

# **Managed exchange rates, dual listing, and foreign exchange exposure: the experience of Chinese firms**

**Min Ye and Elaine Hutson\***

UCD Michael Smurfit Graduate Business School  
University College Dublin,  
Blackrock, County Dublin, Ireland.  
Tel: +353-1-7168828, Fax: +353-1-7164387,  
E-mail: elaine.hutson@ucd.ie, min.ye@ucd.ie

## **Abstract**

Using daily equity price data from July 2005 to June 2010, we find that the dual-listed Chinese firms were highly exposed to the RMB exchange rate movements. Specifically, 36.73% of dual-listed A-shares and 55.41% of H-shares have significant exchange rate sensitivities. These proportions are much higher than the rates of exposure detected in previous studies of firms in developed markets. Our results are robust to several bilateral exchange rates, including RMB exchange rate against US dollar, euro and Japanese Yen. They are also robust to re-estimation over two sub-periods. Another interesting finding is that, substantial differences are found to exist between the exchange rate sensitivities of A- and H-shares, not only in magnitude, but also in sign. Specifically, dual-listed H-shares generally have higher exchange rate sensitivities than their counterpart A-shares; and 87.80% of dual-listed A- and H-shares are even different in the sign of their exposure coefficients. We argue that the Hong Kong-listed shares of the dual-listed firms better reflect the economic reality of their foreign exchange exposure. And we then further advance two explanations: “hot money” inflows to China, and optimistic investor sentiment amongst Chinese investors, to explore the reasons for the weaker efficiency of the Chinese market.

**Key words:** foreign exchange exposure, dual-listing, “hot money”, investor sentiment, managed exchange rate

**EFMA Classification:** 350, 560, 610, 620

---

\* Corresponding author.

# **Managed exchange rates, dual listing, and foreign exchange exposure: the experience of Chinese firms**

## **1. Introduction**

Emerging markets have in recent years been in the spotlight for their strong potential for economic growth, and for providing investors with higher expected returns than developed markets. The downside to emerging market investments is that their risks may not be as well-understood as those in developed markets. A critical risk is exchange rate risk. However, very little research has been conducted on firm-level exchange rate exposure in emerging markets. This may be because many emerging markets have fixed or pegged currency systems, and given the apparent exchange rate stability in such systems it is perhaps assumed that firms in many emerging markets are not exposed to exchange rate risk.

The contrary is more likely. In many emerging markets, regulation and corporate governance systems are incomplete; Hutson and Stevenson (2010), for example, found that a weak country-level corporate governance environment is associated with higher levels of foreign exchange exposure. Political and economic risks are nonnegligible; investors can quickly lose confidence in the strength or stability of a country and dispose of assets denominated in the country's currency (Sirr, Garvey and Gallagher 2011). It is reasonable to hypothesise that firms in emerging markets – irrespective of the exchange rate system in place – may incur a high degree of foreign exchange risk. Chue and Cook (2008) examine firms in several emerging markets, and find levels of significant exposure that is in most cases much higher than found in studies of exposure in developed country firms. In one of the few studies that explicitly investigate foreign exchange exposure in countries with non-flexible exchange rate regimes, Parsley and Popper (2006) look at foreign exchange exposure in East and Southeast Asian firms. They find that firms in Malaysia, the Philippines and Thailand are more likely to be significantly exposed to movements in the value of the US dollar when a dollar peg is in place, compared to periods without the peg. This is perhaps not so surprising, given that currency pegs are in general rather short-

lived (Klein and Shambaugh 2008); speculative capital inflows make it increasingly difficult for countries to maintain pegs.

As one of the largest and best-performing emerging markets in the world, China has attracted considerable attention from international investors. This has been accompanied by strong interest in issues relating to the Chinese economy. In particular, there is an increasingly hot debate about Chinese currency arrangements. Some of China's trading partners, especially the US, have argued that the renminbi (RMB) is undervalued, and that China should accelerate its exchange rate appreciation or liberalise its exchange rate arrangements.<sup>1</sup> As shown in Figure 1, which depicts the RMB exchange rate against the US dollar from 1994 to 2011, the RMB has appreciated considerably since July 21, 2005, when the People's Bank of China abandoned the long-standing dollar peg and announced a de jure managed float with reference to a basket of currencies. There appears to have been reversion to a de facto peg against the dollar after the financial crisis took a serious turn in the wake of Lehman's collapse in September 2008. China provides a particularly interesting environment in which to study firm-level exchange rate exposure in managed exchange rate regimes. Examining the exposure of Chinese firms not only offers the opportunity to shed some light on exchange exposure in emerging markets, especially in countries with similar pegged or managed exchange rate regimes, but also supplements the limited literature on the link between exchange rate regimes and firm-level foreign exchange exposure.

The "puzzle of the Chinese stock market" (Bailey, Chung and Kang 1999; Fernald and Rogers 2002) refers to the price premium phenomenon between local-listed shares and foreign-listed shares of the same dual-listed Chinese companies. If markets are efficient, then stocks of the same company – that have identical expected cash flow and risk characteristics – should trade at the same price. Studies focusing on developed market firms, however, have confirmed that the price of the stock issued in the foreign market is generally higher than the price of the stock in the home market; this is the 'overseas share premium' phenomenon (Eun and Janakiraman 1986; Hietala 1989; Hardouvelis, La Porta and Wizman 1994; Stulz and Wasserfallen 1995). Similar results can also be found in studies of emerging market firms listing

---

<sup>1</sup>In China's defence, speedy appreciation of the Chinese currency is not in line with China's economic development goals, and may jeopardise recovery of the world economy.

abroad, such as Thailand (Bailey and Jagtiani 1994) and Mexico (Domowitz, Glen and Madhavan 1997). In contrast, Chinese local-listed shares (A-shares), tend to trade at a higher price than the foreign-listed shares – the main ones being H-shares (listed in Hong Kong)<sup>2</sup>. Investigating the exchange rate sensitivities of dual-listed shares in China and Hong Kong allows us to explore potential explanations for the “puzzle of the Chinese stock market”, through the lens of foreign exchange exposure.

In this paper, we take the population of firms that are dual-listed in the Chinese mainland markets and Hong Kong, and using daily data for the period from July 21, 2005 (when China announced switching the exchange rate regime from the dollar peg to a de jure managed float), to June 18, 2010 (when China declared the resumption of exchange rate reform after de facto pegging the RMB to US dollar), we estimate their exposure to exchange rate movements. In doing this, we ask two main questions. *First*, how exposed are Chinese firms to foreign exchange rate movements? We estimate the exposure of Chinese firms to the trade-weighted exchange rate and to the dollar, the euro, and the yen. We find that dual-listed Chinese firms are highly exposed to RMB exchange rate movements; using the nominal effective exchange rate (NEER), 37 percent of A-shares and 55 percent of H-shares have significant exchange rate sensitivities. This provides evidence consistent with Parsley and Popper (2006) that firms in countries with highly managed exchange rates can be more exposed than firms in developed countries – that in general have free-float exchange rate arrangements. We find that exposure is strongest relative to the US dollar – the currency that dominates the basket of currencies in the current de facto managed float exchange rate regime. Further, we find that exposure to the dollar increases dramatically after the Lehman crisis, when the RMB reverted to a de facto dollar peg.

*Second*, is there a difference in exchange rate sensitivity between China-listed stocks and their Hong Kong-listed counterparts? We find substantial differences in the exchange rate sensitivities of A and H-shares, in sign as well as magnitude. The 37 percent of A-shares that are significantly exposed all have positive exchange rate sensitivities (that is, the value of the stock rises as the RMB rises), while the 55 percent of H-shares that are significantly exposed have negative exposure coefficients. An appreciation of RMB appears to be bad news for investors in H-shares but good

---

<sup>2</sup>More details on A and H shares can be found in section 3.2.

news for holders of A-shares. China is in general a net exporter, so an appreciating RMB should in theory have a negative effect on most firms' value. We therefore argue that the Hong Kong-listed shares of the dual-listed firms better reflect the economic reality of their foreign exchange exposure. These findings are robust to the exchange rate used – they hold for the dollar and euro bilateral rates – and when the data period is divided into the two sub-periods.

In order to explain this rather anomalous finding, we advance two potential explanations for the positive relation between the value of the RMB and the A-share returns: “hot money” inflows to China, and optimistic investor sentiment amongst Chinese investors. Using proxies for investor sentiment and “hot money” inflows, our empirical results confirm that both of these factors are important determinants of A-shares' returns, although “hot money” flows are a much stronger determining factor.

The remainder of the paper is organised as follows. In section 2, we review the relevant literature, and in section 3 we provide the background information on China's exchange rate regime, as well as discussing A and H-shares. This section provides contextual background for the empirical analysis. Section 4 describes the methodology and data set; section 5 presents our empirical results, and section 6 presents our “hot money” versus “investor sentiment” analysis. In section 7 we summarise and conclude.

## **2. Foreign exchange exposure and cross-listing: theory and evidence**

Theory suggests that because exchange rate volatility is important source of macroeconomic uncertainty, changes in exchange rates should have a significant impact on firm value (Shapiro 1975; Dumas 1978; Hodder 1982; Bartov and Bodnar 1994). The exchange rate exposure of a firm is thus defined as the sensitivity of its value, or stock price, to exchange rate changes ( Hekman 1983). This includes *direct* exposure, encompassing transaction exposure (involving known foreign currency receivables and payables) and expected future foreign currency cash flows. *Indirect* exchange exposure arises from the competitive environment in which the firm operates. A firm that manufactures and sells locally, for example, will be exposed to a strengthening domestic currency as competing imports become relatively cheap.

The many studies examining the exchange rate exposure of firms in developed countries have met with limited success in documenting significant exposure. Focusing on US multinational corporations (MNCs), Jorion (1990), Amihud (1994), Bartov and Bodnar (1994) and Shin and Soenen (1999) found little or no contemporaneous relation between changes in exchange rates and the value of the firm. These findings are not substantially improved when lagged exchange rates are included in the modelling; Amihud (1994) and Fraser and Pantzalis (2004), for example, fail to find significant lagged effects.

Dominguez and Tesar (2001) suggest that this may be explained in part by the use of trade-weighted exchange rate indexes if the weights do not correspond with individual firms' or industries' trade patterns. The use of firm-specific exchange rates – whereby an exchange rate index is calculated for each firm based on the geographic spread of operations – yields mixed results. Using this approach on a sample of 226 US MNEs, Ihrig (2001) found that the proportion significant rose to 16 percent from 10 percent when a broad exchange rate index was used. In contrast, Fraser and Pantzalis (2004) found that only 27 out of the 310 sample firms (8.7%) were significantly sensitive to firm-specific exchange rate indexes – considerably fewer than the 39 (12.6% of the sample) when a broad index is used. They suggest that these results contribute evidence in favour of the notion that firms may be subject to foreign exchange exposure, even without operating in those countries – that is, indirect exposure.

Most non-US studies have similar findings. Loudon (1993) studied 141 Australian firms and found that only 10.6 percent exhibit significant exposure to the foreign currency value of the Australian dollar. Nydahl (1999) found that 17 percent of Swedish firms are significantly exposed, and using a sample of German firms, Bartram (2004) found that 7.5 percent of the 373 non-financial firms in his sample were significantly exposed. He and Ng (1998) found a more substantial 26 percent of Japanese MNCs have significant exchange rate exposure.

The findings change little in large-scale cross-country studies of firm-level foreign exchange exposure. Bartram and Karolyi (2006) studied the exposure of 12,821 non-financial firms in 20 countries, and find few firms with significant exposure. Doidge, Griffin and Williamson (2006) examined a sample of 17,929 firms from Europe, Asia and North America, and found that only 8.2 percent of firms were significantly

exposed. Hutson and Stevenson (2010) examined 3,788 firms from 23 developed countries, and documented significant exposure for 11 percent of the sample firms.

Relatively few studies have been conducted on firms in emerging markets. Dominguez and Tesar's (2001) multi-country study of firm-level exchange rate exposure included two emerging markets – Chile and Thailand. They found that 19 percent of Chilean firms and 20 percent of Thai firms are significantly exposed. Chue and Cook (2008) study firm-level exposure in emerging markets. They find, consistent with Dominguez and Tesar (2001), that emerging market firms appear to be more highly exposed to exchange rate changes than firms in developed markets. For example, for Brazil, Indonesia, Korea, Mexico, South Africa, Taiwan, Thailand and Turkey, more than 35 percent of Chue and Cook's (2008) sample firms are significantly exposed.

Parsley and Popper (2006) examined the foreign exchange exposure of firms in East and Southeast Asia countries, five of which (Indonesia, Korea, Malaysia, the Philippines and Thailand) are emerging markets. For these countries, they find that over the period from January 1990 to March 2002 the fraction of firms significantly exposed is quite high; over 40 percent for Indonesia, Korea, Malaysia and the Philippines, and 19 percent of Thai firms were found to be significantly exposed. Parsley and Popper (2006) then go on to examine exposure to various currencies over different time periods. They show that in some countries, firms are highly exposed to the dollar – to which most of these countries' currencies were pegged – as well as the non-peg currencies. Further, comparing dollar-peg periods with periods without a peg, far more firms are significantly exposed to the dollar with a peg than without one. An important implication of Parsley and Popper's findings is that currency pegs do not necessarily protect firms against exposure to exchange rate movements. For example, 56 percent of Malaysian firms are exposed to the dollar with a peg and 27 percent are exposed without a peg; in Thailand, the proportions with and without a peg are 75 percent and 10 percent, respectively; and in the Philippines, 45 percent of firms show significant dollar exposure with a peg while none are found to be exposed without a peg.

