

Arbitrage Activities Between HSI Stocks and HSI-Related Derivatives Products

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Estimates show that arbitrage is an important element supporting the turnover of HSI stocks. It follows that an active derivatives market or an active derivative product raises turnover of the cash market. Similarly, reducing the transaction costs of arbitrage and hedging activities between the cash market and the derivatives market will increase such opportunities, thus enhancing liquidity on both sides.

Introduction

- The research paper entitled *Turnover Behaviour of the Hong Kong Stock Market*² shows that the recent shrinkage in market turnover was largely due to price effect and a drop in the turnover of non-HSI stocks. The turnover of HSI stocks in volume terms has been relatively stable. One of the engines that supports the turnover of HSI stocks is believed to be the arbitrage and hedging activities between HSI stocks and derivatives products with HSI stocks as underlyings.
- This paper estimates the turnover of HSI stocks due to arbitrage activities and the strategies to facilitate such activities to be carried out efficiently. Turnover arising from hedging activities is not covered in this paper because investors may or may not *fully* hedge their exposure. There is no indication what precise proportion of exposure has been hedged. Nevertheless, any strategies that reduce the costs of arbitraging or enhance the efficiency in carrying out such activities will also be applicable to hedging activities. As such, the strategies discussed in this paper will also assist in raising hedging activities.

Estimates of Turnover of HSI stocks due to Arbitrage Activities

- Arbitrage in this paper refers to trading to take riskless or near riskless profit from price differentials in related markets. This follows the definition adopted in HKEx's Derivatives Market Transaction Survey (DMTS).
- Estimates of turnover of HSI stocks due to arbitrage activities are based on :

$$\text{Estimates} = \sum \alpha_i T_i ,$$

where α represents the share of turnover of derivatives products for arbitrage;
 T represents the notional value of turnover of a certain derivatives product; and
 i represents derivatives products such as HSI futures (HSIF), Mini-HSIF, HSI options (HSIO) and stock options of HSI stocks (SOHSI).

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² The research paper is downloadable from the website of the SFC, Research Papers and Statistics, <http://www.hksfc.org.hk/eng/statistics/html/index/index0.html>.

- Estimates show that turnover of HSI stocks due to arbitrage activities is an important element supporting the turnover of HSI stocks (Appendix 1).
- These estimates are necessarily crude, as these are primarily derived from HKEx's DMTS, the assumptions made and professional judgement.
 - The DMTS is conducted on its participants, with information providing to HKEx on a voluntary basis. It has been highlighted in the DMTS that "*the participants might only provide their best estimates instead of hard data. Reliability of results is subject to the closeness of their estimates to the actual figures.*" Therefore, such figures need to be used and interpreted with caution.
 - We assumed that arbitrage activities take place between the cash market and the derivatives market. However, these can take place among various derivatives products such as :
 - ☞ between HSIF and HSIO
 - ☞ between Mini-HSIF and HSIO
 - ☞ between HSIF and Mini-HSIF
 - ☞ between HSIF / Mini-HSIF / HSIO and TraHK
 in which cases the turnover of HSI stocks is unaffected. It is noted however that the turnover of TraHK due to arbitrage activities should not affect the turnover of HSI stocks significantly because the former has been accounting for a very small proportion – usually less than 3% – of the latter (Appendix 2).
 - We have not included the impact of issuing derivatives warrants and the impact of trading activities of derivatives products in the OTC market, as such information is not available. Therefore, certain professional adjustments will be made where appropriate.
- While the estimates are crude, they give a clear indication that arbitrage is an important element supporting the turnover of HSI stocks. It follows that an active derivatives market or an active derivative product raises turnover of the cash market. Similarly, reducing the costs of arbitrage activities will increase arbitrage opportunities, thus enhancing liquidity on both sides.

An Active Derivatives Market and/or An Active Derivatives Product

- Statistics of the FIBV show that while the stock market of Hong Kong was the 9th largest in the world, the derivatives market was ranked 17th in 2001. Turnover of the derivatives market in notional value was 82% of the market cap of the stock market. This was lower than major markets such as the US (235%), the UK (120%), France (143%) and Korea (228%)³.
- In fact, except for HSIF, trading of most listed derivatives products has not been very active. Among other factors, one possible reason is the low retail participation rate. According to the DMTS, local retail investors accounted for 29% of the total turnover of all derivatives products for the 12 months ending Jun 2002 (Chart 1)⁴. By type of derivatives product, local retail investors constituted 42% of the turnover of HSIF. Corresponding figures for HSIO, Mini-HSIF and stock options were 29%, 64% and 9%. Retail participation in Mini-HSIF has been relatively higher due to its smaller contract size – one-fifth of that of a standard HSIF contract.

