spot market, she also simultaneously sells such deposits forward, say three months later. Hong Kong banks, acting as her counterparty, would do exactly the opposite, i.e., buying US dollar deposits spot and sell them forward. The open positions can also be covered in other derivatives market (e.g., foreign currency options).

Usually banks and their customers can cover their open positions in the market, i.e., by trading with each other, without involving the HKMA. However, at times when there are very strong inflow pressures, the Hong Kong dollar exchange rate would quickly appreciate. Since the HKMA has a standing commitment to buying whatever amount of US dollar deposits the market wishes to sell at the rate of 7.75 Hong Kong dollars per US dollar (the strong-side Convertibility Undertaking (CU)), the HKMA may become the only buyer of US dollar deposits when the market exchange rate reaches 7.75, and the HKMA pays its purchase of US dollar deposits from the market by crediting the Hong Kong dollar deposit accounts that banks keep with the HKMA. The total balance of such accounts is called the Aggregate Balance, a component of the Hong Kong dollar Monetary Base. In other words, strong and persistent inflow pressures will ultimately lead to

an increase in the Aggregate Balance of the HKMA.

From the discussion above, it is clear that when the Hong Kong dollar is subject to strong inflow pressures, i.e., when the desire to increase holdings of Hong Kong dollar deposits is stronger than the willingness to reduce such holdings, a number of things may happen: the spot exchange rate appreciates, the forward exchange rates appreciate, the expected appreciation implied in option prices become larger, net Hong Kong dollar liabilities of the Hong Kong banking system become bigger, and the Aggregate Balance of the HKMA becomes bigger. And these are the first-round effects. Subsequently, after the US investor buys Hong Kong dollar deposits, she may use those deposits to buy CDs issued by Hong Kong banks, Exchange Fund Bills and Notes issued by the HKMA, stocks listed on the Hong Kong stock exchange, or properties in Hong Kong. Those actions may result in lower interest rates, higher stock prices, or higher property prices.

## **2. Which indicators are informative about exchange market pressures?**

As explained above, inflow pressures will show up in both prices and quantities of net Hong Kong dollar liabilities. Price indicators have the virtue of being available in real time or with little time lag, but they do not reveal the size or positions of various types of financial contracts that have led

to the changes in prices. Quantitative indicators have the virtue of intuitive appeal (e.g., an inflow of some billions of Hong Kong dollars), but they typically are available only with some time lag, and could be distorted by accounting conventions, such as the treatment of valuation changes, regarding the recording of assets and liabilities on the banks' balance sheet. The list of indicators discussed below is monitored regularly by HKMA economists, but it is not an exhaustive list.

### **(a) Price indicators**

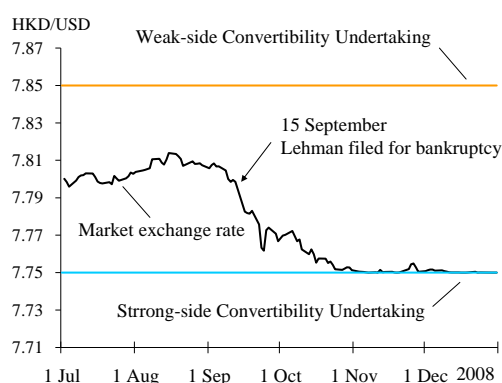
#### *Spot exchange rate*

When the spot exchange rate moves significantly in one direction, it may indicate sizeable inflow or outflow pressures. Note it is the *change* in the spot rate that matters. Even if the spot rate stays close to the strong-side CU, there may not be large inflow pressures if the spot rate does not move much. The spot exchange rate tends to be very sensitive to one-way fund flow pressures; it could move significantly before other indicators begin to reveal signs of fund flows. Indeed, the spot exchange rate typically appreciates sharply toward the strong-side CU in the face of strong inflow pressures, before the CU is triggered and the Aggregate Balance increases.

