Online Appendix for

"Demand Curves for Stocks Slope Down in the Long Run: Evidence from the Chinese Split-Share Structure Reform"

This appendix reports on extensions and robustness tests of the results reported in "Demand Curves for Stocks Slope Down in the Long Run: Evidence from the Chinese Split-Share Structure Reform." Section 1 reports the process of the lockup expiration of the non-tradable shares. Section 2 reports the regression results when we include the A/H shares. We also report the results if we only include the A/H shares. Section 3 reports the results on how *ΔFloat* is associated with the actual A-share supply increase as measured by non-tradable shareholders' selling. We find that firms with higher *ΔFloat* indeed experienced a higher A-share supply. Section 4 displays the relation between change in premium and *ΔFloat* using scatter plots. Section 5 reports the analysis of a trading strategy trying to exploit the predictable effect of the long-term demand curve.

Section 1. The process of lockup expiration

According to the guidelines issued by the CSRC, a lockup period for the converted non-tradable shares is imposed. This lockup period has to be at least one year, and the length varies across different non-tradable investors. For investors who own less than 5% of the total number of a firm's shares, all shares will become tradable one year after reform completion. Investors who own more than 5% (typically strategic shareholders and very often the controlling shareholder) are allowed to sell no more than 5% of the total number of a firm's shares within the second year and no more than 10% in the second year and the third year combined. By the end of the third year after the reform, most lockups have expired. We report the detailed lockup expiration schedule in Table IA1.

Section 2. *ΔFloat* and change in premium – including A/H firms

In Table IA2, we include the A/H firms into our sample. The paper focuses on A/B firms because this was the dominant type of dual-class Chinese firms. Dual-listing in the Hong Kong H share market is now more popular than dual-listing in the B share market. However, at the Split-Share Structure Reform, the number of dual-listed A/H firms was only 28. Our results are robust if we include them in our sample.

Section 3. *ΔFloat* and non-tradable shareholders' trading

Our identification relies on the assumption that *ΔFloat* is a good proxy for the increase in supply. The existing literature has made the same assumption (Firth, Lin, and Zou, 2010; Li, Wang, Cheung, and Jiang, 2011). Megginson, Nash, Netter, and Poulsen (2005), using a sample of 900 privatization cases around the world, also find that, on average, governments sell 35% of their ownership in state-owned enterprises. In this subsection, we collect data and examine whether *ΔFloat* is correlated with non-tradable shareholders' selling.[1]

We manually collect data on non-tradable shareholders' holdings from firms' annual reports. Firms are required to report their ten largest shareholders for each fiscal year-end. For each firm, we obtain the list of its non-tradable shareholders at the most recent year-end before the reform and collect their holdings for each year-end afterward. On average, these non-tradable shareholders hold 81% of the non-tradable shares in the year-end before the reform. We assume its ownership

[1] Firms can also conduct seasoned equity offerings to increase their share supply. In our sample period, firms were not allowed to issue additional B-shares. We therefore examine whether A-share issuance is related to *ΔFloat*. In Table IA4 of the Internet Appendix, we find that firms' issuance is unrelated to *ΔFloat*.

becomes zero for a non-tradable shareholder who later disappears from the ten largest shareholder list. The average (highest) ownership of our sample firms' tenth largest shareholder is 0.39% (1.41%). The results are very similar if we assume that the ownership of the disappeared non-tradable shareholder equals that of the tenth largest shareholder.

Figure IA1 presents the aggregate holdings of these non-tradable shareholders. The x-axis is the year relative to the reform. The y-axis is the ratio of non-tradable shareholders' aggregate holdings to the initial number of tradable shares, where the initial number of tradable shares is measured at t_0 and adjusted by stock splitting and new issuance. Non-tradable shareholders' aggregate holdings are 4.76 times of the initial tradable shares. The ratio decreases to 2.89 by the end of 2014. On average, non-tradable shareholders sell 40% of their holdings. They still control most of the firms, but their ownership significantly decreases from 70% to 42%. It is also evident that most of the change occurs in the first three years after the reform, and the speed of selling becomes much slower after that.