In the only other study that we know of that looks at foreign exchange exposure under different exchange rate regimes, Dahlquist and Robertsson (2001) show that for

Swedish firms moving from a semi-fixed to a floating exchange rate was associated with an increase in exposure to the yen and the dollar, but a decrease in exposure to the Deutschemark.

Overall, research on emerging markets is sparse, although the existing evidence suggests that emerging market firms may be more exposed than those in developed markets. The very limited evidence on firm-level foreign exchange exposure under different exchange rate regimes suggests that firms can be highly exposed, even to the currency to which the country's currency is pegged.

Few studies have looked at the exchange exposure experienced by non-financial firms in China. Bernard (2008) used survey data to examine the exposure of 230 Chinese textile and apparel exporters, and found that over 95 percent of these firms have net exposure to the US dollar, with 30 percent having net exposure to the euro. Zhang, Miao and Zhou (2011) also look at the exposure of Chinese exporting firms. Using monthly data for A-shares from February 2002 to January 2010, they report that 11.7 percent of these firms have significant exposure to trade-weighted exchange rate movements, and 13.7 percent are significantly exposed to the US dollar. Both of these studies focused on exporting firms only. Aggarwal, Chen and Yur-Austin (2011) investigated the foreign exchange exposure of Chinese firms, including non-exporting firms. For most of their sample firms, the stock price declines following appreciation of the yuan, as would be expected for exporters. However, their data are drawn from only a short period from July 2005 to July 2006 – a limited data set covering the first year of the de jure managed float period.

Underlying the commonly-used capital market approach to estimating firm-level foreign exchange exposure is a critical assumption: equity prices fully and unbiasedly reflect new information about firm value; that is, the market is efficient. Many firms around the world list in one or more foreign markets as well as in their home market, and this has provided a good setting for examining issues in stock market efficiency. Stocks of a company traded in different locations have the same expected cash flow and risk characteristics; if markets are efficient, they should be priced the same. The studies focusing on well-developed capital markets, such as Europe and the US, find that the prices of stocks issued in foreign markets are generally higher than that of the stock issued in the home country (Eun and Janakiramanan 1986; Hietala 1989;

Hardouvelis, La Porta and Wizman 1994; Stulz and Wasserfallen 1995). The ‘overseas share premium’ phenomenon is also found in some emerging markets such as Thailand (Bailey Bailey and Jagtiani 1994) and Mexico (Domowitz, Glen and Madhavan 1997). Bodurtha, Kim and Lee (1995), Froot and Dabora (1999), and Kim, Szakmary and Mathur (2000) show that these differentials result from market segmentation that comes about because of ownership restrictions; differences in information asymmetry, market liquidity, elasticity of demand and risk preferences; as well as legal, cultural and language differences between countries.

In contrast to the price premium for foreign shares in developed countries and other emerging markets, the ‘foreign’ shares of Chinese firms – B-shares and H-shares – tend to trade at a lower price than the corresponding A share<sup>3</sup>. This phenomenon is referred to as the “puzzle of the Chinese stock market” by Bailey, Chung and Kang (1999) and Fernald and Rogers (2002). A number of potential explanations have been advanced to explain the A-H share price differential; most prominently, differences in market liquidity (Wang and Jiang 2004; Yang, Xu and Yang 2007), limited investment alternatives (Fernald and Rogers 2002; Lee and Poon 2005), risk attitudes between foreign and domestic investors (Zhang and Zhao 2003) coupled with concerns over higher country risk of China relative to Hong Kong (Wang 2005), and information asymmetry by foreign investors relative to domestic investors (Chan, Menkveld and Yang 2006). Some also argue that foreign exchange risk is an important factor, as H-shares are dominated in Hong Kong dollars (HKD) while companies who issue H-share have assets dominated in RMB (Fernald and Rogers 2002; Wang and Jiang 2004; Wang 2005).

A recent paper investigates pricing efficiency in A-shares and H-shares. Zhao, Ma and Liu (2005) study the link between fundamental value and market price of 29 dual-listed Chinese companies during the period 1998-2003. Using three valuation models to estimate ‘fundamental’ value, they find that the correlation between equity price and value is much larger for H-shares than for the corresponding A-shares. Their conclusion is that the H-share market is more efficient than the A-share market. Given the collective findings on pricing and efficiency in the A and H-share markets,

---

<sup>3</sup> A-shares are ‘local’ in the sense that their ownership is restricted to domestic investors. B-shares are ‘foreign’ in that they were initially available only to foreign investors; since February 2001 Chinese citizens have been permitted to trade B-shares if they have the required foreign currency. H-shares are traded in Hong Kong. More detail on these shares can be found in section 3.2.

it is possible that the twin shares in cross-listed Chinese stocks have different sensitivities to exchange rate movements.

### **3. Background Information**

#### ***3.1 China's exchange rate regime***

The RMB exchange rate against the US dollar for the period January 1994 – April 2011 is depicted in Figure 1a. On January 1st, 1994, reform of the exchange rate regime saw the introduction of a de jure managed float. An exchange rate of 8.72 RMB/USD saw the currency devalued by 33 percent, and from that time the state's foreign exchange reserves began to increase. The RMB was allowed gradually to rise against the US dollar, and by 1998 it had appreciated by 5.3 percent. From 1998 to 2005 the exchange rate remained within a narrow band of 8.27 to 8.28 USD/RMB – tightly pegged to the US dollar.

On July 21st, 2005, the People's Bank of China announced that the RMB official exchange rate would be adjusted to 8.11 USD/RMB from 8.28, appreciating by around 2.1 percent. At the same time, the central bank announced a switch from the single dollar-peg monetary policy to a managed floating exchange rate system with reference to a basket of currencies. Three weeks later, on August 10th, 2005, Zhou Xiaochuan, the governor of the People's Bank of China, revealed in a speech in Shanghai that the major currencies contained in the basket were the US dollar (USD), the Japanese yen (JPY), the Euro (EUR) and the South Korean won (KRW). Minor currencies in the basket included the Australian and Canadian dollars, the pound sterling, the Malaysian ringgit, the Russian ruble, the Singapore dollar, and the Thai baht (*The Economist*, 11 August 2005). The weights attached to each currency in the basket, however, remained secret. Several researchers have since attempted to estimate the weights. Shah, Zeileis and Patnaik (2005) and Eichengreen (2006) found that in the first few months of the de jure managed float, the Chinese currency basket was dominated by the US dollar, with a weight around 90 percent. After February 2006, Frankel and Wei (2007) found that there was a modest but steady increase in the weight of other currencies in the basket, with some weight transferred from the dollar to a few non-dollar currencies. Frankel (2009) found that by mid-2007, the Chinese authorities had switched a substantial part of weight in the dollar into the euro. Finally, Fidrmuc (2010) found that there had been an increase in the weight of

the euro and yen and a corresponding decline in the the dollar's weight in the basket, although he suggests that the Japanese yen is generally more important than the euro. This research confirms that during the first five years of the de jure managed float, the RMB was in fact tightly coupled to the dollar.

Figure 1.b depicts the trade-weighted indexes of the RMB and the purported major currencies in the Chinese currency basket – the US dollar, the euro, the yen and the won, July 21st, 2005 to June 18th, 2010. Consistent with the findings of the studies discussed above, the paths of the RMB and the USD trade-weighted indexes coincide strongly in the first few months of the period, and they begin to diverge to a modest extent from the beginning of 2006. This divergence becomes larger over time; by September 2008, the RMB had appreciated by 21 percent against the dollar, and at the same time the path of the trade-weighted RMB seems to coincide more with that of the euro, and to a lesser extent with the yen.

It is clear from Figure 1a that the appreciation against the US dollar slowed after the financial crisis took a serious turn with the turmoil in international financial markets in the wake of Lehman's collapse in 2008; the exchange rate appears to have reverted to a de facto dollar peg. Fidrmuc (2010) claims that the weight of the US dollar in the basket had increased a few months before the Lehman crisis. As can be seen in Figure 1b, the paths of the trade-weighted RMB and USD coincide again from mid-2008.

### ***3.2 Dual-listed A- and H-shares***

There are several classes of shares issued by Chinese firms, the main types being A, B, and H shares. The distinctions among these is based primarily on the locations in which the firm is listed and the investors who are permitted to trade them. Both A and B shares are listed and traded on the Shanghai Stock Exchange (SHSE) or the Shenzhen Stock Exchange (SZSE). A-shares are domestic shares whose ownership is restricted to domestic investors. B-shares were available only to foreign investors until February 2001, when the rules were relaxed to allow Chinese citizens to trade B-shares if they have the required foreign currency – US dollars for Shanghai B-shares and Hong Kong dollars for Shenzhen B-shares.

With its sound regulatory framework, strong investor demand and fund-raising capability, and advanced clearing and settlement infrastructure, Hong Kong is the premier choice for mainland Chinese companies seeking a listing on an overseas market. The offshore stocks issued by China-domiciled companies and traded on the Hong Kong Stock Exchange (HKSE) are known as H-shares. Most companies that are listed in both China and Hong Kong (49 out of 61) chose to go public in Hong Kong first.<sup>4</sup> Although there are now a few Chinese stocks traded on the New York Stock Exchange (N-shares) and the Singapore stock exchange (S-shares), most Chinese offshore stocks are listed in Hong Kong. H-shares provide Hong Kong-based and international investors with opportunities to invest in Chinese stocks without having to be concerned about the various investment barriers – including currency controls – and excessive costs of investing in the A-share market.

Except for ownership restrictions, A-shares and the corresponding H-shares are associated with exactly the same rights and obligations, and therefore in theory should have the same price. However, as can be seen Table 2, in most cases there is a substantial A-share price premium. The table details the number of firms with a premium of A-shares over H-shares (Panel A), number of firms with a premium of H-shares over A-shares, and mean and median A- or H-share premium (Panel C). Consistent with prior studies of the “puzzle of the Chinese stock market”, it is clear that more firms have A-shares trading at a premium to H-shares than the other way around. Further, A-share premiums are much higher than H-share premiums. In some years, there are firms with A-share premiums that are more than 300 percent, whereas the H-share premium is seldom over 50 percent. The average A-share premium for the full period is 117 percent, which is almost five times as high as the average H-share premium of 25 percent. The appendix provides detail on individual shares’ premiums, as well as data on trading volume. The trading volume of the A-shares is much higher than that of their counterpart H-shares in most cases, suggesting the possibility that there is more speculative activity in the China mainland markets than in the Hong Kong market.

---

<sup>4</sup> Details on the listing dates for each firm can be found in the appendix.

## 4. Measuring Foreign Exchange Exposure

### 4.1 Model specification

The capital market approach adapted by Jorion (1990) is the most commonly-used approach to estimating foreign exchange exposure.<sup>5</sup> Based on the work of Adler and Simon (1986), who estimate the exposure of an asset by regressing the contemporaneous exchange rate change on return, Jorion (1990) suggests an augmented market model that includes a stock market return term to control for macroeconomic effects. This approach therefore measures firm-specific exchange rate sensitivity or “residual exposure”. The regression equation is:

$$R_{n,t} = \alpha_n + \beta_n^m R_{m,t} + \beta_n^X X_t + \varepsilon_{n,t} \quad (1)$$

Where  $R_{n,t}$  denotes the return of firm  $n$  in period  $t$ ;  $R_{m,t}$  is the rate of return of the market portfolio in period  $t$ , and  $X_t$  denotes the exchange rate change.  $\beta_n^m$  measures the  $n$ th firm’s sensitivity to the market, and  $\beta_n^X$  is firm  $n$ ’s exposure to the exchange rate movements, independent of the effect that exchange movements have on the overall market.

Following Jorion (1990) and others, we apply the augmented capital market model to estimate foreign exchange exposure. As shown in section 3.2, there is a substantial difference in the price behaviour of A and H-shares. We therefore measure the exchange rate sensitivity of the stock returns of A- and H-shares separately, as follows:

$$R_{n,t}^{A/H} = \alpha_n + \beta_n^m R_{m,t} + \beta_n^X X_t + \varepsilon_{n,t} \quad (2)$$

where  $R_{n,t}^{A/H}$  denotes the rate of return of the A ( $R_{n,t}^A$ ) or H-shares ( $R_{n,t}^H$ ) of firm  $n$  in period  $t$ . As shown by Alexander, Eun and Janakiramanan (1987), the expected return of a dual-listed firm depends not only on the return on the domestic market portfolio but also on the return on the foreign market. We include both the Chinese and the Hong Kong stock market return in our model. To avoid the multicollinearity problem arising from incorporating the highly correlated returns of Chinese stock market and

---

<sup>5</sup> Another way used to estimate the foreign exchange exposure is cash flow approach. However, compared to the capital market approach, which can capture the overall effect of exchange rate risk on the value of the firm, the cash flow approach has the disadvantage of being considered “incomplete” as it does not include expectations about the future and therefore does not measure the total impact of currency movements on firm value. Martin and Mauer (2003) provide a detailed discussion on the strength and weaknesses of capital market versus cash flow-based methods.

Hong Kong market in our estimation model, a weighted stock market return,  $R_{m,t}$ , is constructed<sup>6</sup>.