A good example of strong inflow pressures as indicated by the spot exchange rate is the period at the height of the global financial crisis during 2008

Q4. In mid-September 2008, the decision by the US authorities not to rescue the investment bank Lehman Brothers sent shock waves through global financial systems and liquidity evaporated almost overnight. Banks and domestic corporations in Hong Kong repatriated their overseas funds back into the Hong Kong dollar. Strong inflow pressures therefore showed up as a rapid strengthening of the Hong Kong dollar spot exchange rate from around 7.80 in mid-September to 7.75 on 31 October 2008 (Chart 1).

Chart 1: Hong Kong dollar spot exchange rate



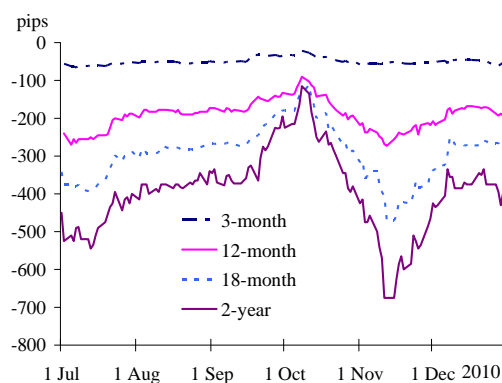
### Forward exchange rates

Inflow pressures can be reflected in the forward exchange market in a number of ways. First, when banks cover their open positions resulting from the sale of Hong Kong dollar deposits to the nonbank sector, they can buy Hong Kong dollar forward; or when hedge funds speculate on an appreciation in the Hong Kong dollar, they can also buy Hong Kong dollar forward. These actions will exert strengthening pressure on the forward exchange rate.

Secondly, fund inflows may lead to an increase of liquidity in the banking system, driving the Hong Kong dollar interest rate lower. When Hong Kong dollar interest rate falls below its US dollar counterpart, the resulting negative interest rate differential will lead to a forward discount. In other words, the Hong Kong dollar forward exchange rate will be stronger than its spot exchange rate.

Note again it is the pace of change, rather than the level, of the forward discounts that is indicative of inflow pressure. For example, amid the anticipation and the announcement of the QE2 in October and early November 2010, Hong Kong dollar forward discounts widened significantly (Chart 2).

Chart 2: Hong Kong dollar forward discounts

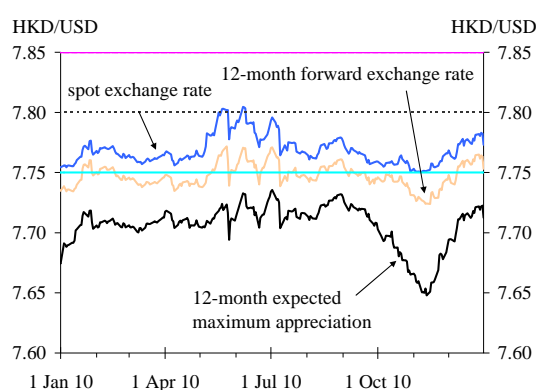


### Option prices

If inflow pressures are expected to increase and the Hong Kong dollar exchange rate is expected to appreciate, the price of the call option on the Hong Kong dollar (the right to buy Hong

Kong dollars at a pre-determined strike price at a future time) could rise. Options are forward-looking in nature and thus offer a useful source of information for gauging market assessment about future values of financial assets or risk appetite. As an example, when market sentiment shifted abruptly towards a stronger Hong Kong dollar in September and October 2008, the expected rate of maximum appreciation calculated based on currency option prices rose markedly (Chart 3).

Chart 3: The expected rate of maximum appreciation in the Hong Kong dollar calculated based on currency option prices



**(b) Quantity indicators**

The Aggregate Balance

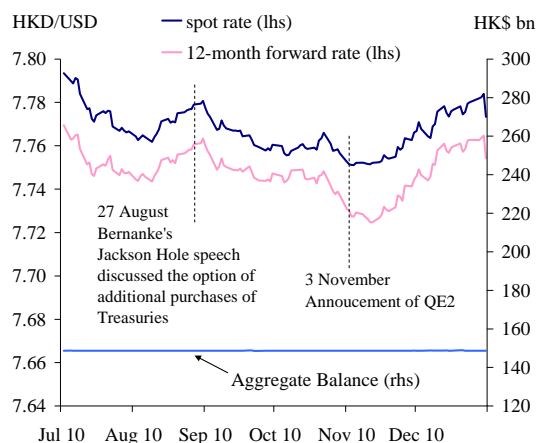
Changes in the Aggregate Balance resulting from market operations by the HKMA are the most visible and readily available indicators of fund flow pressures. Since the HKMA is the only institution in the world that is committed to selling an unlimited amount of Hong Kong dollars at the rate of 7.75 Hong

