

Effect of initial public offerings on short-term interbank rates

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Abstract

This note, based on market data from 2015 to 2018, analyses the effects of initial public offerings (IPO) on short-term interbank interest rates in Hong Kong. The analysis indicates that IPO activities did push up 1-week and 2-week HIBORs during the entire subscription period, yet their effect would only be statistically significant when the locked-up capital of IPOs reaches the threshold of 0.6 times the Aggregate Balance. Apart from that, the movements of 1-week and 2-week HIBORs are also affected by other factors, including lagged LIBORs and systematic funding needs at month-end and year-end.

首次公開募股活動對短期同業拆借利率的影響

摘要

本文根據2015年至2018年的市場數據，分析首次公開募股活動對香港短期同業拆借利率的影響。分析結果顯示首次公開募股活動在認購新股期間推高1星期以及2星期港元銀行同業拆息，但該影響只有在凍結的資金達到0.6倍總結餘時具統計顯著性。另外，港元銀行同業拆息的波動亦受其他因素影響，包括滯後倫敦銀行同業拆息、月尾及年尾的系統性資金需求。

The views and analysis expressed in this article are those of the author and do not necessarily represent the views of the Office of the Government Economist.

I. INTRODUCTION

1. This note discusses and examines the effects of IPO activities on short-term interbank interest rates in Hong Kong. Based on all new share issues on the Main Board from 2015 to 2018, the analysis indicates that generally speaking, IPO activities did push up interbank interest rates, though this effect is most significant for 1-week and 2-week HIBORs and for IPOs which have locked up a noticeable amount of capital.

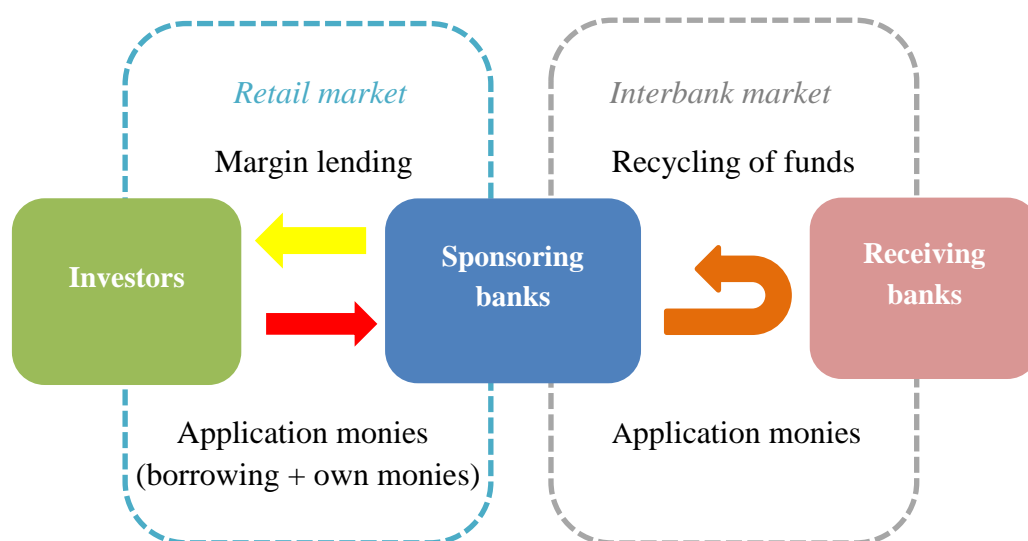
II. RELATIONSHIP BETWEEN IPOs AND INTERBANK LIQUIDITY

2. It is useful to outline the payment flows of an IPO for a better understanding of the potential impact on interbank interest rates¹. Typically, during the subscription period, investors can submit their IPO applications to their sponsoring banks, and some of them might also use margin financing to fund their applications. Upon the closing date of the subscription period, the sponsoring banks would pass the investors' application monies to the receiving banks of the IPO, which have been designated by the issuer of the IPO for collecting and processing applications, recycling application monies and arranging refunds for unsuccessful applications after allotment of shares. In this process, there would be some interbank transfers from the sponsoring banks to receiving banks. Depending on the amounts of funds raised and margin financing involved, the interbank transfers could be potentially significant and sponsoring banks might also make borrowing arrangements with the receiving banks (so that the payment obligation and the borrowing cancel off with each other).