An implicit assumption of the above linear regression model (Eq. (2)) is that the disturbances ( $\varepsilon_{n,t}$ ) are homoscedastic. However, several studies (Baillie and Bollerslev 1989; Hsieh 1989; Bollerslev, Chou and Kroner 1992; Tse 1998, among others) have documented the existence of conditional heteroskedasticity in asset returns, which lead to inefficient parameter estimates as well as biased test statistics in the ordinary least squares regression<sup>7</sup>. We use the Lagrange Multiplier test proposed by Engle (1982) to check whether the residuals,  $\varepsilon_{n,t}$ , exhibit time-varying heteroskedasticity. If we do not reject the null hypothesis that the error terms of Eq. (2),  $\varepsilon_{n,t}$ , present no heteroskedasticity, we perform an Ordinary Least Squares (OLS) regression. Otherwise we add a GARCH(p, q) process to the initial augmented market model to incorporate conditional variance into the system. We find that in around 90 percent of cases, the error terms in Eq. (2),  $\varepsilon_{n,t}$ , show heteroskedasticity. We thus add a GARCH(p, q) process to the initial augmented market model to incorporate conditional variance into the system. The regression model therefore becomes:

$$R_{n,t}^{A/H} = \alpha_n + \beta_n^m R_{m,t} + \beta_n^X X_t + \varepsilon_{n,t}$$

With  $\varepsilon_{n,t} = \mu_{n,t} \sqrt{\sigma_{n,t}^2}$

$$\text{and } \sigma_{n,t}^2 = \gamma + \sum_{i=1}^p \tau_i \sigma_{n,t-i}^2 + \sum_{j=1}^q \varphi_j \varepsilon_{n,t-j}^2 \quad (3)$$

where  $\sigma_{n,t}^2$  denotes the conditional variance of the residuals  $\varepsilon_{n,t}$ ;  $\gamma$ ,  $\tau_i$  and  $\varphi_j$  are unknown parameters<sup>8</sup>; and  $\mu_{n,t}$  represents the white noise error term.

Akaike (1973) Information Criterion (AIC) and Schwarz (1978) Information Criterion (SIC or BIC) are used to determine the optimal GARCH (p,q) model for each firm. We find both of these criteria select GARCH (1,1) as the optimal model for almost all of the firms. This is consistent with many empirical studies (such as Bollerslev, Chou

<sup>6</sup> The construction of the weighted stock market return is detailed in section 4.2.

<sup>7</sup> See Gujarati (2003).

<sup>8</sup> The unknown parameters are estimated by maximum-likelihood and generated using the Bemdt et al. (1974) algorithm.

and Kroner 1992; Muller and Verschoor 2006), which show that the GARCH (1,1) specification is optimal for modelling the variance generating process of financial time series. The Ljung and Box (1978) test and Engle's ARCH test confirm the explanatory power of the selected models; the results suggest that the residuals,  $\varepsilon_{n,t}$ , from applying a GARCH (1,1) model exhibit no significant autocorrelation and heteroskedasticity for almost all of the regressions.

#### ***4.2 Sample selection and data description***

Our data cover the period from July 21st 2005 to June 18th, 2010. During this period, the RMB was a de jure managed float against a basket of currencies, but as discussed in section 3.1, the RMB was strongly linked to the US dollar. Summary statistics for RMB exchange rates – the NEER and the bilateral rates of China's main trading partners the US, the Eurozone and Japan – are contained in Table 1. The volatility that is apparent in the RMB/YEN, RMB/EUR and the NEER relative to the RMB/USD in Figure 2 is confirmed by the relative standard deviations of the three bilateral rates and the NEER. The RMB/EUR and RMB/YEN exchange rates were respectively 9½ and 9 times more volatile than the USD/RMB, and the RMB was four times more volatile than the USD/RMB on a trade-weighted basis.

Our sample comprises Chinese firms that are dual-listed in the Chinese mainland and Hong Kong stock markets, for the period from July 21, 2005 (when China announced switching the exchange rate regime from the dollar peg to a de jure managed float), to June 18, 2010 (when China declared the resumption of exchange rate reform after de facto pegging the RMB to US dollar). There were 61 dual-listed firms as at 18th June, 2010. Ten of these are financial firms, which we exclude.

A difficulty in dealing with Chinese stock data is that long periods of suspension from stock markets are common. Thirty-five of the firms saw their A- or H-shares suspended during the sample period. Two firms (Luoyang Glass and Hisense Kelon) had their H-shares suspended for more than half of the observation period (56 and 73 percent respectively); we consequently delete these from our sample, resulting in a final sample of 49 firms.<sup>9</sup> For some firms, the estimation period starts later than our

---

<sup>9</sup> In the appendix, we provide details of all suspensions lasting longer than a week (5 trading days). Among the 33 firms that experienced suspensions, 26 firms had less than 5% missing data; the other 7 firms' missing data rates are within 5% and 9%.

sample start date of July 21, 2005. The start date for these firms is the listing date for the A- or H-share, whichever is later.<sup>10</sup>

Given the relatively short sample period, we use daily data to estimate the foreign exchange exposure of each of our sample firms. As suggested by Chamberlain, Howe and Popper (1997) and Di Iorio and Faff (2000), moving from monthly data (the data interval that is most commonly used in the exchange exposure literature) to daily data makes it easier to pick up firm-level exchange exposure. The daily equity price data for our sample were obtained from Bloomberg. We removed outliers, defined as daily return observations that deviate from the mean by more than three standard deviations. These may arise from special events such as sharp rises in price on the first trading day after IPO.

To represent the Chinese mainland market, we use the Hu Shen 300 Index (HS 300 Index), which is a weighted index compiled by China Securities Index Co., Ltd., and the Hang Seng Index is used to proxy the Hong Kong market portfolio. Both the market index and market capitalisation data were sourced from Datastream.

We first use a trade-weighted RMB exchange rate index (NEER) to estimate foreign exchange exposure. We then conduct a second stage of analysis using bilateral exchange rates, for two main reasons. *First*, we wish to compare Chinese firms' exposure to the US dollar – to which the RMB has been strongly linked – to the currencies of other major trading partners. *Second*, we use bilateral rates to test the robustness of our findings. Miller and Reuer (1998) emphasised that because of the existence of low and negative correlations among exchange rates over time, the use of a trade-weighted index may lead to an underestimation of foreign exchange exposure. Williamson (2001) also suggested that the use of trade-weighted exchange rates may lack power if a firm is exposed to only a few currencies in the basket. The bilateral exchange rates are the RMB against the US dollar, the euro and the Japanese yen;<sup>11</sup> they are expressed as the price of one Chinese yuan in units of dollar, euro or yen, so that a positive value for  $X_t$  indicates an appreciation of the RMB.

---

<sup>10</sup> The listing dates are detailed in the appendix.

<sup>11</sup> Europe, the US and Japan are China's top 3 major partners in international trade as measured by total export-import volume. They are also among the top 5 countries/regions for Chinese FDI. Further, as we discussed in section 3.1, the literature investigating the composition of the Chinese currency basket suggests that the US dollar, euro and the yen have the greatest weights in the de jure managed float basket.

Following Parsley and Popper (2006) and Doidge, Griffin and Williamson (2006), in this estimation  $\beta_n^X X_t = \beta_n^U X_U + \beta_n^E X_E + \beta_n^Y X_Y$ , where  $X_U$ ,  $X_E$ , and  $X_Y$  denote the change in the RMB/USD, RMB/EUR and RMB/YEN exchange rates, and correspondingly,  $\beta_n^U$ ,  $\beta_n^E$ , and  $\beta_n^Y$  measure firm  $n$ 's exchange rate sensitivity to the US dollar, the euro and the yen. As reported in Table 1, the correlations between these three exchange rates are low; the highest is -0.33. We confirm no significant collinearities using the diagnostics of Belsley, Kuh and Welsch (1980). All of our exchange rate data come from Datastream.

## 5. Finding on Foreign Exchange Exposure

### 5.1 Overall exchange rate exposure

Table 3 reports the exchange rate sensitivities of the sample A- and H-shares to overall RMB exchange rate (NEER) movements. Our main findings are summarised as follows. *First*, we find strong evidence of significant exposure of both the A- and H-shares to exchange rate movements. Specifically, 36.7 percent (18/49) of A-shares and 55.1 percent (27/49) of H-shares have significant  $\beta_n^X$ . Consistent with the findings of previous research on emerging market firms (Parsley and Popper 2006; Chue and Cook 2008), the proportions of firms significantly exposed to exchange rate movements are much higher than the rates of exposure detected in studies of firms in developed markets, most of which have free-float exchange rate regimes. It is clear that Chinese firms are not protected from changes in exchange rates by a heavily controlled (and for part of the sample period, de facto pegged) exchange rate regime.

*Second*, there are substantial differences between the foreign exchange exposure detected in the A- and H-shares – in sign as well as magnitude. Of the 18 A-shares that are significantly sensitive to exchange rate movements, all have positively signed coefficients. In contrast, all 27 H-shares with significant exchange rate sensitivity have negative exposure coefficients. An appreciation of the RMB appears to be good news for the A-share and bad news for the H-share. As China is a net exporter, an appreciation of the home currency makes exported goods more expensive. This may be perceived to lead to a fall in foreign demand and the associated reduction in foreign sales revenue and firm value. In addition, for firms that manufacture and sell locally, value may be impaired by a strengthening domestic currency as competing imports

become relatively cheap. Exchange rate sensitivity,  $\beta_n^X$ , for Chinese firms in general should theoretically be negative, as we have found for the H-shares. This result has parallels the findings of Zhao, Ma and Liu (2005) – that the H-shares more closely reflect firm value than the equivalent A-shares.

*Third*, the magnitude of the exchange rate sensitivities (measured by the absolute value of the exposure coefficient,  $|\beta_n^X|$ ), differs substantially between A and H-shares. The mean of  $|\beta_n^X|$  for the A-shares is 0.30 – less than half the mean of the absolute value of the exposure coefficient for the H-shares of 0.61. In general, therefore, H-shares are more sensitive to exchange rate movements than A-shares.

## **5.2 Robustness tests**

### **5.2.1 Exposure to bilateral exchange rates**

Our findings on the sample firms' exposure to the US dollar, the euro and the yen are summarised in Table 4, Panels A, B and C respectively. More than one-third of the A-shares (34.7 percent) and 28.6 percent of the H-shares are significantly exposed to RMB exchange rate movements against the US dollar. Against the euro, the sample firms are even more likely to be significantly exposed; 55.1 percent of A-shares and 81.6 percent of H-shares have significant exposures. Finally, 28.6 percent of A-shares and 75.5% of H-shares are significantly sensitive to RMB exchange rate changes against the yen. These summary figures show that Chinese firms have substantial exposures against the currencies of China's major trading partners, particularly to the euro and the yen – to which the RMB is much more loosely bound than to the dollar. These findings show that many Chinese firms are highly exposed to currencies against which (given the very low weights of the euro and the yen in the currency basket) the RMB is essentially floating. However, even though fewer firms are significantly exposed to the dollar, the difference in average magnitude between the exposure coefficients for the euro and the yen on the one hand, and the dollar on the other, are quite stark. Exposure to the dollar is on average 6 times higher than exposure to the euro and 9 times higher than yen exposure. This finding is particularly interesting given that, as discussed in section 3.1, the dollar is by far the dominant currency in the basket.

Among the A-shares that have significant exchange rate sensitivities, in almost all cases their returns have positive sensitivities to the US dollar and the euro; in contrast,

almost all of the exposure coefficients for the H-shares are negative. As China is a net exporter to the US and Europe, Chinese firms would in general be expected to have a negative exchange rate sensitivities, as seen for the H-shares. However, the opposite seems to be the case for the yen; as reported in Panel C of Table 4, among the A-shares that have significant exchange rate sensitivities, all of the exposure coefficients are negative, while for those for the H-shares are almost all positive. As China is a net importer from Japan, it might be expected that Chinese firms would have positive exposure coefficients to movements in the yen – as found for the H-shares. These findings on the yen exposure coefficients are consistent with our contention that the H-shares more appropriately reflect economic reality than the A-shares.

### **5.2.2 Sub-period analysis**

We divide our data into two sub-periods: July 21, 2005 to September 15, 2008 and September 16, 2008 to June 19, 2010. The break point of September 15, 2008 is selected for two reasons. *First*, it is approximately the time of the dramatic worsening of the financial crisis, triggered by Lehman Brothers' declaration of bankruptcy. *Second*, at about this time the Chinese authorities reverted to a de facto dollar peg after a long period of allowing the RMB to appreciate against the dollar (see Figure 1a). We re-estimate our equations for each of these two sub-periods. The data set for the pre-crisis analysis comprises a restricted set of only 45 firms which have sufficient data observations. Our sub-period findings appear in Table 5; Panels A, B, C and D present summary results respectively for exposure to the NEER, the US dollar, the euro and the yen.

Consistent with our findings for the full period, most of the A-shares that are significantly sensitive to the NEER, the dollar and the euro have positive response coefficients, while most of the H-shares have negative coefficients. Also consistent with our full-period findings, in both sub-periods the H-shares generally have larger exchange rate sensitivity to the NEER, the euro and the yen than the A-shares. There are substantial differences, however, in exposures pre- and post-crisis. Many more firms are significantly exposed in the post-crisis than the pre-crisis period. NEER exposures, for example, show that the the proportion of H-shares significantly negatively exposed increases from 15.6 percent in the pre-crisis to 51 percent in the post-crisis period. The proportion of positively sensitive A-shares is 8.9 percent pre-

crisis and 34.7 percent post-crisis. The magnitudes of exposure also increase; the mean and median exposure to the NEER approximately double after the crisis.

Exposure to the dollar rose dramatically after the reversion to a de facto dollar fix in 2008; the number of both A- and H-shares that are significantly exposed to RMB exchange rate movement against US dollar increased and so do their exchange rate sensitivities. Specifically, as reported in Panel B of Table 5, the proportion of H-shares significantly negatively exposed to the US dollar goes from 8.9 percent in the pre-crisis period to 38.8 percent post-crisis. The number of positively sensitive A-shares is 15.6 percent pre-crisis and 30.6 percent post-crisis. The mean (and median) exposure of the H-shares increases eightfold, and that of A-shares increased by about 60 percent. Exposure to the euro increases but not as dramatically; the mean exposure for H-shares, for example, increases (in an absolute sense) from -0.28 to -0.48.