Kong dollars per US dollar, this means that strong inflow pressures will ultimately be shown as an increase in the deposits of the banking system at the HKMA. For example, strong inflows led to the sale by the HKMA of a total of around HK\$640 billion to banks between September 2008 and December 2009, as reflected in the changes in the Aggregate Balance.<sup>2</sup>

Note that an unchanged Aggregate Balance does not necessarily imply that there are no inflow pressures into the Hong Kong dollar, but it does imply that the inflow pressures are not particularly large. For example, there was much attention about whether there was renewed inflow pressure on the Hong Kong dollar with the launch of QE2 by the Fed. While the Aggregate Balance remained stable, spot and forward exchange rates strengthened and net Hong Kong dollar liabilities of banks increased (Chart 4 and Chart 5). These indicators show that, while there was an increase in the demand for Hong Kong dollar assets by the private non-bank sector, the pressure of inflows was not strong enough to cause the banking system as a whole to buy Hong Kong dollars from the HKMA, so that the Aggregate Balance has remained little changed.

<sup>2</sup> This is often referred to as “net fund flow into the Hong Kong dollar”. Analytically, this terminology is imprecise since it has the connotation that the Hong Kong dollar comprises only the monetary base. A more precise term would be “net fund flow into the Hong Kong dollar currency board account”.

Chart 4: QE2 and its impact on inflow pressures in Hong Kong



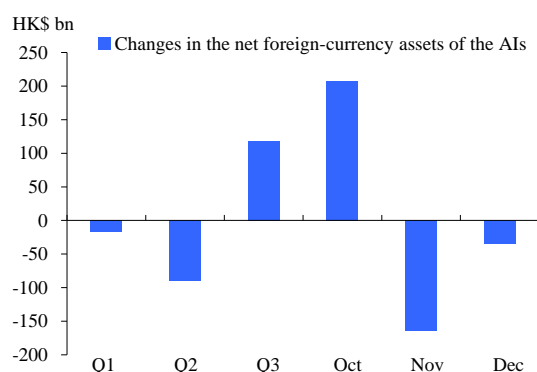
Net Hong Kong dollar liabilities of the banking system

When inflow pressures are not particularly large, they may be reflected as an increase in the net Hong Kong dollar liabilities of the banking system instead of an increase in the Aggregate Balance. The mirror image of such increase in net Hong Kong dollar liabilities is an increase in net foreign currency assets of the banking system. For example, during July and October 2010, there were market reports of fund inflows into Hong Kong, reflecting the expectation of QE2 and buoyant IPO activities. Banks' net foreign currency assets increased by about HK\$330 billion in this period, accounting for 60% of the total increase in Hong Kong dollar deposits during the period. Thus, even though the strong-side CU was not

triggered and the HKMA did not have to sell Hong Kong dollars during this period, there were increased demand for Hong Kong dollar assets, albeit at a somewhat moderate scale. Note that banks' net Hong Kong dollar liabilities, or equivalently their net foreign currency assets, can be very volatile, reflecting Hong Kong's status as an international IPO centre. For example, the record-breaking IPO of AIA in October 2010 led to a sharp increase in banks' net foreign currency assets but the increase was quickly unwound in November (Chart 5).

There are a number of limitations when using the increase in net Hong Kong dollar liabilities or net foreign currency assets of the banking system as a measure of inflow pressures. First, changes in banks' net foreign currency assets may include valuation effects. As such, they are a noisy signal of inflow pressures, especially when financial market conditions are very volatile. Secondly, unlike the Aggregate Balance, which is available almost on a real-time basis, data of net Hong Kong dollar liabilities of the banking system are published only with a one-month time lag, reducing the timeliness of the indicator as a measure of fund flow pressures.