In Table IA3, we investigate whether *ΔFloat* is correlated with the decrease in non-tradable shareholders' holdings by regressing the decrease in non-tradable shareholders' holdings over different horizons on *ΔFloat*. The coefficients of *ΔFloat* are positive for all of the horizons. They increase in the first few years and become flat from year five onwards. This is consistent with the pattern in Figure IA1. In December 2014, the coefficient of *ΔFloat* is 0.20 (t=3.76), and the intercept is 0.63. Table 1 shows that the average *ΔFloat* of the low and high *ΔFloat* groups is 2.93 and 9.73. These estimates imply that, by December 2014, the share supply increased by 121.6% and 257.6% for the low *ΔFloat* and high *ΔFloat* groups, respectively. Overall, these results confirm that non-tradable shareholders do sell and that their selling is strongly positively correlated with *ΔFloat*, indicating that *ΔFloat* is a good proxy for A-share supply increase.

Section 4. Virtualizing the main results

Our sample is relatively small. To ensure that our results are not driven by outliers, in Figure IA2, we virtualize each of the nine cross-sections in Table 2 with scatter plots. A clear inverse relationship is evident between *ΔFloat* and *ΔPremium* for all nine horizons. We also find a few very large *ΔFloat* values. If we exclude the firm whose *ΔFloat* is the largest, the inverse relation becomes even stronger.

Section 5. A trading strategy

Considering a hypothetical world where short selling is allowed and foreign currency regulation is lifted, would an arbitrageur be able to profit from the pricing discrepancies across different A/B shares in our sample? To exploit the pricing discrepancies, an arbitrageur would have to buy the A-shares with high *ΔFloat* and short the A-shares with low *ΔFloat*. Suppose he buys the A-shares with ΔFloat above the sample median and shorts the A-shares with ΔFloat below the sample median, from the month after the reform completion (t3) to December 2014. In that case, the average monthly equally-weighted portfolio alpha is -0.14% (*t*=-0.44). If he hedges his positions in A-shares with opposite positions in B-shares, his portfolio alpha would be -0.11% (*t*=-0.36). Even if this arbitrageur had perfect foresight that the price impact would be the largest around two years after the reform and only started to implement the above trading strategy in January 2008, his alpha would be 0.42% (t=1.79) (0.30% if he hedged with trading B-shares (t=0.90)). However, it is unlikely that someone will have perfect foresight.

These results are not surprising because the demand curves become flattered very slowly. The price effects we document only translate into a very small expected return difference between various A-shares. This logic also sheds light on why arbitrage is unlikely to eliminate the price pressure effects caused by float change. Even if an arbitrageur can short sell and have free access to foreign currency, transaction costs such as commissions can easily eat all possible profits. Here we have a case with economically meaningful price-level effects, but little that would be of interest to an arbitrageur.

Table IA1. The process of lockup expiration

This table summarizes the schedule of lockup expiration in the Split-Share Structure Reform. Panel A reports the forecasted lockup expiration. The forecasted lockup expiration is based on the firms' disclosure right after the completion date. Panel B reports the actual lockup expiration. Because some investors make further promises, actual lockup expiration may take longer than forecast, but the difference is small. We define the periods as follows: [0, 6] includes the first six months after reform completion, i.e., t_3 to t_3+6. Other periods are defined similarly. The last column reports the percentage of shares that are still subject to lockup by the end of 2014. In each period, we calculate the percentage of unlocked shares this period over the total non-tradable shares at the start of the reform and take an average over our sample firms. The values reported are in percentages. Data on both forecasted and actual lockup expiration are available from the China Stock Market & Accounting Research (CSMAR) database.

Windows	[0,6]	[7,18]	[19,30]	[31,42]	[43,54]	[55,66]	[67,78]	[79,Dec-14]	Dec-14
Panel A. The forecasted lockup expiration									
Mean	10.291	18.807	13.039	46.423	5.563	4.664	1.212	0.000	0.000
Median	8.450	14.085	9.813	51.136	0.000	0.000	0.000	0.000	0.000
Panel B. The actual lockup expiration									
Mean	10.291	16.330	8.704	42.358	5.582	6.696	1.593	3.777	4.669
Median	8.450	11.422	6.920	44.233	0.000	0.000	0.000	0.000	0.000