³ Sourced from the FIBV, these figures were in 1999 and were the latest available figures for turnover of derivatives products in notional values.

⁴ This compared to the 36% for the participation rate of local retail investors in the cash market, according to HKEx's Cash Market Transaction Survey for the 12 months ending Sep 2001.

Chart 1a – Turnover of All Derivatives Products by Investor Type
(For The Year Ending Jun 2002, %)

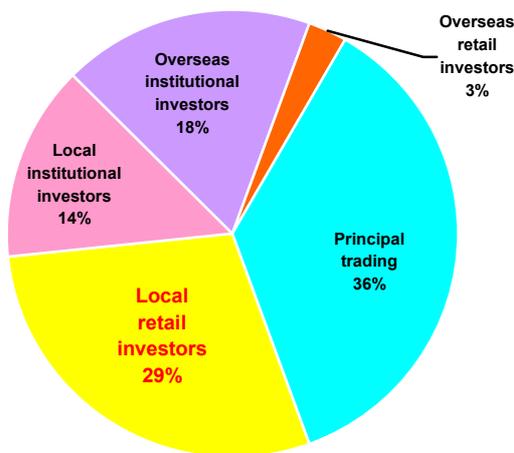
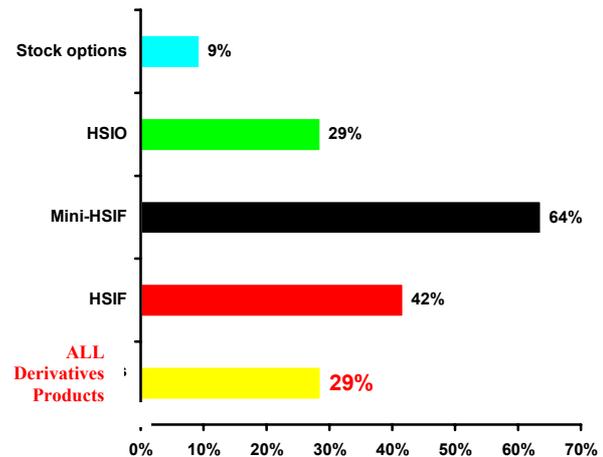


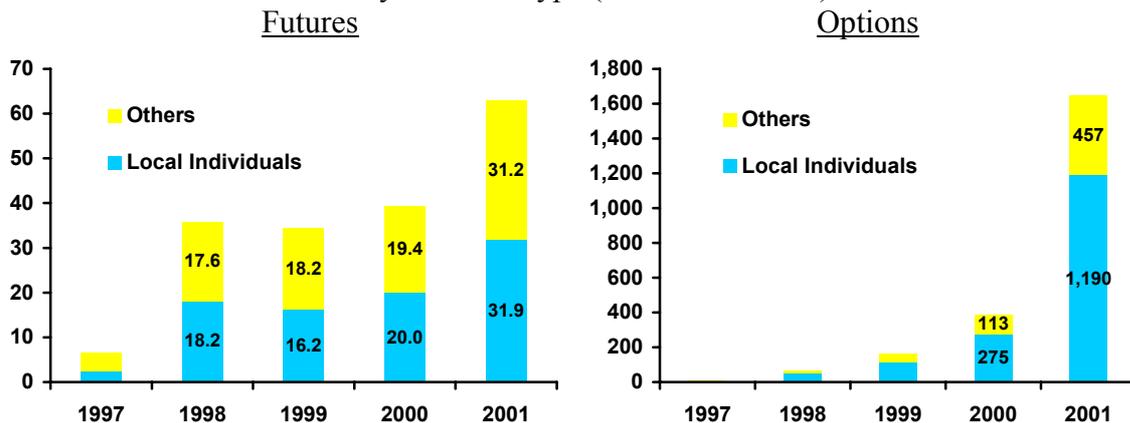
Chart 1b – Participation Rate of Local Retail Investors by Derivative Product
(For The Year Ending Jun 2002, %)