## **6. Why is the reaction in dual-listed firms so different in China versus Hong Kong?**

It is clear from the above analysis that, as the theoretical direction of exposure is negative, H-share stock prices better reflect the economic reality of exchange exposure than A-share prices. This is consistent with the literature on efficiency in Chinese dual-listed stocks (Ma 1996; Zhao, Ma and Liu, 2005; Wang, 2005). But why does the A-share stock price tend to react to exchange rate movements in such a different way – in the opposite direction to the H-share price? We propose two possible (non-mutually exclusive) explanations for this finding. *First*, “hot money” inflows to China; and *second*, optimistic sentiment amongst Chinese investors.

### **6.1 Hot money**

“Hot money” refers to the flow of speculative funds from one country to another, with the objective of making a short-term profit from interest rate differences or anticipated exchange rate shifts (Chari and Kehoe 2003). Following the exchange rate reform beginning July 2005, speculators would have seen Chinese monetary authorities allowing the RMB gradually to rise as a ‘sure bet’ profit opportunity (Cheng and Batson 2008; Pettis and Wright 2008; Dyer 2008). As the stock market is one of the

few possible destinations for ‘hot money’,<sup>12</sup> such speculative capital inflows may lead to an overheated stock market and drive up stock prices (Tian and Ma 2010; Zhang and Fung 2006). In order to further investigate this issue, we examine the relation between hot money flows and the value of stocks listed in China.

Given that China’s system of capital controls makes “hot money” activity essentially illegal, there are no official figures on these flows. They are not directly monitored, and they are also difficult to estimate given that speculative capital can move very quickly in and out of markets (Martin and Morrison 2008). The quantity of “hot money” flows can be estimated from data on foreign exchange reserves. As the trade surplus and foreign direct investment (FDI) are the main official sources of foreign exchange reserves (Pettis and Wright 2008; Emerging Markets Monitor 2009), one commonly-used approach to estimating the flow of “hot money” is to subtract a nation’s trade surplus (or deficit) and its net flow of FDI from the change in foreign reserves. Using this approach, Prasad and Wei (2005) and Martin and Morrison (2008) reported that since 2003 there have been large quantities of capital inflows into China that cannot be explained by the trade surplus or FDI.

Using the same approach, we calculate the unexplained increase in China’s foreign reserves since June 2005. Data on foreign reserves are collected from the People’s Bank of China. Trade surplus and FDI data are compiled by the General Administration of Customs of the People’s Republic of China, and the National Bureau of Statistics of China respectively; both are sourced from Datastream. Figure 3 depicts the derived “hot money” inflows together with the HS 300 index for the period. Except for the period around the end of 2007 when Chinese stock market peaked<sup>13</sup> the Chinese stock market has tended to move in sync with “hot money” flows. This is consistent with a possible “hot money” explanation for our finding of positive exchange rate sensitivity for the A-shares of dual-listed Chinese companies. The positive relation between the Chinese firms’ A-share returns and the value of the

---

<sup>12</sup> Zheng Tuo, a fund manager at the Fortis Haitong Investment Management Company in Shanghai, says that ‘hot money’ can be invested in one of only two markets: the real-estate market and equity market (Aredy 2006).

<sup>13</sup> Starting from June 2005, the Chinese stock market entered a strong boom period, with the HS 300 Index increasing by 565% (or 6.65 times) – from 855.95 to the historical high of 5688.54 in November 2007. This period is known as the bubble phase of Chinese stock market (Jiang et al. 2010). The following year, the bubble burst, with HS 300 Index tumbling to a low of 1663.66 in November 2008 – a drop of 71% from its peak.

RMB may simply be an artefact of this phenomenon; an increase in the value of the RMB may have triggered greater flows of “hot money” into China as speculators had their priors confirmed that the monetary authorities were still allowing the RMB to rise. It must be noted that the “hot money” phenomenon would not occur in Hong Kong because the Hong Kong dollar is fixed to the US dollar in a long-standing currency board arrangement.

## ***6.2 Investor sentiment***

Another potential explanation for why most dual-listed A-shares are positively exposed to exchange rate movements is “investor sentiment” – a notion introduced by Lee, Shleifer and Thaler (1991). Ma (1996) found that an important explanation for elevated A-share prices is the highly speculative behaviour of Chinese domestic investors. The mean turnover of dual-listed A-shares is, on the whole, higher than that of their counterpart H-shares (turnover data for each firm appear in the appendix). That is, stocks on the Chinese mainland markets are much more actively traded than in Hong Kong. Taking Datang International Power as an example, its mean daily turnover in Hong Kong is 1.25 percent of shares on issue compared to a mean of 2.31 percent in the China mainland market. It is thus reasonable to infer that there is considerably more speculative activity in Chinese stocks in the Chinese markets vis-à-vis the Hong Kong Stock Exchange.

Bailey (1994) suggested that Chinese domestic investors tend to be unduly optimistic, which may drive the overpricing of A-shares. Similarly, Yao, Luo and Morgan (2010) argue that because of limited information disclosure by Chinese listed companies and the lack of professional investment knowledge, Chinese investors buy shares randomly regardless of the performance of the company.

As a proxy for Chinese investor sentiment, we use the consumer confidence index – a commonly used measure of investor sentiment (Charoenrook 2003; Fisher and Statman 2003; Lemmon and Portniaguina 2006). The Chinese consumer confidence index is compiled by the National Bureau of Statistics of China, and the Hong Kong consumer confidence index by the Chinese University of Hong Kong; both are sourced from Datastream. Figure 4 plots these consumer confidence indexes, together with the Hong Kong and China stock market indexes, from June 2005 to June 2010. It is clear from the graph that the consumer confidence index in China is

generally higher than its Hong Kong counterpart. It is also apparent from the figure that the Hong Kong confidence index tends to move with the Hong Kong stock market, whereas China's consumer index is relatively involatile, and remains at a high level regardless of the performance of Chinese stock market.

### 6.3 Empirical test and results

To examine the relation between dual-listed A-share returns and “hot money” inflows and investor sentiment, we estimate the following model:

$$R_{m,t} = a + bHM_t + c_1CCI_t + c_2CCI_{t-1} + r_{m,t}$$

$$\text{and } R_{n,t}^A = \alpha_n + \beta_n^m r_{m,t} + \beta_n^X X_t + \gamma_n HM_t + \omega_{n1} CCI_t + \omega_{n2} CCI_{t-1} + \varepsilon_{n,t} \quad (4)$$

where  $HM_t$  is a dummy variable equal to one when the inflow of hot money to China increases at time  $t$  and zero otherwise, and  $CCI_t$  is the consumer confidence dummy, equal to one when the consumer confidence index increases at time  $t$ , and zero otherwise. Based on the fact we showed above that the paths of Chinese stock market is in general consistent with “hot money” moves, it is reasonable to infer that “hot money” inflows have an effect on stock market returns<sup>14</sup>. To avoid any bias due to factor correlations, we orthogonalize the market index against “hot money” and consumer confidence;  $r_{m,t}$  is the residual market factor that is orthogonal to the “hot money” inflows ( $HM_t$ ). The literature on investor sentiment suggests that the effect of investor sentiment on stock market returns may be lagged (Brown and Cliff 2005; Verma and Soydemir 2006; Schmeling 2009). That is why we include the consumer confidence index ( $CCI_t$ ) and its lag ( $CCI_{t-1}$ )<sup>15</sup>. Monthly data are used, and the data set comprises of 41 firms after excluding those with insufficient data observations.

The results are reported in Table 6. Our findings suggest that “hot money” inflows have significant effects at both aggregate stock market and individual stock levels. As can be seen in Panel A, the coefficient of “hot money” inflows ( $b$ ) is significant, and in Panel B, 88 percent of A-shares' returns have significant sensitivity to “hot money” inflows. In contrast, the coefficient of consumer confidence index and its lag ( $c_1$  and

<sup>14</sup> The correlation between  $R_{m,t}$  and  $HM_t$  is 0.23, significant at 10 percent level (t-stat = 1.86).

<sup>15</sup> Our lag selection rule fixes the maximum lag length at 1 by minimizing SIC (Schwarz information criterion). The one-month lag is also used in sentiment papers such as Jansen and Nahujs (2003), Fisher and Statman (2000, 2003), Baker and Wurgler (2006), among others.

$c_2$ ) are insignificant, suggesting that investor sentiment seems to have no significant effect on market return<sup>16</sup>. However, 32 percent of A-shares' returns are significantly sensitive to change of contemporaneous consumer confidence index, and 29 percent have significant sensitivity to its one-month-lagged change. Investor sentiment therefore has an effect, but the “hot money” effect is a stronger influence on Chinese stock returns.

The positive sensitivity of the Chinese stock market and the individual stocks to “hot money” inflows is consistent with our contention that the positive relation between the Chinese A-shares' returns and the value of the RMB may simply be an artefact of the “hot money” phenomenon. An increase in the value of the RMB may have triggered greater flows of “hot money” into China as speculators had their priors confirmed that the monetary authorities were still allowing the RMB to rise.

The change in the sensitivity to the consumer confidence index from contemporaneous positive to lagged negative is consistent with prior studies on stock market returns and investor sentiment. Investor sentiment tends to be positively correlated with contemporaneous stock returns (Lee, Jiang and Indro 2002; Jansen and Nahuis 2003; Brown and Cliff 2004; Fisher and Statman 2003; Li and Zhang 2008), and negatively related to subsequent stock returns (Fisher and Statman, 2000, 2003; Brown and Cliff 2005; Baker and Wurgler 2006; Schmeling 2009). Brown and Cliff (2005) suggest that this is the result of overly optimistic driving prices above fundamental values; periods of high sentiment should be followed by negative returns, as market prices revert to fundamental values. Our negative lagged negative coefficients are consistent with a reversal of sentiment, correcting prior valuation errors.

## 6. Summary and conclusions

In this paper we have investigated the foreign exchange exposure of dual-listed Chinese firms in order to address two questions. First, what is the extent of foreign

---

<sup>16</sup> It is reasonable to assume that the inflow of “hot money” to stock market may simultaneously effect the returns at both market level and stock level. We also test with the model :

$$R_{m,t} = a + bHM_t + b_1HM_{t-1} + c_1CCI_t + c_2CCI_{t-1} + r_{m,t}$$

and  $R_{n,t}^A = \alpha_n + \beta_n^m r_{m,t} + \beta_n^X X_t + \gamma_n HM_t + \gamma_{n1} HM_{t-1} + \omega_{n1} CCI_t + \omega_{n2} CCI_{t-1} + \varepsilon_{n,t}$   
The coefficient of lagged “hot money” is statistically insignificant; and the results for  $b$ ,  $\gamma_n$ ,  $\omega_{n1}$  and  $\omega_{n2}$  are not qualitatively different.

exchange exposure faced by Chinese firms? Our study yields strong evidence that the dual-listed Chinese firms were highly exposed to the overall RMB exchange rate movements during the period from July 2005 to June 2010. Our results are robust to several bilateral exchange rates, including RMB exchange rate against US dollar, euro and yen. They are also robust to re-estimation over two sub-periods.

Second, given the characteristics of Chinese dual-listed shares, do they respond the same to RMB exchange rate movements? Our results show that differences exist between the exchange rate sensitivities of A- and H-shares – not only in magnitude, but also in sign. This is a particularly interesting finding that offers a novel perspective on the “puzzle of Chinese stock market”. We argue that the Hong Kong-listed shares of the dual-listed firms better reflect the economic reality of their foreign exchange exposure. That is, the Chinese mainland stock market is not as efficient as the Hong Kong stock market. To further explore the reasons for the weaker efficiency of the Chinese market – or the anomalous positive relation between the firms’ China-listed stock prices and the value of the RMB – we advance two explanations: “hot money” inflows to China, and optimistic investor sentiment amongst Chinese investors. We find that both “hot money” inflows and investor sentiment contribute to an explanation, although “hot money” inflows appear to be the more important factor.

Our research fills in the gap existing in the literature in relation to the foreign exchange exposure of emerging market firms. Our findings have implications for firms in other emerging nations: they should be aware of the exposure they may similarly incur. In an economically globalised world, non-freely floating exchange rate regimes appear to do little to alleviate foreign exchange exposure.