3. In theory, if the recycling mechanism is functioning properly, such interbank transfers should not have significant impacts on the interbank market. Nonetheless, in reality, regulatory requirements such as credit limits may restrict receiving banks' capacities to extend loans to sponsoring banks. Without the efficient recycling of funds, the demand for interbank loans would in turn affect the interbank interest rates. In the case of a large and heavily over-subscribed IPO, the resultant funding pressure would drain liquidity from the interbank market and exert a more visible impact on interbank rates. This process is illustrated in *Figure 1* below.

¹ Most of this information is based on Frank Leung and Philip Ng (2008), "Impact of IPO activities on the Hong Kong-dollar interbank market." *HKMA Quarterly Bulletin*, September 2008.

Figure 1: Subscription period



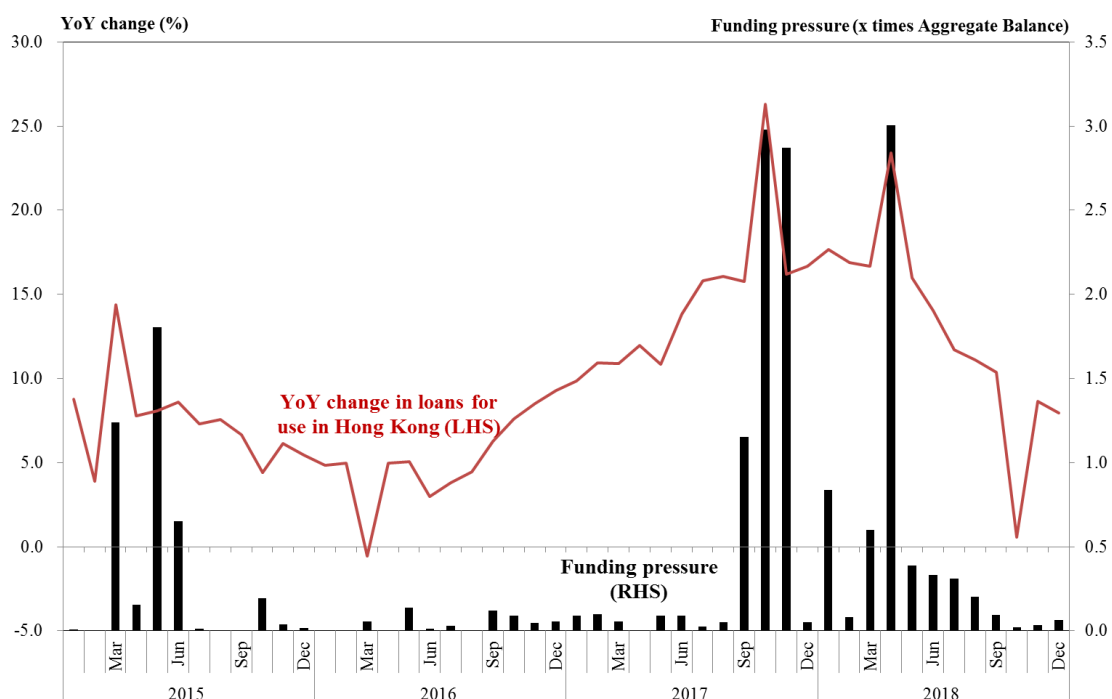
4. Theoretically speaking, the impact of IPO activities should first be reflected in sharp increases in loans² drawn by the investors during the subscription period. As the demand for loans should increase with the total capital pledged by the investors (i.e. locked-up capital³) for the subscription of new shares, excessive demand for loans would create large funding pressure in the banking system. As the extent of this effect would also depend on the prevailing liquidity in the interbank market, the funding pressure is measured as the ratio of locked-up capital to the Aggregate Balance (i.e. the sum of balances in the clearing accounts maintained by banks with the HKMA for settling interbank payments). As shown in *Chart 1*, spikes in the year-on-year change in total loans and advances for use in Hong Kong were observed when estimated funding pressure surged sharply, indicating that substantial margin lending was involved for large and heavily oversubscribed new share issues⁴. To meet the short term loan demands, banks might resort to borrowing in the interbank market, thereby posing some upward pressure on HIBORs.