Source: HKEx, DMTS 2001/2002

- Estimates also show that turnover of HSI stocks arising from arbitrage activities is mainly due to the HSIF (Chart 5 of Appendix 1). The contributions of other listed derivatives products are much smaller.
- Retail participation is a necessary factor for a derivatives market to takeoff, as the participation of retail investors is essential to provide sufficient liquidity. While retail investors may not have the resources to carry out arbitrage activities, the liquidity provided by their presence is crucial to attract institutional investors who are the main arbitrageurs.
- For instance, the retail participation rate is much higher in Korea Stock Exchange, which has emerged as the largest exchange around the globe in terms of the number of derivatives contracts traded. In Korea, local individuals contributed 51% to total futures trading and 72% to total options trading in 2001 (Chart 2).⁵

Chart 2 – Turnover Volume by Investor Type (million contracts)



Source: Korea Stock Exchange

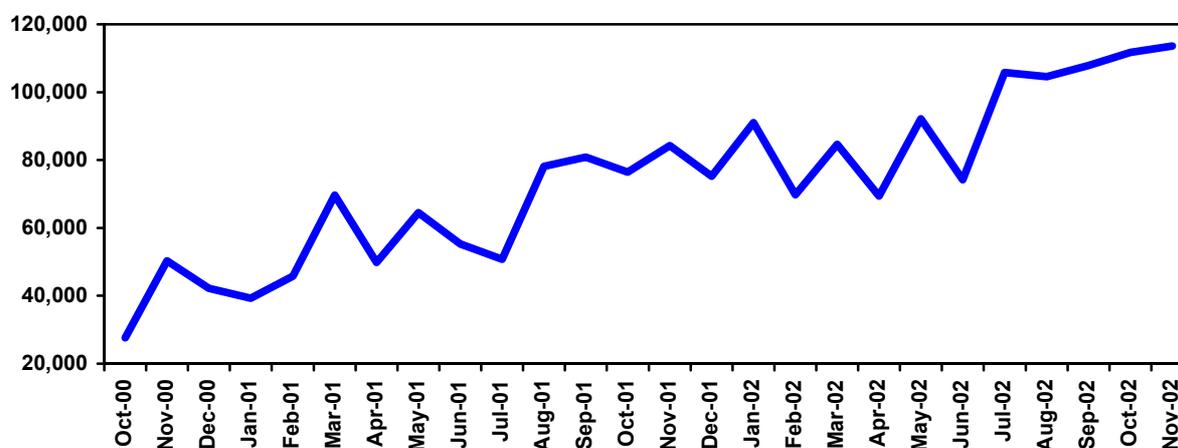
⁵ Readers may refer to the Market Update of the Quarterly Bulletin (2002 Winter, Issue No. 50) of the SFC for a brief comparison of the development of the derivatives markets in 2002. The Market Update article is downloadable from the SFC website at http://www.hksfc.org.hk/eng/press_releases/html/index/index2.html.

- EUREX and derivatives exchanges in the US also have active retail participation to provide liquidity. In contrast, retail investors and their intermediaries in Hong Kong are relatively less active in trading derivatives. They appear to be less familiar with using derivatives as tools in managing risks.
- Among other things, one way to raise the retail participation rate in Hong Kong is enhancing broker and investor (both retail and institutional) education in derivatives trading and the use of derivatives as risk management tools.
 - On the demand side, there is on-going work on investor education, but it has been mostly on retail investors. More work needs to be done to educate institutional investors in using derivatives to manage risks, as local institutional investors only accounted for 14% of the total turnover for the 12 months ending Jun 2002.
 - On the supply side, greater attention on educating intermediaries is also needed so that they see the business opportunities and have the knowledge to sell derivatives products to investors.

Launching New Derivatives Products

- Introducing new derivatives products that cater for retail needs would be another option. The sustained increase in the turnover of Mini-HSIF shows that there is a demand by retail investors for such small-sized derivatives products (Chart 3). Reflecting this, local retail investors contributed 64% to the total turnover of Mini-HSIF for the 12 months ending Jun 2002. Following the success of Mini-HSIF, the Mini-HSIO was launched on 18 Nov 2002.

Chart 3 – Turnover of Mini-HSIF (Volume, contract)



Remark: Mini-HSIF was launched in Oct 2000.