## References

- Adler, M., and D. Simon, 1986, Exchange risk surprises in international portfolios, *The Journal of Portfolio Management* 12, 44-53.
- Aggarwal, Raj, Xiaoying Chen, and Jasmine Yur-Austin, 2011, Currency risk exposure of chinese corporations, *Working Paper Series*.
- Akaike, H., 1973, Information theory and an extension of the maximum likelihood principle, Second International Symposium on Information Theory (Springer Verlag).
- Alexander, G.J., C.S. Eun, and S. Janakiramanan, 1987, Asset pricing and dual listing on foreign capital markets: A note, *The Journal of Finance* 42, 151-158.
- Amihud, Yakov, 1994, Exchange rates and the valuation of equity shares, In: Amihud, Y., Levich, R.M. (Eds.), *Exchange rates and corporate performance*. Irwin, New York 49-59.
- Areddy, J.T., 2006, Chinese turn to stocks: Key index tops 2000-point mark for the first time in five years, *Wall Street Journal (Eastern ed.)*, 21 Nov, p. C12.
- Bailey, Warren, 1994, Risk and return on china's new stock markets: Some preliminary evidence, *Pacific-Basin Finance Journal* 2, 243-260.
- Bailey, Warren, Y. Peter Chung, and Jun-koo Kang, 1999, Foreign ownership restrictions and equity price premiums: What drives the demand for cross-border investments?, *Journal of Financial and Quantitative Analysis* 34, 489-511.
- Bailey, Warren, and Julapa Jagtiani, 1994, Foreign ownership restrictions and stock prices in the thai capital market, *Journal of Financial Economics* 36, 57-87.
- Baillie, Richard T., and Tim Bollerslev, 1989, The message in daily exchange rates: A conditional-variance tale, *Journal of Business & Economic Statistics* 7, 297-305.
- Baker, Malcolm, and Jeffrey Wurgler, 2006, Investor sentiment and the cross-section of stock returns, *The Journal of Finance* 61, 1645-1680.
- Bartov, Eli, and Gordon Bodnar, M. , 1994, Firm valuation, earnings expectations, and the exchange-rate exposure effect, *The Journal of Finance* 49, 1755-1785.
- Bartram, Söhnke M. , 2004, Linear and nonlinear foreign exchange rate exposures of german nonfinancial corporations, *Journal of International Money and Finance* 23, 673-699.
- Bartram, Söhnke M., and G. Andrew Karolyi, 2006, The impact of the introduction of the euro on foreign exchange rate risk exposures, *Journal of Empirical Finance* 13, 519-549.
- Belsley, David A., Edwin Kuh, and Roy E. Welsch, 1980. *Regression diagnostics : Identifying influential data and sources of collinearity / david a. Belsley, edwin kuh, roy e. Welsch* (Wiley, New York :).
- Bemdt, E.K., B.H. Hall, R.E. Hall, and J.A. Hausman, 1974, Estimation and inference in nonlinear structural models, *Annals of Economic and Social Measurement* 3, 653-665.
- Bernard, Andrew B., 2008, Chinese exporters, exchange rate exposure, and the value of the renminbi, *Working Paper Series* 2008-52.
- Bodurtha, JN, D-S Kim, and CMC Lee, 1995, Closed-end country funds and u.S. Market sentiment, *Review of Financial Studies* 8, 879-918.
- Bollerslev, T., R.Y. Chou, and K.F. Kroner, 1992, Arch modeling in finance, *Journal of Econometrics* 52, 5-59.

- Brown, Gregory W., and Michael T. Cliff, 2005, Investor sentiment and asset valuation, *The Journal of Business* 78, 405-440.
- Chamberlain, Sandra, John S. Howe, and Helen Popper, 1997, The exchange rate exposure of u.S. And japanese banking institutions, *Journal of Banking & Finance* 21, 871-892.
- Chan, K., A. J. Menkveld, and Z. Yang, 2006, Are domestic investors better informed than foreign investors? Evidence from the perfectly segmented market in china, *Working Paper*.
- Chari, V. V., and Patrick J Kehoe, 2003, Hot money, *Journal of Political Economy* 111, 1262-1292.
- Charoenrook, Anchada 2003, Does sentiment matter?, *Working Paper*.
- Cheng, J., and A. Batson, 2008, Yuan appreciation takes on new meaning in hong kong, *Wall Street Journal (Eastern ed.)*, 6 Aug, p. C1.
- Chue, Timothy K., and David Cook, 2008, Emerging market exchange rate exposure, *Journal of Banking & Finance* 32, 1349-1362.
- Dahlquist, Magnus, and Göran Robertsson, 2001, Exchange rate exposure, risk premia, and firm characteristics, *Working Paper*.
- Di Iorio, Amalia, and Robert Faff, 2000, An analysis of asymmetry in foreign currency exposure of the australian equities market, *Journal of Multinational Financial Management* 10, 133-159.
- Doidge, Craig, John Griffin, and Rohan Williamson, 2006, Measuring the economic importance of exchange rate exposure, *Journal of Empirical Finance* 13, 550-576.
- Dominguez, Kathryn M. E., and Linda L. Tesar, 2001, A reexamination of exchange-rate exposure, *The American Economic Review* 91, 396-399.
- Domowitz, Ian, Jack Glen, and Ananth Madhavan, 1997, Market segmentation and stock prices: Evidence from an emerging market, *The Journal of Finance* 52, 1059-1085.
- Dumas, B., 1978, The theory of the trading firm revisited, *The Journal of Finance* 33, 1019-1030.
- Dyer, Geoff, 2008, China risks a scorching as hot money flows in at record level, *Financial Times*, 4 July, p. 4.
- Eichengreen, Barry, 2006, China's exchange rate regime: The long and short of it, Columbia University's conference on Chinese money and finance, New York, February 2-3.
- Emerging Markets Monitor, 2009, China: Risk of capital flight replaces hot money concerns, *Emerging Markets Monitor*, 19 Jan, p. 7.
- Engle, R.F., 1982, Autoregressive conditional heteroscedasticity with estimates of the variance of united kingdom inflation, *Econometrica: Journal of the Econometric Society* 50, 987-1007.
- Eun, Cheol S., and S. Janakiramanan, 1986, A model of international asset pricing with a constraint on the foreign equity ownership, *The Journal of Finance* 41, 897-914.
- Fernald, John, and John H. Rogers, 2002, Puzzles in the chinese stock market, *Review of Economics and Statistics* 84, 416-432.
- Fidrmuc, Jarko, 2010, Time-varying exchange rate basket in china from 2005 to 2009, *CESifo Working Paper Series No. 3147*
- Fisher, Kenneth L., and Meir Statman, 2003, Consumer confidence and stock returns, *Journal of Portfolio Management* 30, 115-127.

- Frankel, Jeffrey A., 2009, New estimation of china's exchange rate regime, *Pacific Economic Review* 14, 346-360.
- Frankel, Jeffrey A., and Shang-Jin Wei, 2007, Assessing china's exchange rate regime, *Economic Policy* 22, 575-627.
- Fraser, Steve P., and Christos Pantzalis, 2004, Foreign exchange rate exposure of us multinational corporations: A firm-specific approach, *Journal of Multinational Financial Management* 14, 261-281.
- Froot, Kenneth A., and Emil M. Dabora, 1999, How are stock prices affected by the location of trade?, *Journal of Financial Economics* 53, 189-216.
- Gujarati, Damodar, 2003. *Basic econometrics* (McGraw-Hill).
- Hardouvelis, Gikas, Rafael La Porta, and Thierry A. Wizman, 1994, What moves the discount on country equity funds? , *NBER Working Paper No. 4571*.
- He, Jia, and Lilian K. Ng, 1998, The foreign exchange exposure of japanese multinational corporations, *The Journal of Finance* 53, 733-753.
- Hekman, Christine R., 1983, Measuring foreign exchange exposure: A practical theory and its application, *Financial Analysts Journal* 39, 59-65.
- Hietala, Pekka T., 1989, Asset pricing in partially segmented markets: Evidence from the finnish market, *The Journal of Finance* 44, 697-718.
- Hodder, James E., 1982, Exposure to exchange-rate movements, *Journal of International Economics* 13, 375-386.
- Hsieh, David A., 1989, Modeling heteroscedasticity in daily foreign-exchange rates, *Journal of Business & Economic Statistics* 7, 307-317.
- Hutson, Elaine, and Simon Stevenson, 2010, Openness, hedging incentives and foreign exchange exposure: A firm-level multi-country study, *Journal of International Business Studies* 41, 105-122.
- Ihrig, Jane E., 2001, Exchange-rate exposure of multinationals: Focusing on exchange- rate issues, *FRB International Finance Discussion Paper No. 709*
- Jansen, W. Jos, and Niek J. Nahuis, 2003, The stock market and consumer confidence: European evidence, *Economics Letters* 79, 89-98.
- Jiang, Zhi-Qiang, Wei-Xing Zhou, Didier Sornette, Ryan Woodard, Ken Bastiaensen, and Peter Cauwels, 2010, Bubble diagnosis and prediction of the 2005–2007 and 2008–2009 chinese stock market bubbles, *Journal of Economic Behavior & Organization* 74, 149-162.
- Jorion, Philippe, 1990, The exchange-rate exposure of u.S. Multinationals, *Journal of Business* 63, 331.
- Kim, Minho, Andrew C. Szakmary, and Ike Mathur, 2000, Price transmission dynamics between adrs and their underlying foreign securities, *Journal of Banking & Finance* 24, 1359-1382.
- Klein, Michael W., and Jay C. Shambaugh, 2008, The dynamics of exchange rate regimes: Fixes, floats, and flips, *Journal of International Economics* 75, 70-92.
- Lee, Charles M. C., Andrei Shleifer, and Richard H. Thaler, 1991, Investor sentiment and the closed-end fund puzzle, *The Journal of Finance* 46, 75-109.
- Lee, Joseph, and Joanna Poon, 2005, Convergence of a-share and h-share prices, *Working Paper No. 19*.
- Lemmon, Michael, and Evgenia Portniaguina, 2006, Consumer confidence and asset prices: Some empirical evidence, *The Review of Financial Studies* 19, 1499-1529.
- Ljung, G.M., and G.E.P. Box, 1978, On a measure of lack of fit in time series models, *Biometrika* 65, 297.

- Loudon, Geoffrey, 1993, The foreign exchange operating exposure of Australian stocks, *Accounting & Finance* 33, 19-32.
- Ma, X., 1996, Capital controls, market segmentation and stock prices: Evidence from the Chinese stock market, *Pacific-Basin Finance Journal* 4, 219-239.
- Martin, Anna D., and Laurence J. Mauer, 2003, Exchange rate exposures of US banks: A cash flow-based methodology, *Journal of Banking & Finance* 27, 851-865.
- Martin, Michael F., and Wayne M. Morrison, 2008, China's "hot money" problems, *Congressional Research Service Reports*, 21 July p.
- Miller, Kent D., and Jeffrey J. Reuer, 1998, Asymmetric corporate exposures to foreign exchange rate changes, *Strategic Management Journal* 19, 1183-1191.
- Muller, Aline, and Willem F. C. Verschoor, 2006, Asymmetric foreign exchange risk exposure: Evidence from U.S. Multinational firms, *Journal of Empirical Finance* 13, 495-518.
- Nydahl, Stefan, 1999, Exchange rate exposure, foreign involvement and currency hedging of firms: Some Swedish evidence, *European Financial Management* 5, 241-257.
- Parsley, David C., and Helen A. Popper, 2006, Exchange rate pegs and foreign exchange exposure in East and South East Asia, *Journal of International Money and Finance* 25, 992-1009.
- Pettis, M., and L. Wright, 2008, Hot money poses risks to China's stability, *Financial Times*, 13 July, p. 9.
- Prasad, Eswar S., and Shang-Jin Wei, 2005, The Chinese approach to capital inflows: Patterns and possible explanations, *IMF Working Paper* 05/79.
- Schmeling, Maik 2009, Investor sentiment and stock returns: Some international evidence, *Journal of Empirical Finance* 16, 394-408.
- Schwarz, G., 1978, Estimating the dimension of a model, *The Annals of Statistics* 6, 461-464.
- Shah, Ajay, Achim Zeileis, and Ila Patnaik, 2005, What is the new Chinese currency regime?, Research Report Series, Department of Statistics and Mathematics, WU Vienna University of Economics and Business, Vienna, November.
- Shapiro, Alan C., 1975, Exchange rate changes, inflation, and the value of the multinational corporation, *The Journal of Finance* 30, 485-502.
- Shin, Hyun-Han, and Luc Soenen, 1999, Exposure to currency risk by US multinational corporations, *Journal of Multinational Financial Management* 9, 195-207.
- Sirr, Gordon, John Garvey, and Liam Gallagher, 2011, Emerging markets and portfolio foreign exchange risk: An empirical investigation using a value-at-risk decomposition technique, *Journal of International Money and Finance* 30, 1749-1772.
- Stulz, Rene M., and Walter Wasserfallen, 1995, Foreign equity investment restrictions, capital flight, and shareholder wealth maximization, theory and evidence, *Review of Financial Studies* 8, 1019-1057.
- Tian, Gary G., and S. Ma, 2010, The relationship between stock returns and the foreign exchange rate: The ARDL approach, *Journal of the Asia Pacific Economy* 15, 490-508.
- Tse, Yiuman, 1998, International transmission of information: Evidence from the Euroyen and Eurodollar futures markets, *Journal of International Money and Finance* 17, 909-929.

- Verma, Rahul, and Gökçe Soydemir, 2006, The impact of u.S. Individual and institutional investor sentiment on foreign stock markets, *Journal of Behavioral Finance* 7, 128-144.
- Wang, Steven S., and Li Jiang, 2004, Location of trade, ownership restrictions, and market illiquidity: Examining chinese a- and h-shares, *Journal of Banking & Finance* 28, 1273-1297.
- Wang, Y., 2005, Dual-listing in hong kong and its impact on the performance of a-shares, *Working Paper*.
- Williamson, Rohan, 2001, Exchange rate exposure and competition: Evidence from the automotive industry, *Journal of Financial Economics* 59, 441-475.
- Yang, P., X. Xu, and Y. Yang, 2007, Cross-sectional analysis of price differences of cross-listed stocks, *Management World* 113-122.
- Yao, Shujie, Dan Luo, and Stephen Morgan, 2010, Bank share prices and stock market integration in greater china, *Journal of the Asia Pacific Economy* 15, 388-395.
- Zhang, G., and H.-G. Fung, 2006, On the imbalance between the real estate market and the stock markets in china, *Chinese Economy* 39, 26-39.
- Zhang, Y., and R. Zhao, 2003, Risk under “one country and two systems”: Evidence from class a, b and h shares of chinese listed companies, *Review of Pacific Basin Financial Markets and Policies* 6, 179-197.
- Zhang, Z., B. Miao, and S. Zhou, 2011, Exchange rate exposure of chinese firms, *Working Paper*.
- Zhao, Z., Y. Ma, and Y. Liu, 2005, Equity valuation in mainland china and hong kong: The chinese a-h share premium, *HKIMR Working Paper* No. 14.