Table IA2. *ΔFloat* and change in premium – including A/H firms

This table shows cross-sectional regressions of change in the A/B (or A/H) share premium on *ΔFloat* for various horizons. In Panel A, the sample includes both the A/B firms and the A/H firms. In Panel B, the sample only includes the A/H firms. Change in the A/B (A/H) premium is the difference between the A/B (A/H) share premium *t* months after the reform completion date (t_3) minus the premium right before the reform announcement date (t_0). A/B Dummy equals one for A/B firms and zero for A/H firms. We look at various horizons: *N* refers to *N* months after reform completion. In the last column, *t* is December 2014, which is the end of our sample period. *ΔFloat* is our measure of the change in float. *ΔFloat* is defined as the total number of A-shares divided by the total number of tradable A-shares, measured at the announcement date. AB Dummy is a dummy variable if the firm is dual-listed in the A- and B- markets, and 0 if dual-listed in the A- and H-markets.

$$\Delta Premium_{i,(t0,\ t3+N)} = \alpha_N + \beta_N \Delta Float_i + \gamma AB\ Dummy_i + \varepsilon_{i,(t0,\ t3+N)}.$$

The *t*-statistics are in parentheses.

Panel A. A/B firms and A/H firms

Horizon	0	1	12	24	36	48	60	72	Dec-14
ΔFloat	-0.0247	-0.0277	-0.0456	-0.0573	-0.0415	-0.0310	-0.0310	-0.0359	-0.0253
	(-2.44)	(-2.10)	(-2.89)	(-4.25)	(-3.00)	(-3.11)	(-2.96)	(-2.95)	(-2.41)
A/B	-0.3781	-0.6075	-1.0989	-1.1194	-0.7281	-0.4044	-0.4320	-0.5830	-0.0768
Dummy	(-3.01)	(-3.72)	(-5.61)	(-6.69)	(-4.24)	(-3.27)	(-3.32)	(-3.86)	(-0.59)
Intercept	0.0446	0.2755	0.8971	1.3636	1.1898	0.6347	0.5081	0.7129	0.1300
	(0.34)	(1.62)	(4.41)	(7.84)	(6.65)	(4.93)	(3.75)	(4.54)	(0.96)
Adj. R^2	0.103	0.127	0.255	0.354	0.182	0.140	0.136	0.161	0.037

Panel B. A/H firms

Horizon	0	1	12	24	36	48	60	72	14-Dec
ΔFloat	-0.0183	-0.0304	0.0019	-0.0120	-0.0021	-0.0067	-0.0143	-0.0308	-0.0094
	(-0.70)	(-0.81)	(0.04)	(-0.43)	(-0.07)	(-0.38)	(-0.95)	(-1.21)	(-0.41)
Intercept	-0.0029	0.2954	0.5447	1.0280	0.8978	0.4543	0.3846	0.6757	0.1755
	(-0.01)	(0.83)	(1.36)	(3.85)	(3.22)	(2.69)	(2.68)	(2.78)	(0.81)
Adj. R^2	-0.019	-0.013	-0.038	-0.031	-0.038	-0.033	-0.003	0.017	-0.032

Table IA3. *ΔFloat* and non-tradable shareholders' selling

This table reports how *ΔFloat* is related to non-tradable shareholders' selling. We measure their selling by tracking the change in ownership of the non-tradable shareholders who are on the ten largest shareholders list at the most recent year-end before the announcement of the reform (t_0). For a non-tradable shareholder who later disappears from the ten largest shareholder list, we assume its ownership becomes zero. To be consistent with the way we measure *ΔFloat*, we scale the non-tradable shareholders' holdings by the initial number of tradable shares at t_0. We track their aggregate holdings for the first six years after the completion of the reform (t_3) and also in December 2014. In the regressions, the dependent variable is the decrease in holdings from the most recent year-end before the reform announcement to *N* years after the reform completion. *ΔFloat* is defined as the total number of A-shares divided by the total number of tradable A-shares, measured at the announcement date. The *t*-statistics are in parentheses.