Source: HKEx

Improving Efficiency in Carrying Out Arbitrage Activities

- In the case where the HSIF is traded at a discount to the cash market, arbitrageurs may need to short sell HSI stocks.
 - This will involve securities borrowing and lending (SBL) arrangements.
 - ☞ The SFC and HKEx are studying the possibility of establishing a centralized SBL system.
 - ☞ One of the objectives is to enable small brokers and retail investors to borrow stocks which may facilitate short selling activities.

- In addition, the tick rule prohibits the short sale of a stock at a price below the current best offer price.
 - ☞ Whilst the tick rule aims to alleviate the selling pressure in a declining market, it increases the cost of short selling. As a short seller cannot short sell at the price at which there are buying interests (current best bid), the tick rule therefore discourages the execution of arbitrage transactions as a little price difference could mean a significant cut in profit.
 - ☞ Besides, a short seller needs to line up at the current best offer queue to wait for execution. When there is a change in the current best offer price, the short seller will need to re-enter the order at the new offer price.
 - ☞ The tick rule therefore discourages arbitrage activities which require timely execution of trades. The delay in execution caused by the tick rule increases the transaction cost and pricing risk of these transactions.
 - ☞ The SFC therefore approved HKEx's proposal in late 2001 that tick rule exemption should be granted to genuine index arbitrage transactions.
- The SFC published on 28 Nov 2002 a revised Guidance Note for Short Selling Reporting and Stock Lending Record Keeping Requirements.
 - ☞ This guidance note elaborates the law which extends exemptions to market making transactions on the exchanges and introduces alternative methods of complying with the covered short selling reporting requirements.
 - ☞ By reducing the burden of reporting, it is hoped that short selling activities can be carried out more efficiently.
- Targeting larger investors and promoting the trading of HSI-related derivatives products, the SFC and HKEx have agreed to raise the large open position reporting requirement from the existing 250 to 500 contracts.
 - By raising the reporting requirement and thus reducing the cost of reporting, investors and intermediaries will be more willing to trade derivatives or use derivatives in arbitrage activities.
- Reducing the board lot size of HSI stocks will also help reduce the entry cost for arbitrage activities. This is particularly important to the arbitrage activities against the Mini-HSIF, as it is only one-fifth the size of a standard HSIF contract. HKEx is studying the feasibility.
 - Arbitrage activities involve the purchase of the 33 HSI stocks or at least the largest 7-8 stocks at the same time. The cost required to buy one lot of all 33 HSI stocks amounted to HK\$483,120 at the end of Oct 2002, while that for the largest 7 stocks (71% of the total market cap of the 33 stocks) was HK\$205,225. These compared to the contract size of a Mini-HSIF contract of HK\$94,000 at the end of Oct 2002.
 - If the board lot size of HSI stocks is reduced, the entry cost will be lowered, thus allowing more efficient arbitrage between the two markets. It may also reduce the tracking error of replicating the HSI.
 - Nevertheless, reducing the board lot size of HSI stocks will involve a number of other issues which will require further studies before we arrive at any concrete conclusion.

Appendix 1 – Estimates of Turnover of HSI stocks due to Arbitrage Activities

- Estimates of the turnover of HSI stocks due to arbitrage activities are based on the following equation :

$$Estimates = \sum \alpha_i T_i ,$$

where α represents the share of turnover of derivatives products for the purpose of arbitrage;

T represents the notional value of turnover of a certain derivatives product; and i represents derivatives products such as HSI futures (HSIF), Mini-HSIF, HSI options (HSIO) and stock options of HSI stocks (SOHSI).

- While α_i (the share of turnover of derivatives products for the purpose of arbitrage) is obtainable from the DMTS, T_i (turnover of various products in notional value) can also be estimated in the following manner.

