

Internet Appendix 1: Sample Cross-Listed Stocks

The table below reports all 53 firms with cross-listed A-shares and H-shares in our sample. The time for cross-listing is in boldface.

No.	Name	Sector	H-Shares	H-share IPO date	A-Shares	A-share IPO date
1	Tsingtao Brewery Co Ltd	Beverages	168 HK	7/15/1993	600600 CH	8/27/1993
2	Guangzhou Shipyard International	Machinery	317 HK	8/6/1993	600685 CH	10/28/1993
3	Sinopec Shanghai Petrochemical	Chemicals	338 HK	7/26/1993	600688 CH	11/8/1993
4	Shenji Group Kunming Machine	Machinery	300 HK	12/7/1993	600806 CH	1/3/1994
5	Maanshan Iron & Steel	Metals & Mining	323 HK	11/3/1993	600808 CH	1/6/1994
6	Beiren Printing Machinery	Machinery	187 HK	8/6/1993	600860 CH	5/6/1994
7	Tianjin Capital Environmental	Commercial Services & Supplies	1065 HK	5/17/1994	600874 CH	5/17/1994
8	Dongfang Electric Corp Ltd	Electrical Equipment	1072 HK	6/6/1994	600875 CH	6/6/1994
9	Luoyang Glass Co Ltd	Building Products	1108 HK	7/8/1994	600876 CH	10/31/1995
10	Sinopec Yizheng Chemical Fiber	Chemicals	1033 HK	3/29/1994	600871 CH	4/11/1995
11	Northeast Electric Development	Electrical Equipment	42 HK	7/5/1995	000585 CH	12/13/1995
12	Nanjing Panda Electronics Co L	Communications Equipment	553 HK	4/24/1996	600775 CH	11/18/1996
13	Jingwei Textile Machinery	Machinery	350 HK	2/2/1996	000666 CH	12/10/1996
14	Shandong Xinhua Pharmaceutical	Pharmaceuticals	719 HK	12/31/1996	000756 CH	8/6/1997
15	China Eastern Airlines Corp Lt	Airlines	670 HK	2/5/1997	600115 CH	11/5/1997
16	Angang Steel Co Ltd	Metals & Mining	347 HK	7/24/1997	000898 CH	12/25/1997
17	Yanzhou Coal Mining Co Ltd	Oil, Gas & Consumable Fuels	1171 HK	4/1/1998	600188 CH	7/1/1998
18	Hisense Kelon Electrical Holding	Household Durables	921 HK	7/23/1996	000921 CH	7/13/1999
19	Jiangsu Expressway Co Ltd	Transportation Infrastructure	177 HK	6/27/1997	600377 CH	1/16/2001
20	Guangzhou Pharmaceutical Co Lt	Pharmaceuticals	874 HK	10/30/1997	600332 CH	2/6/2001
21	China Petroleum & Chemical Co	Oil, Gas & Consumable Fuels	386 HK	10/19/2000	600028 CH	8/8/2001
22	Huaneng Power International In	Independent Power Producers &	902 HK	1/21/1998	600011 CH	12/6/2001
23	Shenzhen Expressway Co Ltd	Transportation Infrastructure	548 HK	3/12/1997	600548 CH	12/25/2001
24	Jiangxi Copper Co Ltd	Metals & Mining	358 HK	6/12/1997	600362 CH	1/11/2002
25	Anhui Conch Cement Co Ltd	Construction Materials	914 HK	10/21/1997	600585 CH	2/7/2002
26	China Shipping Development Co	Marine	1138 HK	11/11/1994	600026 CH	5/23/2002
27	Anhui Expressway Co	Transportation Infrastructure	995 HK	11/13/1996	600012 CH	1/7/2003