**Table 1** Summary statistics for RMB exchange rates

---

*Panel A : Descriptive statistics*

	RMB NEER	RMB/USD	RMB/EUR	RMB/YEN
Mean	0.000043	0.000058	-0.000008	0.000059
Median	0.000043	0.000006	0.000064	0.000000
Maximum	0.006187	0.001757	0.020553	0.030091
Minimum	-0.010316	-0.001307	-0.014948	-0.014493
Std. dev.	0.001295	0.000323	0.003048	0.002854
Skewness	-0.540	0.863	-0.125	0.759
Kurtosis	8.037	7.575	6.753	14.420
Observations	1281	1281	1281	1281

*Panel B: Correlations*

RMB NEER	1.000			
RMB/USD	0.082	1.000		
RMB/EUR	-0.012	-0.175	1.000	
RMB/YEN	0.271	-0.327	0.051	1.000

---

**Notes:** Summary statistics are for daily log price changes from July 21, 2005 to June 18, 2010.

**Table 2** Summary of price differences between A- and H- shares

	2005	2006	2007	2008	2009	2010 (to June 18th)	Full period
<b>Panel A: Number of firms with a premium of A-shares over H-shares</b>							
0-100%	17	20	21	28	29	26	
100-200%	4	7	13	9	13	12	
200-300%	3	1	8	4	6	4	
> 300%	0	0	6	6	4	3	
Total	24	28	48	47	52	45	
<b>Panel B: Number of firms with a premium of H-shares over A-shares</b>							
0-50%	5	7	2	10	8	16	
50-100%	0	1	1	0	1	0	
100-200%	1	1	0	0	0	0	
Total	6	9	3	10	9	16	
<b>Panel C: Mean and median of premiums</b>							
<i>A-share premium</i>							
Mean	85%	73%	167%	123%	113%	109%	117%
Median	53%	42%	112%	94%	89%	76%	86%
<i>H-share premium</i>							
Mean	40%	39%	37%	16%	17%	19%	25%
Median	16%	25%	39%	13%	7%	19%	17%

**Notes.** In this table, we document the number of firms whose A-shares trade at a higher price than H-shares (Panel A), and the number of firms whose H-shares trade at a higher price than A-shares (Panel B), for each year of the sample period. The A-share premium (Panel A) is calculated as  $[\text{price A}]/[\text{price H} \times X] - 1$ , and the H-share premium (Panel B) is calculated as  $[\text{price H} \times X]/[\text{price A}] - 1$ ; where X is the RMB exchange rate against HK dollar. In Panel A, we divide the firms into those with premiums of A over H-shares between zero and 100 percent, 100 to 200 percent, 200 to 300 percent, and greater than 300 percent. In Panel B, we divide the firms into those with premiums of H over A shares into those with premiums of between zero and 25 percent, and 25 and 50 percent. Panel C presents the mean and median premiums for each year for the firms with a premium of A-shares over H-shares ('A-share premium'), and a premium of H-shares over A-shares ('H-share premium'). Full detail on each firm's premiums can be found in the appendix.

**Table 3** Exchange rate sensitivity to the NEER

	Number (%) significantly positive	Number (%) significantly negative	Mean	Median	$\beta_n^{A,X} * \beta_n^{H,X} < 0$
$\beta_n^{A,X}$	18 (36.7%)	0	0.30	0.30	43 (87.8%)
$\beta_n^{H,X}$	0	27 (55.1%)	-0.61	-0.47	

**Notes:** In this table we summarise the sample firms' foreign exchange exposures using the trade-weighted exchange rate or NEER. 'Significantly positive' means the percentage of shares that have significantly positive exchange rate sensitivity at the 10 percent level or better; 'Significantly negative' means the percentage of shares that have significantly negative exchange rate sensitivity at the 10 percent level or better. The column titled  $\beta_n^{A,X} * \beta_n^{H,X} < 0$  presents the number (percentage) of firms whose  $\beta_n^{A,X}$  and  $\beta_n^{H,X}$  have opposite signs.

**Table 4** Exchange rate sensitivity to bilateral exchange rates

	Number (%) significantly positive	Number (%) significantly negative	Mean	Median	$\beta_n^{A,X} * \beta_n^{H,X} < 0$
<b>Panel A: US dollar</b>					
$\beta_n^{A,U}$	17 (34.7%)	0	3.05	1.24	37 (75.51 %)
$\beta_n^{H,U}$	0	14 (28.6%)	-2.53	-1.41	
<b>Panel B: Euro</b>					
$\beta_n^{A,E}$	26 (53.1%)	1 (2.0%)	0.18	0.19	42 (85.71%)
$\beta_n^{H,E}$	1 (2.04%)	39 (79.6%)	-0.44	-0.39	
<b>Panel C: Yen</b>					
$\beta_n^{A,Y}$	0	14 (28.6%)	-0.12	-0.10	38 (77.55%)
$\beta_n^{H,Y}$	36 (73.5 %)	1 (2.0%)	0.28	0.28	

**Notes:** In this table we summarise the sample firms' foreign exchange exposures using the three bilateral exchange rates; the RMB against the US dollar, euro and yen. 'Significantly positive' means the percentage of shares that have significantly positive exchange rate sensitivity at the 10 percent level or better; 'Significantly negative' means the percentage of shares that have significantly negative exchange rate sensitivity at the 10 percent level or better. The column titled  $\beta_n^{A,X} * \beta_n^{H,X} < 0$  presents the number (percentage) of firms whose  $\beta_n^{A,X}$  and  $\beta_n^{H,X}$  have opposite signs.

**Table 5** Exchange rate sensitivity: sub-period analysis

	Number (%) significantly positive	Number (%) significantly negative	Mean	Median	$\beta_n^{A,X} * \beta_n^{H,X} < 0$
<b>Panel A: NEER (trade-weighted)</b>					
<b>Pre-crisis (45 firms)</b>					
$\beta_n^{A,X}$	4 (8.89%)	1 (2.22 %)	0.18	0.20	30 (66.67 %)
$\beta_n^{H,X}$	0	7 (15.56 %)	-0.41	-0.39	
<b>Post-crisis (49 firms)</b>					
$\beta_n^{A,X}$	17 (34.69 %)	1 (2.04 %)	0.35	0.37	42 (85.71%)
$\beta_n^{H,X}$	0	25 (51.02 %)	-0.70	-0.62	
<b>Panel B: US dollar</b>					
<b>Pre-crisis (45 firms)</b>					
$\beta_n^{A,U}$	7 (15.56 %)	0	1.62	1.33	26 (57.78 %)
$\beta_n^{H,U}$	3 (6.67 %)	4 (8.89 %)	-0.37	-0.74	
<b>Post-crisis (49 firms)</b>					
$\beta_n^{A,U}$	15 (30.61 %)	8 (16.33 %)	2.58	0.89	25 (51.02 %)
$\beta_n^{H,U}$	5 (10.20 %)	19 (38.78 %)	-3.06	-2.36	
<b>Panel C: Euro</b>					
<b>Pre-crisis (45 firms)</b>					
$\beta_n^{A,E}$	9 (20.00 %)	1 (2.22 %)	0.08	0.13	32 (71.11 %)
$\beta_n^{H,E}$	0	11 (24.44 %)	-0.28	-0.34	
<b>Post-crisis (49 firms)</b>					
$\beta_n^{A,E}$	14 (28.57 %)	0	0.17	0.18	42 (85.71%)
$\beta_n^{H,E}$	1 (2.04 %)	38 (77.55 %)	-0.48	-0.46	
<b>Panel D: Yen</b>					
<b>Pre-crisis (45 firms)</b>					
$\beta_n^{A,Y}$	2 (4.44 %)	8 (17.78 %)	-0.16	-0.11	31 (68.89 %)
$\beta_n^{H,Y}$	27 (60.00 %)	0	0.45	0.44	
<b>Post-crisis (49 firms)</b>					
$\beta_n^{A,Y}$	0	16 (32.65%)	-0.12	-0.11	35 (71.43%)
$\beta_n^{H,Y}$	19 (38.78%)	2 (4.08%)	0.21	0.22	

**Notes:** In this table we summarise the sample firms' foreign exchange exposures using the NEER and the three bilateral exchange rates; the RMB against the US dollar, euro and yen. We divide our sample period into two sub-periods; 'pre-crisis' is July 21, 2005 to September 15, 2008, and 'post-crisis' is September 16, 2008 to June 19, 2010. 'Significantly positive' means the percentage of shares that have significantly positive exchange rate sensitivity at the 10 percent level or better; 'Significantly negative' means the percentage of shares that have significantly negative exchange rate sensitivity at the 10 percent level or better. The column entitled  $\beta_n^{A,X} * \beta_n^{H,X} < 0$  presents the number (percentage) of firms whose  $\beta_n^{A,X}$  and  $\beta_n^{H,X}$  have opposite signs.

**Table 6** Sensitivities to “hot money” inflows and investor sentiment (n = 41)**Panel A:** Market-level results

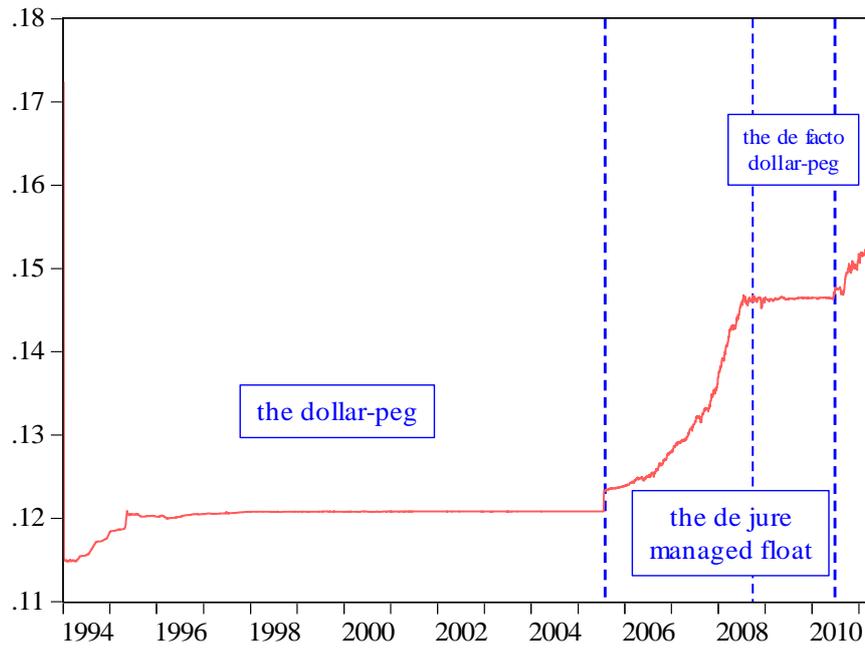
	Coefficient	t-statistics
$a$	-0.01	-1.17
$b$	0.02**	2.00
$c_1$	0.01	1.33
$c_2$	-0.0006	-0.06

**Panel B:** Firm-level results summary

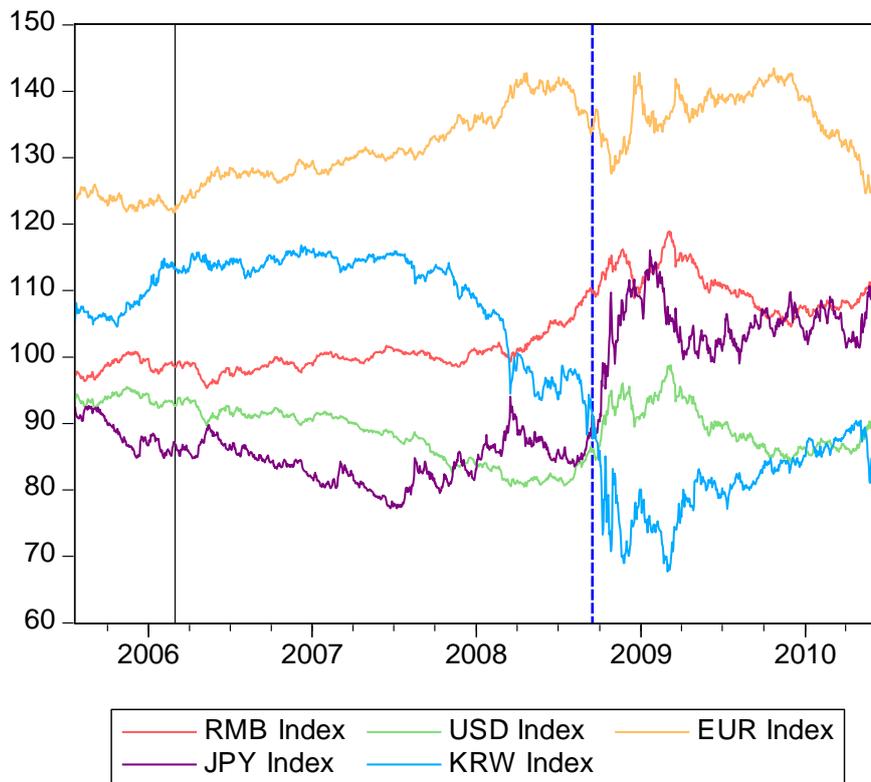
	Number (%) significantly positive	Number (%) significantly negative	mean	Median	Median $\bar{R}^2$	$\omega_{n1} * \omega_{n2} < 0$
$\beta_n^X$	6 (14.6%)	0	1.06	0.96	0.59	36 (87.80%)
$\gamma_n$	36 (87.8%)	0	0.04	0.04		
$\omega_{n1}$	13 (31.7%)	0	0.02	0.02		
$\omega_{n2}$	0	12 (29.3%)	-0.02	-0.02		

**Notes:** In this table, we report our findings for estimating equation (4):  $R_{m,t} = a + bHM_t + c_1CCI_t + c_2CCI_{t-1} + r_{m,t}$  (Panel A), and summary information for estimating equation (5):  $R_{n,t}^A = \alpha_n + \beta_n^m r_{m,t} + \beta_n^X X_t + \gamma_n HM_t + \omega_{n1} CCI_t + \omega_{n2} CCI_{t-1} + \varepsilon_{n,t}$  for each stock. \*\* denotes significance at the 5 percent level for two-tailed tests. Number significantly positive (%) means the number and percentage of shares that have significant exchange rate sensitivity at the 10 percent level or better.  $\omega_{n1} * \omega_{n2} < 0$  is the number (percentage) of shares whose  $\omega_{n1}$  and  $\omega_{n2}$  have different signs among all the sample shares.