² Loans for subscribing for new shares in IPOs are categorized as margin lending for stockbrokers and non-stockbroking companies and individuals. They are included in the statistics for monthly loans and advances for use in Hong Kong.

³ Locked-up capital is the amount of capital locked up for a particular IPO. It is measured as the product of IPO funds raised and the subscription ratio.

⁴ As data on loans and advances to economic sectors (e.g. to stockbrokers) are only available on a quarterly basis, the monthly data on total loans and advances are used for analysis here.

Chart 1: Change in loans for use in Hong Kong and funding pressure arising from IPO subscriptions



Note : “Funding pressure” here is the ratio of the sum of locked-up capital for all IPOs on the Main Board during the month to the Aggregate Balance at the end of the month.

III. INTERBANK YIELD INVERSION

5. As the whole IPO process, i.e. from the beginning of the subscription period till the refund and listing of shares, usually lasts for one to two weeks, it is expected that the effect of IPO activities should be more noticeable on interbank rates of shorter tenors (e.g. 1-week or 2-week HIBORs). If this effect is strong enough (e.g. if multiple IPOs are clustered with fervent market responses within a short period), it may temporarily result in an inverted yield curve for interbank rates, with the shorter-tenor HIBORs higher than their longer-tenor counterparts. This actually happened during late October to early November 2017, when three heavily-subscribed IPOs (China Literature, Razer and Yixin Group) created large demand for short term loans in the interbank market (*Table 1*). With 1-week and 2-week HIBORs rising sharply and above the levels of 1-month to 3-month HIBORs, the yield curve for the average daily HIBORs displayed an unusual inverted U-shape during the subscription period of these three IPOs (*Chart 2*). Yet, this U-shape largely dissipated after the subscription period had ended and the companies were listed.

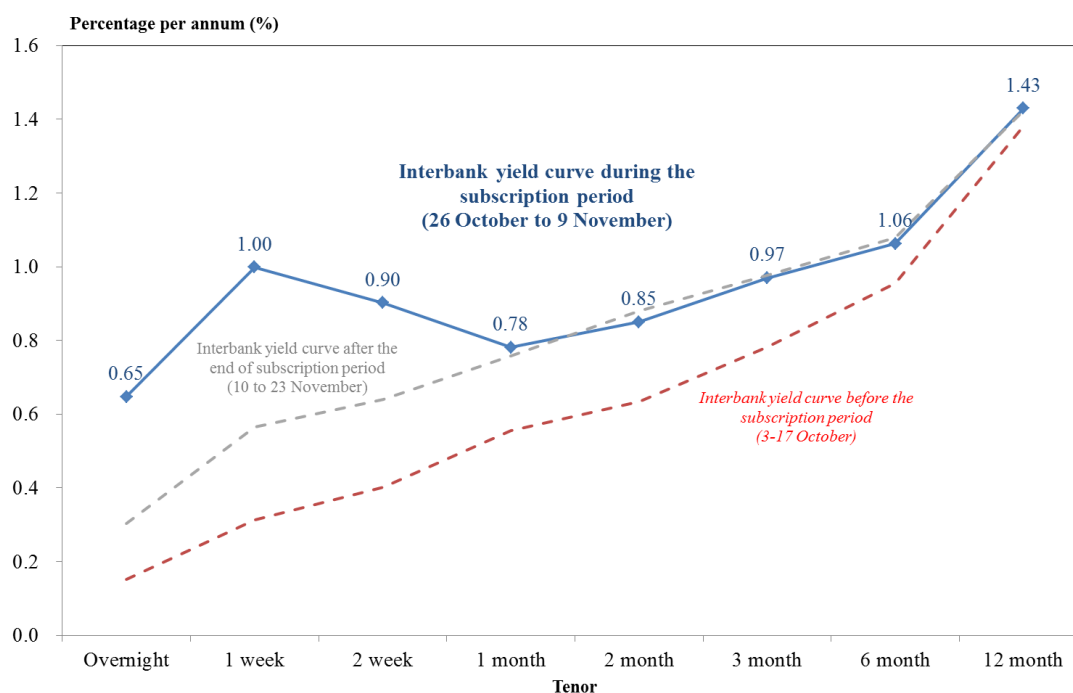
**Table 1: Details of heavily subscribed IPOs
in late October to early November 2017**