No.	Name	Sector	H-Shares	H-share IPO date	A-Shares	A-share IPO date
28	China Southern Airlines Co Ltd	Airlines	1055 HK	7/31/1997	600029 CH	7/25/2003
29	ZTE Corp	Communications Equipment	763 HK	12/9/2004	000063 CH	11/18/1997
30	Huadian Power International Co	Independent Power Producers &	1071 HK	6/30/1999	600027 CH	2/3/2005
31	Bank of China Ltd	Commercial Banks	3988 HK	6/1/2006	601988 CH	7/5/2006
32	Air China Ltd	Airlines	753 HK	12/15/2004	601111 CH	8/18/2006
33	China Merchants Bank Co Ltd	Commercial Banks	3968 HK	9/22/2006	600036 CH	4/9/2002
34	Beijing North Star Co Ltd	Real Estate Management & Devel	588 HK	5/14/1997	601588 CH	10/16/2006
35	ICBC	Commercial Banks	1398 HK	10/27/2006	601398 CH	10/27/2006
36	Datang International Power Generation Co Ltd	Independent Power Producers &	991 HK	3/21/1997	601991 CH	12/20/2006
37	Guangshen Railway Co Ltd	Road & Rail	525 HK	5/14/1996	601333 CH	12/22/2006
38	China Life Insurance Co Ltd	Insurance	2628 HK	12/18/2003	601628 CH	1/9/2007
39	Chongqing Iron & Steel Co Ltd	Metals & Mining	1053 HK	10/17/1997	601005 CH	2/28/2007
40	Ping An Insurance Group Co of	Insurance	2318 HK	6/24/2004	601318 CH	3/1/2007
41	China CITIC Bank Corp Ltd	Commercial Banks	998 HK	4/27/2007	601998 CH	4/27/2007
42	Aluminum Corp of China Ltd	Metals & Mining	2600 HK	12/12/2001	601600 CH	4/30/2007
43	Weichai Power Co Ltd	Machinery	2338 HK	3/11/2004	000338 CH	4/30/2007
44	Bank of Communications Co Ltd	Commercial Banks	3328 HK	6/23/2005	601328 CH	5/15/2007
45	China COSCO Holdings Co Ltd	Marine	1919 HK	6/30/2005	601919 CH	6/26/2007
46	China Construction Bank Corp	Commercial Banks	939 HK	10/27/2005	601939 CH	9/25/2007
47	China Oilfield Services Ltd	Energy Equipment & Services	2883 HK	11/20/2002	601808 CH	9/28/2007
48	China Shenhua Energy Co Ltd	Oil, Gas & Consumable Fuels	1088 HK	6/15/2005	601088 CH	10/9/2007
49	PetroChina Co Ltd	Oil, Gas & Consumable Fuels	857 HK	4/7/2000	601857 CH	11/5/2007
50	China Railway Group Ltd	Construction & Engineering	390 HK	12/7/2007	601390 CH	12/3/2007
51	China Shipping Container Lines	Marine	2866 HK	6/16/2004	601866 CH	12/12/2007
52	China Coal Energy Co Ltd	Oil, Gas & Consumable Fuels	1898 HK	12/19/2006	601898 CH	2/1/2008
53	China Railway Construction Cor	Construction & Engineering	1186 HK	3/13/2008	601186 CH	3/10/2008

Internet Appendix 2 Identification with Discount Rate Fluctuation

Now, we allow a role for the discount rate. The discount rate could also show market specific features. For example, different investor bases could vary the discount rate in A and H markets. To factor this in, we write the discount rate change for A- and H-shares following the capital asset pricing model (CAPM).

$$k_i^A = r_f^A + (\bar{r}_m^A - r_f^A)b_i^A \quad (1')$$

$$k_i^{H,FX} = r_f^{H,FX} + (\bar{r}_m^{H,FX} - r_f^{H,FX})b_i^H \quad (2')$$

k_i^A and $k_i^{H,FX}$ refer to stock i 's discount rate in the A- and H-share markets, while r_f^A and $r_f^{H,FX}$ are expected risk free returns in the A- and H-share markets at time t , respectively. $(\bar{r}_m^A - r_f^A)$ and $(\bar{r}_m^{H,FX} - r_f^{H,FX})$ are the expected market excess returns in A and H markets respectively, while b_i^A and b_i^H are stock betas for firm i in each market.

Following Chari and Henry (2004), since the Hong Kong market can be accessed freely by global investors, we assume the H-share discount rate can be expressed in terms of the global market risk premium as

$$k_i^{H,FX} = r_f^* + \beta_i^W \gamma \sigma_W^2 = k_i^* \quad (3')$$

ere, $(\bar{r}_W - r_f^*) = \gamma \sigma_W^2$, where γ is the coefficient of relative risk aversion and σ_W^2 is the variance of the return on the global market portfolio. β_i^W denotes firm i 's beta with the world market, and r_f^* denotes world risk-free rate.