Chart 5: Changes in the net foreign-currency assets of banks in 2010



### 3. How do we make use of the Balance of Payments statistics and market surveys?

#### Balance of Payments (BoP) statistics

BoP statistics are widely used indicators for cross border flows. They provide an accounting record of changes during a period of time (typically a quarter) in the assets and liabilities of Hong Kong residents vis-à-vis foreign residents. As such, they provide a comprehensive picture of cross-border capital flows. In particular, they reveal which types of assets and liabilities (e.g., bank deposits and loans, stocks and bonds, foreign direct investments, etc.) were involved in cross-border transactions.

However, the concept of BoP statistics is different from Hong Kong dollar fund flows. The former refers to cross-border flows based on the concept of residency, while the latter focuses on fund flows involving the Hong Kong dollar. Transactions as recorded in the BoP statistics do not necessarily involve payments or use of the foreign exchange

market, so they are less useful for analysing exchange market pressures. Conversely, transactions among residents, and among non-residents, can have important impact on the foreign exchange market but are not included in the BoP data. Table 1 sets out the relationship between the concepts of the BoP and Hong Kong dollar fund flows as defined earlier. For example, subscription for H-share IPOs by foreign residents is not recorded in Hong Kong's BoP statistics as this represents transactions among non-residents, but it usually does introduce foreign exchange market pressures. In addition, unlike the price and quantity indicators discussed above, BoP statistics become available only with a long time lag.

Table 1: The relationship between the concepts of BoP and fund flows

	Transaction parties		
	Among Hong Kong residents	Between Hong Kong residents and non-residents	Among non-residents
Transactions involving Hong Kong dollars only		Captured by BoP statistics	
Transactions involving foreign exchange of the Hong Kong dollar	Captured by indicators of Hong Kong dollar fund flows	Captured by both BoP statistics and indicators of Hong Kong dollar fund flows	Captured by indicators of Hong Kong dollar fund flows
Transactions involving foreign currencies only		Captured by BoP statistics	

#### Market surveys

Market surveys can also provide useful information regarding the scale and volatility of fund flows. Survey data on portfolio flows are available from a few private information agencies (e.g. EPFR Global and State-Street have surveys on equity-related capital flows). In some surveys, fund managers are asked how they allocate their funds to

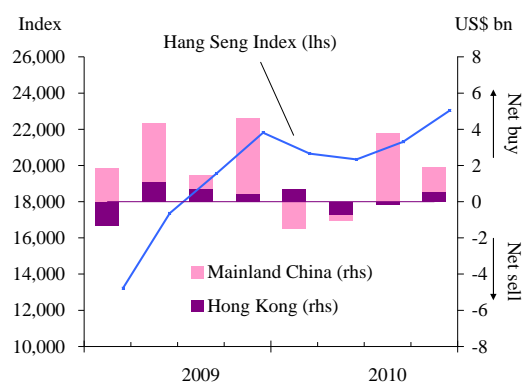
stocks in different economies. Where more funds are allocated to stocks in a particular economy, it means more fund inflows into the stock market there. Survey data show that increased equity-related inflows were associated with a rising Hang Seng Index during 2009 and the second half of 2010 and these net inflows were mainly related to Mainland-related stocks (Chart 6).

Market survey data are typically available without too much time lag, but their coverage is usually incomplete and they do not provide a consistent framework for monitoring fund flows. In particular, portfolio flows as captured by survey data may not involve conversion of currencies. Thus, while providing a useful alternative, care should be taken when interpreting these data.

#### 4. Conclusions

We have discussed in this article the concept of fund flows and showed that a range of indicators are available to monitor exchange market pressures. No single measure is sufficient. With this in mind, economists at the HKMA monitor and analyse both price and quantity indicators, as well as BoP statistics and other market surveys, to form a comprehensive judgment on the nature and scale of fund flows in Hong Kong.

Chart 6: Equity portfolio investment flows



Note: "Mainland China" includes H-shares and Red-chips.

Source: EPFR Global.