Transaction of Derivatives Products for the Purpose of Arbitrage

- According to the DMTS, the main transaction purpose of listed derivatives products was “pure trading”. This accounted for some 40-90% of the total, with the remaining for the purposes of “arbitrage” and “hedging”.
- Definitions of these terms follow those in the DMTS and are defined as follows :
 - Arbitrage – Trading to take riskless or near riskless profit from price differentials in related markets.
 - Hedging – Utilisation of futures/options to reduce or eliminate the market risk of a portfolio by compensating for the effect of price fluctuations of an underlying asset.
 - Pure trading – Trading for potential profit in anticipation of a price movement in either the short or long term, but not for hedging or arbitrage purpose.
- Notice however that the DMTS is conducted on its participants, with information provided to HKEx on a voluntary basis. It has been highlighted in the DMTS that “*the participants might only provide their best estimates instead of hard data. Reliability of results is subject to the closeness of their estimates to the actual figures.*” Therefore, such figures need to be used and interpreted with caution.
- Table 1 shows that the shares of transaction of various derivatives products for the purpose of arbitrage. A relatively smaller share of HSIF was transacted for the purpose of arbitrage, but those of HSIO and Mini-HSIF were comparatively larger.

Table 1 – Transaction of Derivatives Products due to Arbitrage (%)

For the 12 months ending	Jun 1999	Jun 2000	Jun 2001	Jun 2002
HSI futures	8.5%	6.6%	13.5%	8.7%
HSI options	23.2%	16.8%	17.8%	13.4%
Mini-HSI futures	n.a.	n.a.	25.1%	15.5%
Stock options	n.a.	n.a.	9.6%	15.4%

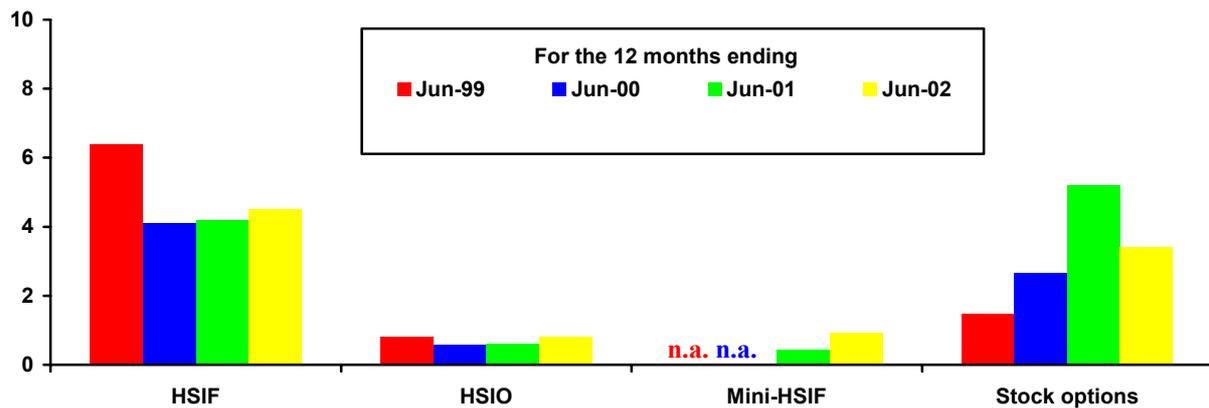
Remark: Mini-HSIF was launched in Oct 2000. Stock options were not covered by the DMTS prior to 2000/2001. Stock futures have not been covered by the DMTS.

Source: HKEx, DMTS 1998/1999-2001/2002

Turnover of Derivatives Products in Value Terms

- In terms of turnover volume, the HSIF and stock options are the major derivatives products (Chart 4). The two are followed by the HSIO and the Mini-HSIF.
- As the DMTS did not cover stock futures, it is not possible to estimate the turnover of HSI stocks arising from arbitrage of stock futures. Nevertheless, this should not affect the final results in any significant manner because the turnover of stock futures is relatively low (e.g. about 2,000 contracts for the 12 months ending Jun 2001).

Chart 4 – Turnover of Major Derivatives Products (Million Contracts)



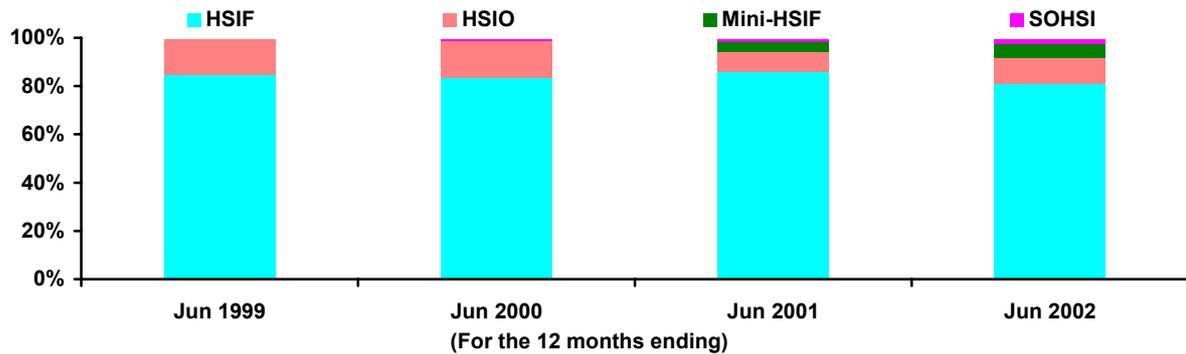
Remark: Mini-HSIF was launched in Oct 2000.