Listed company	Subscription period		Locked-up capital (\$ bn) (subscription ratio) [^]	Funding pressure [*]
	Beginning date of subscription	Closing date		
China Literature Limited	26/10/2017	31/10/2017	\$520 bn (626x)	2.90
Razer Inc.	01/11/2017	06/11/2017	\$120 bn (291x)	0.67
Yixin Group Limited	06/11/2017	09/11/2017	\$380 bn (561x)	2.12

Notes: (^) A subscription ratio of, say 626x, means that an IPO raising \$1 million pitched a subscription of (or locked up) \$626 million.

(*) Funding pressure is the ratio of locked-up capital to the prevailing Aggregate Balance.

Chart 2: Yield curves for HIBORs around the subscription period for three major IPOs in October and November 2017



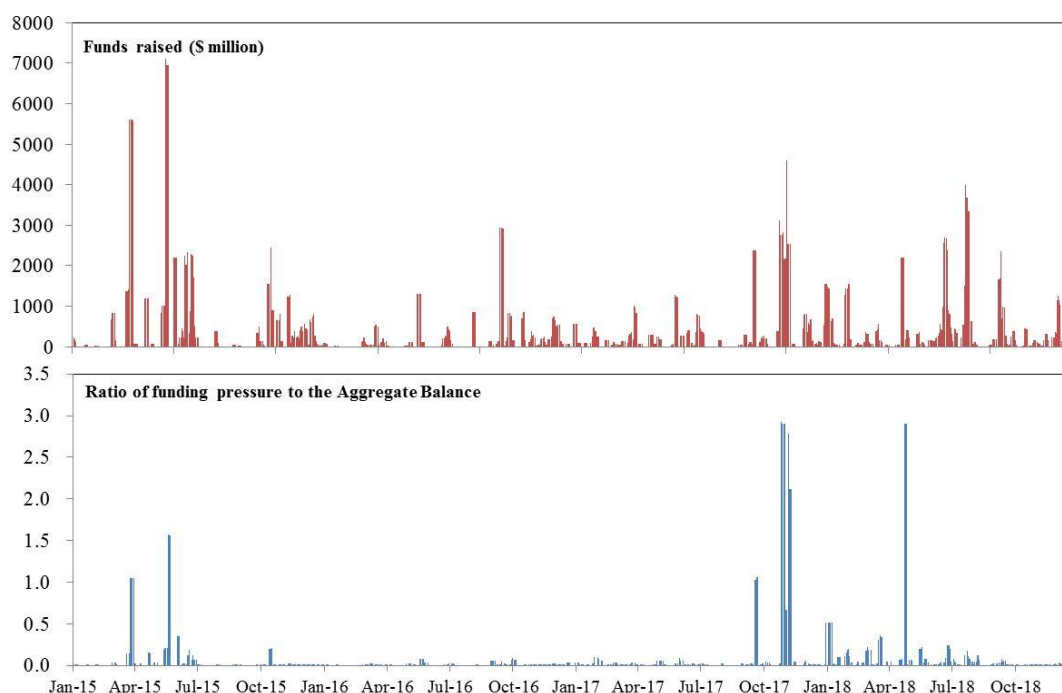
6. While the inverted HIBOR yield curve observed in late October to early November 2017 above (paragraph 4) serves as a vivid example of the effect of IPO activities on short-term interbank rates, it could be argued that this effect is only applicable when there is a clustering of several large-scale IPOs and therefore this incident was very unique. It is also possible that other non-IPO-related factors have affected the movements of the short-term HIBORs during that period. As such, two

econometric exercises have been undertaken to explore the effect of IPO activities on short-term HIBORs more generally.