**Figure 1a** The USD/RMB exchange rate (January 1994 – April 2011)

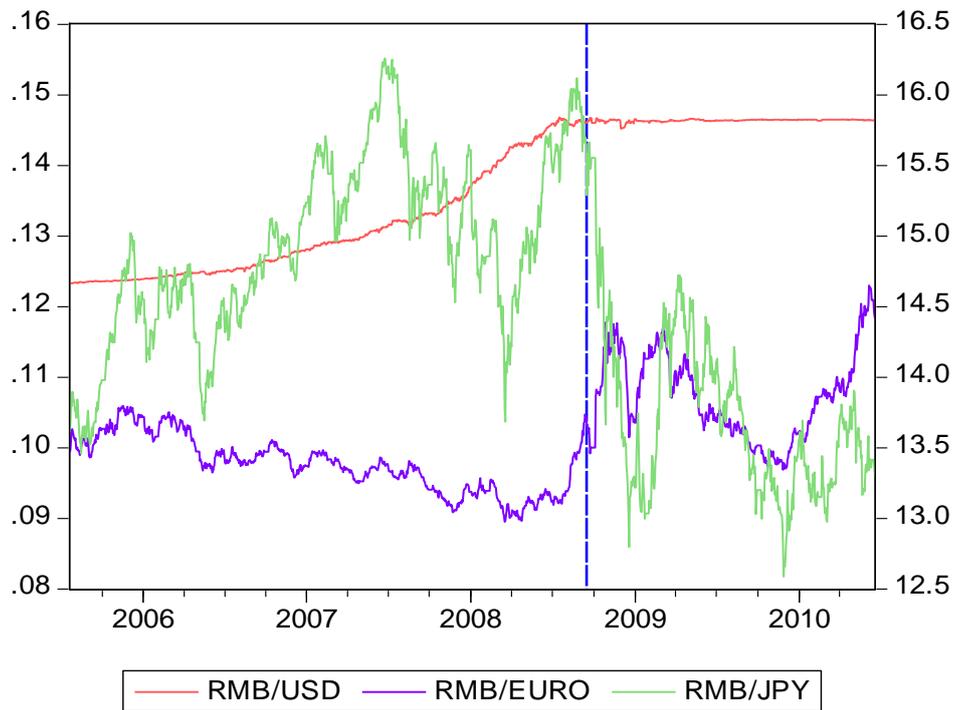


**Figure 1b** Trade-weighted exchange rates



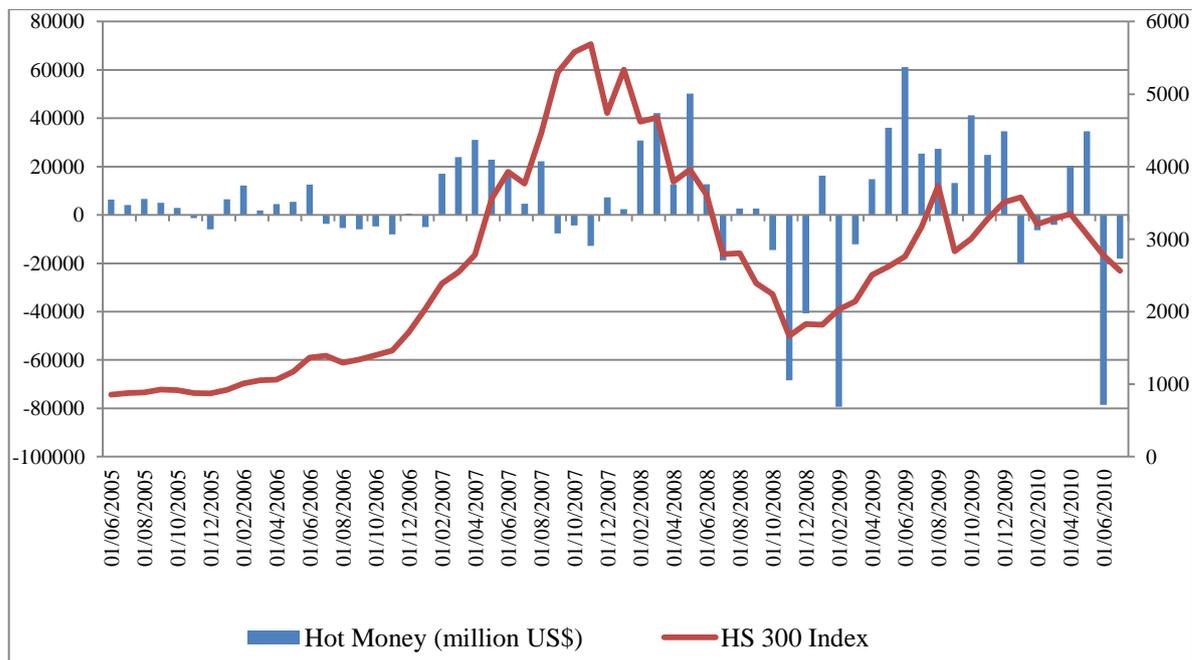
**Notes:** These trade-weighted indices are collected from Datastream (base year 2000 =100).

**Figure 2** RMB exchange rates against the US dollar, the euro and the Japanese yen (July 21st, 2005 – June 18, 2010)



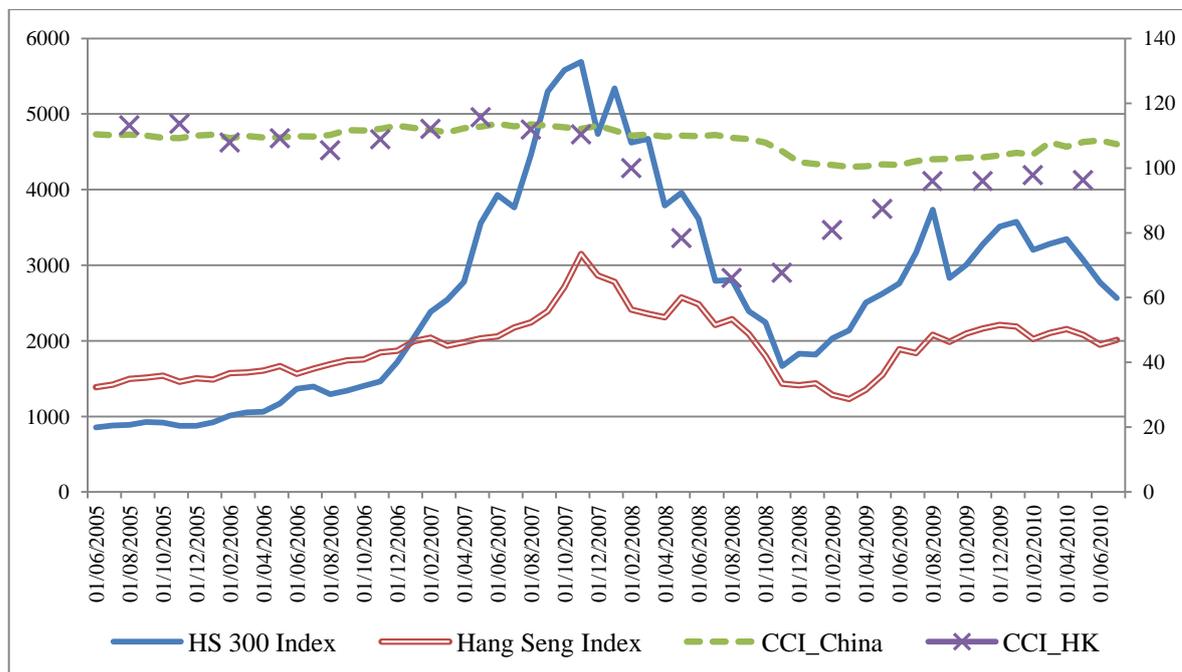
**Notes:** In this figure we depict the RMB/USD, RMB/EURO and RMB/JPY exchange rates, and the NEER (trade-weighted RMB exchange rate index) (2000=100), for the period 21 July 2005 to 18 June 2010. The red line indicates September 15, 2008 – the time of the worsening of the financial crisis with Lehman Brothers' bankruptcy announcement. All data are from Datastream.

**Figure 3** “Hot money” inflows and the Chinese stock market index



**Notes:** “Hot money” inflows are measured by subtracting the trade surplus (or deficit) and the net flow of foreign direct investment (FDI) from the change in China’s foreign reserves. Data on foreign reserves are collected from the People’s Bank of China. Trade surplus and FDI data are compiled by the General Administration of Customs of the People’s Republic of China, and the National Bureau of Statistics of China respectively; both are sourced from Datastream.

**Figure 4** Consumer confidence and stock market indexes for China and Hong Kong



**Notes:** HS 300 Index is Hu Shen 300 Index, which is a weighted index compiled by China Securities Index Co., Ltd, to proxy the Chinese market portfolio; Hang Seng Index, composite index for Hong Kong stock market, is divided by 10 to be of the same scale as that of HS 300 Index. Both market indices are collected from Datastream. CCI\_China and CCI\_HK is the consumer confidence index in China and Hong Kong; they are compiled by the National Bureau of Statistics of China and the Chinese University of Hong Kong; both are sourced from Datastream.

## Appendix 1 Detail on dual-listed A- and H-shares

Firm Name	Stock series	Stock code	Listing date	A-share price premium	Mean return (%)	Mean turnover (%)	Suspension period	Data insufficiency	Reasons for suspension
<b>SHSE</b>									
China CITIC Bank	A	601998	27/04/2007	0.56	-3.80	1.42			
	H	0998	27/04/2007		-1.52	1.17			
Datang International Power	A	601991	20/12/2006	1.33	0.96	2.31			
	H	0991	21/03/1997		-0.90	1.25			
Bank of China	A	601988	05/07/2006	0.30	-0.35	1.33			
	H	3988	01/06/2006		0.45	1.00			
China Construction Bank	A	601939	25/09/2007	0.14	-3.50	1.40			
	H	0939	27/10/2005		-0.63	0.86			
China COSCO Holdings	A	601919	26/06/2007	0.64	-2.98	2.43	26/07/2007 – 03/09/2007	2.31%	Share restructure
	H	1919	30/06/2005		-1.66	1.70			
Zijin Mining Group	A	601899	25/04/2008	0.49	-5.46	2.89			
	H	2899	23/12/2003		-2.01	1.04			
China Coal Energy	A	601898	01/02/2008	0.32	-6.23	2.61			
	H	1898	19/12/2006		-3.55	1.21			
China Shipping Container Lines	A	601866	12/12/2007	1.17	-7.66	1.90			
	H	2866	16/06/2004		-4.83	2.14			
PetroChina	A	601857	05/11/2007	0.82	-9.04	0.97			
	H	0857	07/04/2000		-4.53	0.83			
China Oilfield Services	A	601808	28/09/2007	1.08	-7.48	1.80			
	H	2883	20/11/2002		-3.90	0.98			
China South Locomotive & Rolling Stock Corporation	A	601766	18/08/2008	0.25	3.83	2.61			
	H	1766	21/08/2008		6.94	0.97			
Shanghai Electric	A	601727	05/12/2008	2.03	0.80	4.19	20/04/2009 – 27/04/2009	1.50%	Refinance

	H	2727	28/04/2005		1.81	1.31	20/04/2009 – 27/04/2009	1.50%	Refinance
China Life Insurance	A	601628	09/01/2007	0.11	-2.34	1.23			
	H	2628	18/12/2003		1.51	1.33			
Metallurgical Corporation of China	A	601618	21/09/2009	0.30	-9.31	0.38			
	H	1618	24/09/2009		-10.09	0.57			
China Pacific Insurance	A	601601	25/12/2007	-0.12	-3.21	0.99			
	H	2601	23/12/2009		3.01	0.83			
Aluminum Corporation of China	A	601600	30/04/2007	1.00	-3.29	1.66	12/06/2007 – 02/07/2007	1.84%	Assets restructuring
	H	2600	12/12/2001		-2.16	1.77			
Beijing North Star	A	601588	16/10/2006	1.63	0.44	3.22			
	H	0588	14/05/1997		-0.95	1.01			
Industrial and Commercial Bank of China	A	601398	27/10/2006	0.11	1.10	1.41			
	H	1398	27/10/2006		2.28	0.69			
China Railway	A	601390	03/12/2007	0.15	-4.04	1.81			
	H	0390	07/12/2007		-2.32	1.00			
Guangshen Railway	A	601333	22/12/2006	0.56	-2.49	1.78			
	H	0525	14/05/1996		-2.73	0.81			
Bank of Communications	A	601328	15/05/2007	0.18	-4.04	0.40			
	H	3328	23/06/2005		0.18	1.34			
Ping An Insurance	A	601318	01/03/2007	0.02	-0.20	2.30			
	H	2318	24/06/2004		3.04	1.00			
China Railway Construction Corporation	A	601186	10/03/2008	0.00	-3.64	1.34			
	H	1186	13/03/2008		-1.48	0.84			
Air China	A	601111	18/08/2006	0.85	5.95	2.62	26/02/2010 – 11/03/2010	1.00%	Assets restructuring
	H	0753	15/12/2004		4.55	1.36	26/02/2010 – 11/03/2010	1.00%	Assets restructuring
Sichuan Expressway	A	601107	27/07/2009	1.38	-7.70	6.42			
	H	0107	07/10/1997		3.60	0.67			
China Shenhua Energy	A	601088	09/10/2007	0.25	-6.79	1.34			
	H	1088	15/06/2005		-2.45	0.80			
Chongqing Iron & Steel	A	601005	28/02/2007	1.27	-2.84	2.83			
	H	1053	17/10/1997		-2.11	1.27			