Horizon (years)	0	1	2	3	4	5	6	Dec-14
ΔFloat	0.0670	0.0915	0.1284	0.1502	0.1644	0.1917	0.1754	0.1959
	(2.66)	(3.23)	(2.95)	(3.08)	(3.27)	(3.66)	(3.46)	(3.76)
Intercept	0.2363	0.3232	0.2968	0.4607	0.5146	0.4332	0.5158	0.6298
	(1.09)	(1.38)	(0.83)	(1.15)	(1.24)	(1.00)	(1.23)	(1.47)
Adj. R^2	0.075	0.112	0.093	0.102	0.114	0.142	0.128	0.149

Table IA4. *ΔFloat* and share issuance

This table reports how *ΔFloat* is related to asymmetric share issuance in the A/B markets. The dependent variable is the change in the ratio between A/B shares outstanding. Change in the ratio between A/B shares outstanding is the difference between the ratio *N* years after the reform completion date (t_3) minus the premium right before the reform announcement date (t_0). We look at various horizons: from one to six years after the completion. In the last column, *t* is December 2014, which is the end of our sample period. *ΔFloat* is our measure of the change in float. *ΔFloat* is defined as the total number of A-shares divided by the total number of tradable A-shares, measured at the announcement date. The *t*-statistics are in parentheses.

Horizon (years)	0	1	2	3	4	5	6	Dec-14
ΔFloat	0.0236	0.0260	0.0217	0.0032	0.0175	0.0057	0.0032	0.0298
	(0.62)	(0.65)	(0.54)	(0.07)	(0.32)	(0.10)	(0.04)	(0.29)
Intercept	0.0242	0.0779	0.1372	0.4708	0.5533	0.7303	1.0474	1.5281
	(0.08)	(0.24)	(0.41)	(1.24)	(1.24)	(1.61)	(1.57)	(1.82)
Adj. R^2	-0.008	-0.008	-0.010	-0.013	-0.012	-0.013	-0.013	-0.012

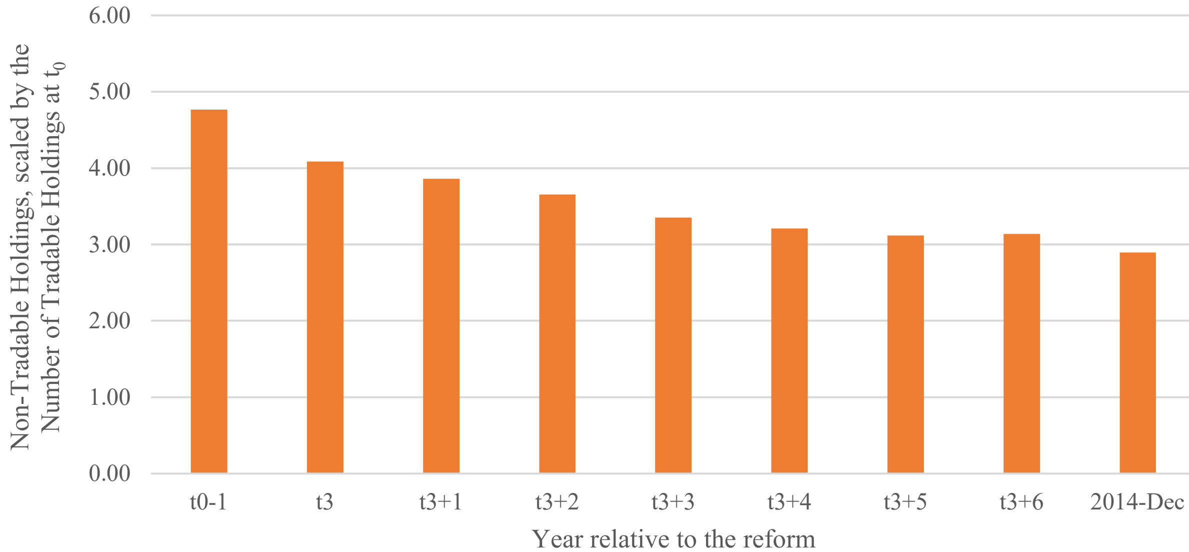

Figure IA1. Holdings of non-tradable shareholders over time

This figure reports the aggregate holdings of the non-tradable shareholders who are on the ten largest shareholders list at the most recent year-end before the announcement of the reform (t_0). We track their aggregate holdings for the first six years after the completion of the reform (t_3) and also in December 2014. The x-axis is the year relative to the reform. The y-axis is non-tradable shareholders' holdings divided by the initial number of tradable shares, where the initial number of tradable shares is measured at t_0 and adjusted by stock splitting and new issuance. For a non-tradable shareholder who later disappears from the ten largest shareholder list, we assume its ownership becomes zero.