On the other hand, based on the fact that the Chinese government allows neither domestic investors to access the global market nor foreign investors to invest in A-shares, it motivates the following functional form similar to Chari and Henry (2004) for the A-share discount rate.

$$\begin{aligned} k_i^A &= r_f^* + \beta_i^W \gamma \sigma_W^2 + (r_f^A - r_f^*) + \gamma [\text{cov}(r_i^A, r_m^A) - \text{cov}(r_i^A, r_W)] \\ &= k_i^* + (r_f^A - r_f^*) + \gamma [\text{cov}(r_i^A, r_m^A) - \text{cov}(r_i^A, r_W)] \end{aligned} \quad (4')$$

Further, we could simplify the above expression of discount rates as follows.

$$k_{it}^A = k_{it}^* + \pi_{it}^A \quad (5')$$

$$k_{it}^{H,FX} = k_{it}^* \quad (6')$$

where $\pi_{it}^A = (r_{f,t}^A - r_{f,t}^*) + \gamma [\text{cov}(r_{i,t}^A, r_{m,t}^A) - \text{cov}(r_{i,t}^A, r_{W,t})]$ reflects the degree of market segmentation. When market is fully integrated with the world market, then $\pi_{it}^A = 0$.

Assuming changes in discount rates take the forms of (5') and (6'), the A- and H-share return can now be rewritten as

$$r_{it}^A = d_{it} - (k_{it}^* + \pi_{it}^A) + \delta_{it}^A + b_{it}^H \quad (7')$$

$$r_{it}^{H,FX} = d_{it} - k_{it}^* + s_{it}^H \quad (8')$$

Assume the fundamental components— d_{it} and k_{it}^* —are independent of all other components. Further, we assume no cross-market correlation between market-specific components, which means that $cov(\delta_{it}^A, s_{it}^H) = 0$, and $cov(\pi_{it}^A, s_{it}^H) = 0$.

In the relation of stock price volatility, they take the forms of (9') and (10') when incorporating discount rate changes.

$$Var(r_{it}^A) = Var(d_{it}) + Var(k_{it}^*) + Var(\pi_{it}^A) + Var(\delta_{it}^A) + b^2 Var(s_{it}^H) \quad (9')$$

$$Var(r_{it}^{H,FX}) = Var(d_{it}) + Var(k_{it}^*) + Var(s_{it}^H) \quad (10')$$

Analogous to (14), when there is a change in transaction tax in the A-share market, the relative volatility can be written as follows:

$$\frac{\Delta Var(r_{it}^A) - \Delta Var(r_{it}^{H,FX})}{\Delta tax^A} = \frac{\Delta Var(\pi_{it}^A) + \Delta Var(\delta_{it}^A)}{\Delta tax^A} \quad (11')$$

If we regress difference in return volatilities on *High_Tax* dummy following Equation (13), then $\widehat{\gamma}_1^* = \Delta Var(\pi_{it}^A) + \Delta Var(\delta_{it}^A)$ provides an estimate of the impact of stamp duty increase on relative volatility. It is noteworthy that both $Var(\pi_{it}^A)$ and $Var(\delta_{it}^A)$ are functions of degree of market segmentation. When market is fully integrated, both terms reduce to zero, whereas when market is perfectly segmented, the values reach their maximum. Therefore, in the case of partial market segmentation, $\widehat{\gamma}_1^*$ will be less than the point estimates in perfectly segmented scenario. Again, this suggests that with partial market segmentation, we underestimate the coefficient of interest.

Internet Appendix 3 Market Efficiency and Stamp duty

In the tables below, we provide test results of the effect of stamp duty changes on market efficiency. In Panel A, we first compute the variance ratio of A-share returns before and after each stamp duty change for 5, 10, and 15 trading days, respectively. For each window, we calculate the variance ratio as $VR(n) = \frac{Var(t,t+n)}{nVar(t,t+1)} = 1 + np(1)$, where n is the number of trading days within the window. The ratio would be one under the null that the log price follows a random walk. The greater the ratio deviates from one, the further away the log price is from a random walk. We compute the variance ratios in both high and low tax regimes, respectively, and t-statistics on the difference between the two values are reported. In Panel B, we adopt the latest method in accounting which examines market efficiency by looking at the speed at which price adjusts to new information in an event study setting. To be specific, we look at the post earnings announcement drift (PEAD) for all A-shares from 2002 to 2014. (2002 was the first year in which information on quarterly earnings announcements became available.) We follow the standard PEAD studies, and incorporate the absolute level of stamp duty tax at each earnings announcement. SUE refers to “standardized unexpected earnings.” The interaction term between stamp duty level and SUE is our key independent variable. Robust standard errors are clustered at the firm level and reported in parentheses. ***, **, and * indicate statistically significant at 1%, 5%, and 10% levels, respectively. Constant terms are omitted in reporting.