Luoyang Glass	A	600876	01/11/1995	3.55	4.32	4.73	27/03/2006 – 10/04/2006	0.86%	Share restructure
							17/04/2006 – 07/06/2006	2.97%	Share restructure
Dongfang Electrical	H	1108	08/07/1994		2.79	0.83	31/06/2006 – 30/07/2009	56.09%	Breach of securities rules
							A	600875	18/10/1995
27/03/2006 – 14/04/2006	1.17%	Share restructure							
Tianjin Capital Environmental Protection	H	1072	06/06/1994		5.90	1.01	20/12/2006 – 02/02/2007	2.58%	Assets restructuring
							A	600874	30/06/1995
09/03/2006 – 19/04/2006	2.34%	Share restructure							
Sinopec Yizheng Chemical Fibre	H	1065	17/05/1994		-0.50	1.20	09/10/2006 – 23/10/2006	0.86%	Share restructure
03/12/2007 – 26/12/2007	1.41%	Share restructure							
Beiren Printing	H	1033	29/03/1994		0.86	2.01	07/01/2008 – 16/01/2008	0.63%	Share restructure
07/03/2006 – 30/03/2006	1.41%	Share restructure							
Maanshan Iron	H	0187	06/08/1993		0.59	0.66	08/12/2009 – 29/12/2009	1.25%	Assets restructure
H	0323	03/11/1993		0.97	2.36				
Kunming Machine	A	600806	03/01/1994	0.35	6.51	3.60	30/10/2006 – 16/11/2006	1.09%	Share restructure
							14/12/2006 – 06/03/2007	4.61%	Share restructure
Panda Electronics	H	0300	07/12/1993		7.59	0.84	26/06/2006 – 07/07/2006	0.78%	Share restructure
H	0553	02/05/1996		1.40	1.03	11/03/2005 – 09/09/2005*	2.73%	Reorganization	
Sinopec Shanghai Petrochemical	A	600688	08/11/1993	1.27	2.65	1.57	10/04/2007 – 26/04/2007	1.02%	Reorganization
							09/10/2006 – 23/10/2006	0.86%	Share restructure
							31/10/2006 – 09/11/2006	0.63%	Share restructure
							03/12/2007 – 26/12/2007	1.41%	Share restructure
							07/01/2008 – 16/01/2008	0.63%	Share restructure
	H	0338	26/07/1993		0.23	1.34			

Guangzhou Shipyard	A	600685	28/10/1993	0.67	6.95	3.46	21/03/2006 – 05/04/2006	0.94%	Share restructure
							13/04/2006 – 23/05/2006	2.27%	Share restructure
Tsingtao Brewery	H	0317	06/08/1993		5.93	1.20			
	A	600600	27/08/1993	0.20	4.79	1.49	29/08/2006 – 04/09/2006	0.39%	Assets restructure
Anhui Conch Cement							04/09/2006 – 20/09/2006	0.94%	share restructure
							29/09/2006 – 19/12/2006	4.53%	share restructure
Anhui Conch Cement	H	0168	15/07/1993		5.06	0.53			
	A	600585	07/02/2002	-0.03	5.60	1.36	16/01/2006 – 25/01/2006	0.63%	Share restructure
Shenzhen Expressway							09/02/2006 – 01/03/2006	1.17%	Share restructure
							13/07/2006 – 31/07/2006	1.02%	Assets restructure
Shenzhen Expressway							30/04/2007 – 04/05/2007	0.39%	Assets restructure
	A	600548	25/12/2001	0.47	0.73	2.56	23/12/2005 – 06/01/2006	0.86%	Share restructure
Jiangsu Expressway							13/01/2006 – 27/02/2006	2.50%	Share restructure
	H	0548	12/03/1997		0.51	0.50			
Jiangsu Expressway	A	600377	16/01/2001	0.19	0.05	1.50	20/02/2006 – 07/04/2006	2.73%	Share restructure
							17/04/2006 – 15/05/2006	1.64%	Share restructure
Jiangxi Copper	H	0177	27/06/1997		1.81	0.82			
	A	600362	11/01/2002	0.89	6.28	4.34	27/02/2006 – 15/03/2006	1.02%	Share restructure
Guangzhou Pharmaceutical							27/03/2006 – 18/04/2006	1.33%	Share restructure
							06/03/2007 – 19/03/2007	0.78%	Assets restructure & refinance
Guangzhou Pharmaceutical							16/01/2008 – 22/01/2008	0.39%	Assets restructure & refinance
	H	0358	12/06/1997		4.37	2.36	06/03/2007 – 19/03/2007	0.78%	Assets restructure & refinance
Guangzhou Pharmaceutical							16/01/2008 – 22/01/2008	0.39%	Assets restructure & refinance
	A	600332	06/02/2001	1.04	2.59	4.68	06/03/2006 – 24/03/2006	1.17%	Share restructure
Yanzhou Coal Mining							30/03/2006 – 21/04/2006	1.33%	Share restructure
	H	0874	30/10/1997		2.68	1.33	03/03/2006 – 15/03/2006	0.70%	Share restructure ?
Yanzhou Coal Mining	A	600188	01/07/1998	0.39	3.67	4.17	23/01/2006 – 14//02/2006	1.33%	Share restructure
							27/02/2006 – 31/03/2006	1.95%	Share restructure
Eastern Airlines	H	1171	01/04/1998		3.37	1.54			
	A	600115	02/05/1997	1.56	3.86	2.85	20/11/2006 – 01/12/2006	0.78%	Share restructure
Eastern Airlines							08/12/2006 – 11/01/2007	1.95%	Share restructure
							22/05/2007 – 31/08/2007	5.78%	Change of the board of directors & reorganization
							05/11/2007 – 09/11/2007	0.39%	

							26/11/2008 – 10/12/2008	0.86%	Assets restructure
							08/06/2009 – 10/07/2009	1.95%	Assets restructure & reorganization
	H	0670	05/11/1997		3.21		22/05/2007 – 31/08/2007	5.78%	Change of the board of directors & reorganization
						1.23	05/11/2007 – 09/11/2007	0.39%	Assets restructure
							26/11/2008 – 10/12/2008	0.86%	Assets restructure & reorganization
							08/06/2009 – 10/07/2009	1.95%	
China Merchants Bank	A	600036	09/04/2002	-0.16	2.77	0.75			
	H	3968	22/09/2006		3.93	1.47			
China Southern Airlines	A	600029	25/07/2003	0.92	4.41		23/03/2007 – 24/04/2007	1.80%	Share restructure
						3.05	09/05/2007 – 18/06/2007	2.27%	Share restructure
							27/11/2008 – 10/12/2008	0.78%	Refinance
							23/02/2010 – 08/03/2010	0.78%	Refinance
	H	1055	31/07/1997		2.57	1.62	27/11/2008 – 10/12/2008	0.78%	Refinance
							23/02/2010 – 08/03/2010	0.78%	Refinance
China Petroleum & Chemical	A	600028	08/08/2001	0.61	2.60	1.59	21/08/2006 – 06/09/2006	1.02%	Share restructure
							15/09/2006 – 09/10/2006	1.33%	Share restructure
	H	0386	19/10/2000		2.22	1.02			
Huadian Power International	A	600027	03/02/2005	0.89	0.91	2.74	12/06/2006 – 23/06/2006	0.78%	Share restructure
							30/06/2006 – 31/07/2006	1.72%	Share restructure
	H	1071	30/06/1999		-0.87	1.43			
China Shipping Development	A	600026	23/05/2002	0.23	1.23	3.08	07/11/2005 – 18/11/2005	0.78%	Share restructure
							28/11/2005 – 29/12/2005	1.88%	Share restructure
	H	1138	11/11/1994		1.97	1.13			
China Minsheng Bank	A	600016	19/12/2000	-0.15	-7.13	1.01			
	H	1988	26/11/2009		-2.80	0.55			
Anhui Expressway	A	600012	07/01/2003	0.27	-0.61	2.90	23/01/2006 – 14/02/2006	1.33%	Share restructure
							20/02/2006 – 31/03/2006	2.34%	Share restructure
	H	0995	13/11/1996		-0.80	0.63			
Huaneng Power International	A	600011	06/12/2001	0.35	0.17	0.74	06/03/2006 – 16/03/2006	0.70%	Share restructure
							23/03/2006 – 18/04/2006	1.48%	Share restructure
							08/01/2010 – 15/01/2010	0.47%	Refinance
	H	0902	21/01/1998		-0.85	1.23	08/01/2010 – 15/01/2010	0.47%	Refinance

**SZSE**

Hisense Kelon	A	000921	13/07/1999	2.70	4.71		01/08/2005 – 26/08/2005	1.56%	Change of the board of directors & assets restructure Assets restructure Periodic announcement not duly published Share restructure Share restructure Assets restructure Periodic announcement not duly published Periodic announcement not duly published Periodic announcement not duly published Assets restructure Breach of securities rules Assets restructure Assets restructure Share restructure Share restructure refinance						
							12/09/2005 – 26/09/2005	0.86%							
							31/03/2006 – 21/04/2006	1.25%							
							08/05/2006 – 30/06/2006	3.13%							
							11/12/2006 – 04/01/2007	1.48%							
						2.50	19/01/2007 – 28/03/2007	3.83%							
							01/06/2007 – 12/06/2007	0.63%							
							27/06/2007 – 11/07/2007	0.86%							
							04/09/2007 – 19/11/2007	4.30%							
							28/04/2008 – 08/05/2008	0.70%							
							14/05/2008 – 28/05/2008	0.86%							
							09/04/2009 – 08/05/2009	1.72%							
						Angang Steel	H	0921		23/07/1996		4.68		16/06/2005 – 20/01/2009	73.36%
2.82	09/04/2009 – 08/05/2009	1.72%													
	29/06/2009 – 16/07/2009	1.09%													
2.04	A	000898	26/12/1997	-0.02	2.78								17/10/2005 – 28/10/2005	0.78%	
													14/11/2005 – 01/12/2005	1.09%	
							10/10/2007 – 17/10/2007	0.47%							
Xinhua Pharmaceutical	H	0347	24/07/1997		3.54	1.79			Share restructure						
						3.28	A	000756		06/08/1997	2.03	3.51	03/03/2006 – 07/04/2006	2.03%	
Jingwei Textile	A	000666	10/12/1996	1.50	3.21				Share restructure Share restructure Assets restructure Assets restructure						
						3.31									
Northeast Electrical	H	0350	02/02/1996		0.44	0.97			Reorganization Share restructure Share restructure						
						3.27	A	000585		13/12/1995	2.23	2.30	20/03/2006 – 29/03/2006	0.63%	
ZTE Corporation	H	0042	06/07/1995		2.43	1.80			Information disclosure of related transaction						
						1.32	A	000063		18/11/1997	-0.47	3.06	04/04/2005 – 25/10/2005*	5.23%	
									Share restructure						
									Share restructure						

	H	0763	09/12/2004		3.96	1.50			
Shandong Chenming Paper Holdings	A	000488	20/11/2000	0.85	-4.01	3.58			
	H	1812	18/06/2008		-1.93	0.87			
Weichai Power	A	000338	30/04/2007	0.47	1.79	1.23	12/03/2008 – 29/04/2008	4.30%	Information disclosure of related transaction
	H	2338	11/03/2004		3.24	1.17			

**Notes.**

1. For each firm, mean premium, mean return and mean turnover are calculated for the period from either July 21, 2005 or the listing date of the A- or H-shares of each firm, whichever was later, to June 16, 2010. *A-share price premium* denotes average of price premium of A-shares over H-shares, which is calculated by  $PA/(PH*X) - 1$ ; X is the RMB exchange rate against HK dollar. Mean return is the average of the log differences of the daily stock prices. Mean turnover is the average of the ratios of trading amount (trading volume multiplies stock price) to free float market capitalisation (free float number of shares multiplied by the latest available market value).
2. Suspension periods which are longer than 1 week (5 trading days) are reported.
3. Data insufficiency measures the ratio of suspension days to the total observation numbers; the higher the ratio, the higher the data insufficiency.
4. \* indicate for 0553 (H), the starting date is 10/09/2005; for share 0042(H), the starting date is 26/10/2005.
5. Stock price data are collected from Bloomberg; trading volume, free float market capitalisation data are collected from Datstream; information about suspension is collected from Sohu Securities (<http://stock.sohu.com>) and Hong Kong Exchanges and Clearing Limited ([www.hkex.com.hk](http://www.hkex.com.hk)).