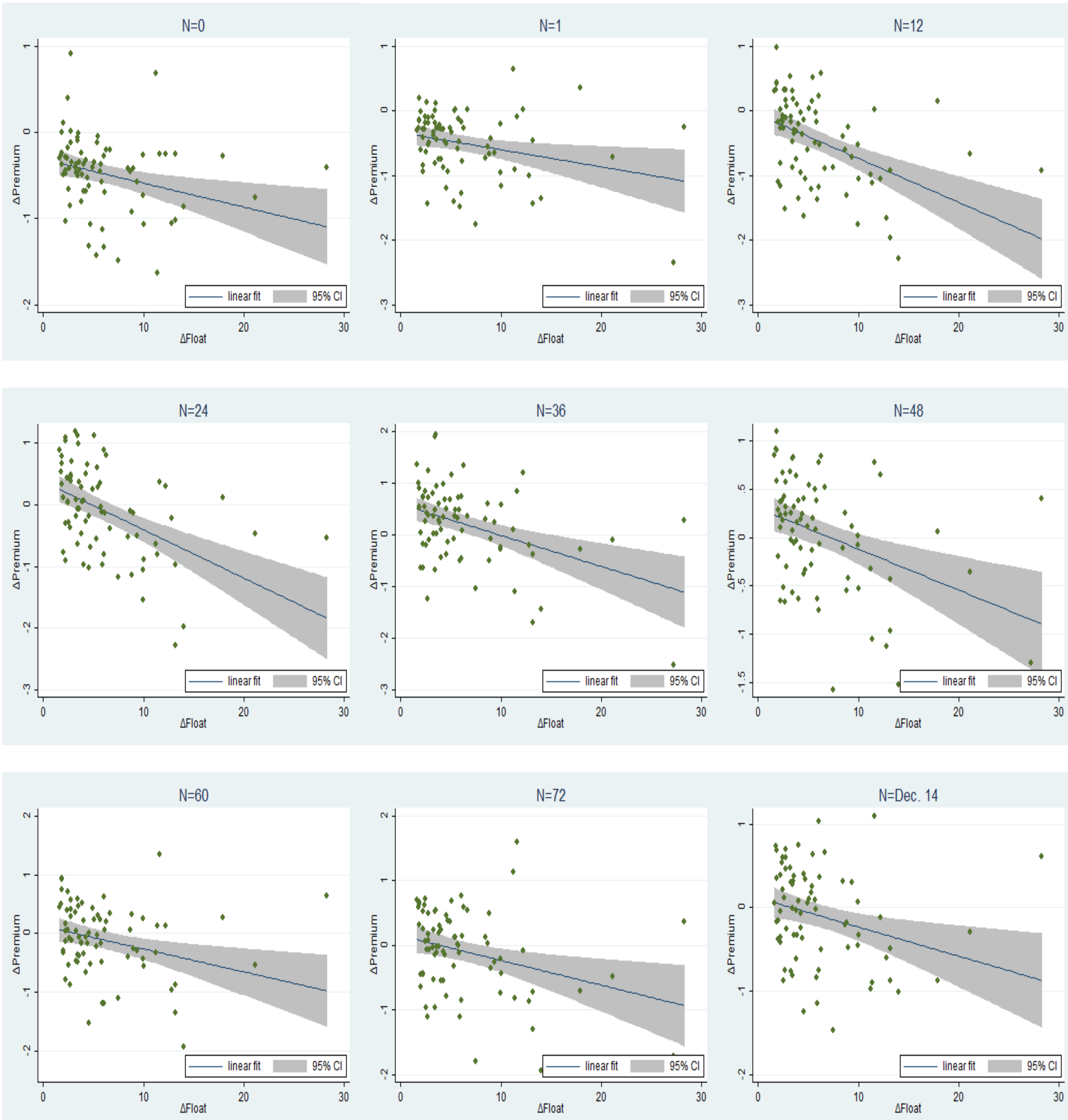

Figure IA2. Virtualizing the main results

This figure shows the scatter plots to virtualize the relationship between *ΔFloat* and *ΔPremium* for the same set of horizon choices as in Table 2. We also show the fitted values and the 95% confidence intervals based on linear regressions as in equation (1). *N* indicates the horizon.