Panel A Variance Ratio

Variance Ratio	5 trading days	10 trading days	15 trading days
Low tax regime	1.09	1.07	1.13
High tax regime	1.04	0.92	0.99
Difference (t-stat)	1.96*	3.68***	2.61***

Panel B Post-Earnings Announcement Drift (PEAD)

VARIABLES	CAR[6,65]
Stamp Tax	0.001 (0.000)
Stamp Tax*SUE	-0.087** (0.035)
SUE	0.639*** (0.085)
Observations	48,346
Quarter FE	Yes
Firm FE	Yes
Cluster at	Firm
Adj. R-square	-0.005

Internet Appendix 4 Baseline Regression without Consideration of Exchange Rate Fluctuation

In the table below, we re-run our baseline regression of difference in price volatility between the A-share and its cross-listed H-share on the high tax dummy as in Table 6. Unlike in Table 6, both V(A) and V(H) are measured in local currency. Especially, in the calculation of V(H), we ignore the effect of exchange rate between RMB and HKD. Firm and event fixed effects are controlled. Robust standard errors are clustered at the firm level and reported in parentheses. ***, **, and * indicate statistically significant at 1%, 5%, and 10% levels, respectively. Constant terms are omitted in reporting.

VARIABLES	V(A)-V(H)							
	(1) Full sample	(2) Full sample	(3) Subsample	(4) Excl. last 3 events	(5) Full sample	(6) Full sample	(7) Full sample	(8) Fama-MacBeth Subsample
HIGH_TAX	-0.0027*** (0.0008)	-0.0070*** (0.0010)	-0.0058*** (0.0009)	-0.0177*** (0.0010)	-0.0074*** (0.0009)	-0.0058*** (0.0008)	-0.0055*** (0.0009)	-0.0068* (0.0039)
Interest (China)	-0.0488** (0.0230)	0.5432*** (0.0467)	0.8151*** (0.1204)	0.1222 (0.0813)	1.1354*** (0.0764)	1.8404*** (0.1314)	0.4105*** (0.0335)	-0.2790** (0.1248)
Δ Interest (China-HK)	-0.1480*** (0.0280)	-0.2706*** (0.0233)	-0.2641*** (0.0263)	0.2640*** (0.0562)	-0.4760*** (0.0466)	-0.6518*** (0.0724)	-0.1808*** (0.0173)	-0.0104 (0.1282)
Estimated over	1 year	1 year	1 year	1 year	6 months	3 months	monthly	monthly
Observations	446	446	392	158	446	446	5,091	4,479
Firm fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Event fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Newey-West standard error	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
Standard error cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	N/A
Adj. R-square*	0.10	0.54	0.58	0.82	0.53	0.53	0.23	0.29

* Average R-square are reported for Fama-MacBeth regression.

Internet Appendix 5 Non-shortable vs. Shortable Counterfactual

This table provides results of stock price volatility in subsamples. We divide the sample into two groups based on the shortability of cross-listed H-shares at the time of stamp duty changes in the A-share market. We follow the model specifications as in column 2 of Table 6 and Table 7 (Panel A and Panel B). Firm and event fixed effects are controlled. Robust standard errors are clustered at the firm level and reported in parentheses. ***, **, and * indicate statistically significant at 1%, 5%, and 10% levels, respectively. Constant terms are omitted in reporting.

VARIABLES	Non-shortable H-share counterfactual			Shortable H-share counterfactual		
	V(A)-V(H)	VAR(A)-VAR(H)	Log(V(A)/V(H))	V(A)-V(H)	VAR(A)-VAR(H)	Log(V(A)/V(H))
HIGH_TAX	-0.0071*** (0.0016)	-0.0004*** (0.0001)	-0.2604*** (0.0525)	-0.0073*** (0.0013)	-0.0004*** (0.0001)	-0.2658*** (0.0328)
Interest (China)	2.2015*** (0.3007)	0.1681*** (0.0242)	61.2728*** (8.7815)	0.5015*** (0.0399)	0.0293*** (0.0032)	17.8587*** (1.3202)
Δ Interest (HK-China)	-0.0666 (0.0623)	-0.0019 (0.0047)	-3.4415* (1.9300)	-0.2869*** (0.0245)	-0.0202*** (0.0019)	-9.0993*** (0.8441)
Observations	72	72	72	374	374	374
Event FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster at	Firm	Firm	Firm	Firm	Firm	Firm
Adj. R-square	0.70	0.70	0.68	0.56	0.50	0.59