Source: HKEx

- To estimate the turnover of HSI stocks arising from arbitrage activities, we convert the turnover of these derivatives products to notional values⁶ and multiply by the transaction ratios for arbitrage purpose to obtain the estimates of turnover of HSI stocks arising from arbitrage activities.
- Estimates show that turnover of HSI stocks due to arbitrage activities is an important element supporting the turnover of HSI stocks.
- Turnover of HSI stocks arising from arbitrage activities is mainly due to the HSIF. For instance, the HSIF contributed 81% to the estimated total for the 12 months ending Jun 2002. The contributions in previous years were even larger. The shares of other derivatives products were much smaller (Chart 5).

⁶ In calculating the notional value, turnover of a derivatives product in a trading day is multiplied by the closing price of the product of the day, the contract size of the product and the delta value. For the delta value, a figure of 1 is taken for futures while a figure of 0.5 is assumed for options for convenience sake but in line with market practice. In estimating the turnover of HSI stocks arising from arbitrage activities of SOHSI, the transaction purpose ratio for SOHSI is not available and is approximated by that for all stock options. This should not affect the final results significantly as the turnover of SOHSI accounts for the majority of the turnover of all stock options.

Chart 5 – Contribution of Arbitrage Activities to the Turnover of HSI Stocks (By Derivatives Product, %)



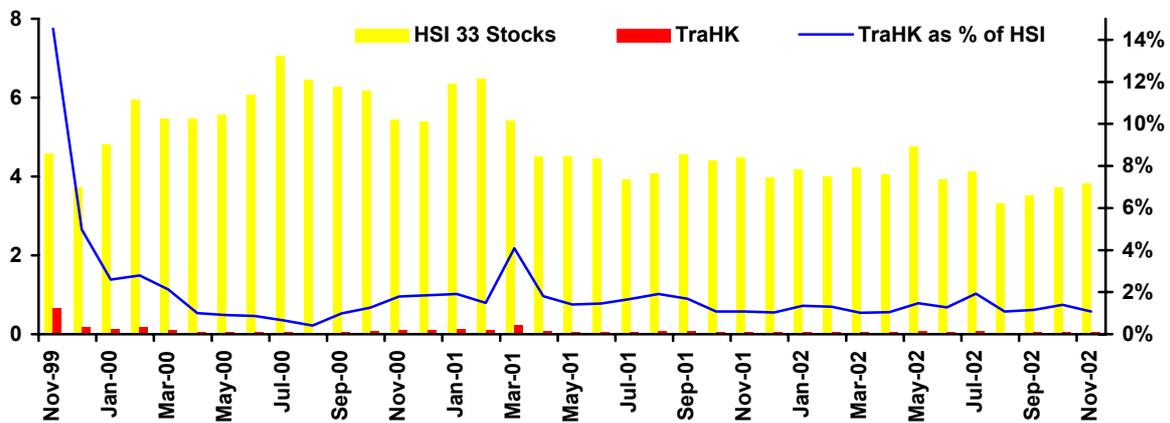
Remark: Mini-HSIF was launched in Oct 2000.

Source: SFC Research estimates

Appendix 2 – Average Daily Turnover of HSI stocks and TraHK

- Turnover of TraHK due to arbitrage activities should not affect the turnover of HSI stocks significantly because the former has been accounting for a very small proportion of the latter. With the exception of the first few months after the inception of TraHK, the share has usually been less than 3% (Chart 6).

Chart 6 – Average Daily Turnover of HSI Stocks and TraHK (HK\$ bn)



Remark: TraHK was launched in Nov 1999.

Source: HKEx