IV. DATA AND METHODOLOGY

7. The data are daily for the period from January 2015 to December 2018. All the data are extracted from Bloomberg. The details of all 369 IPOs listed on the Main Board from January 2015 to December 2018, including their company information, beginning and closing dates of the subscription period, listing date, number of shares for subscription, listing price and subscription ratio have been collected, and the funding pressure has been calculated for each listed company. As shown in *Chart 3*, the total funds raised by these IPOs ranged from \$5 million to \$6,944 million. Since the number of shares for subscription and total subscription ratios of these IPOs vary considerably, the estimated funding pressures also show large disparities throughout the sample period. The figures range from \$5 million (less than 0.001 times the Aggregate Balance) to \$520,884 million (2.898 times the Aggregate Balance).

Chart 3: Funds raised and funding pressure arising from IPOs during the subscription period



Note: Funds raised is the eventual amount of capital raised, including funds raised after the triggering of “clawback mechanisms” which allow reallocation of shares from IPOs’ placing tranche to public subscription tranches when the public oversubscription is 15 times or above.

8. The first econometric exercise is to evaluate, generally speaking, whether IPO activities have any effects on HIBORs and which types of HIBORs are more susceptible to these effects. To do so, IPO-related variables are used to assess the effect of IPO activities on interbank rates: dummy variables for funding pressure being within a specified range of values, and a variable proxying the funding pressure during the subscription period.

9. Also, several additional variables are included in the model to control for the effects of other non-IPO-related factors. These include:

- **LIBOR:** Given that the movement of local interest rates should follow that of their US counterparts under the Linked Exchange Rate system, short term LIBORs should have considerable explanatory power over the movements of HIBORs.
- **Interbank liquidity:** Availability of interbank liquidity will ease the interbank market and hence decrease interest rates. The Aggregate Balance (AB) is used in the model as a narrow measure of the level of interbank liquidity.
- **Seasonality:** Three dummy variables are added to control for month-end and year-end settlements and cash demand prior to the Chinese New Year.

10. Then, to identify short-term HIBORs' relationship with a host of relevant variables, the following model is run:

$$\text{HIBOR}_t = \beta_0 + \beta_1 \text{LIBOR}_{t-1} + \beta_2 \text{IPO}_{\text{FP} \leq 0.2} + \beta_3 \text{IPO}_{0.2 < \text{FP} \leq 0.4} + \beta_4 \text{IPO}_{0.4 < \text{FP} \leq 0.6} + \beta_5 \text{IPO}_{\text{FP} > 0.6} + \beta_6 \text{AB}_t + \beta_7 \text{MD} + \beta_8 \text{YD} + \beta_9 \text{CNY} + \varepsilon$$

where

- IPO_{FP} : Dummy variables for funding pressure being within a specified range of values at time t
- AB_t : Aggregate Balance at time t
- MD : Dummy variable for month-end effect⁵
- YD : Dummy variable for year-end effect⁶
- CNY : Dummy variable for Chinese New Year effect⁷
- ε : HAC robust standard error

⁵ The month-end effect reflects the impact of month-end settlement on interbank rates and is assumed to emerge on the last three trading days of the month.

⁶ The year-end effect reflects the impact of year-end settlement on interbank rates and is assumed to emerge on the last five trading days of the year.

⁷ The Chinese New Year effect reflects the impact of the public's large cash demand right before the holiday season and is assumed to emerge on the last five trading days prior to the holiday.

V. RESULTS

11. As shown in *Table 2*, the coefficients of the IPO funding pressure variables are generally positive, indicating that IPO activities would boost interbank interest rates. Yet the coefficients are only statistically significant and in line with economic reasoning for (1) IPOs with a funding pressure at least 0.6 and (2) with 1-week and 2-week HIBORs as the dependent variables. That means, after the funding pressure reaches the threshold of 0.6 times the Aggregate Balance, the IPOs would boost the 1-week HIBOR by an average of 22.4 basis points and the 2-week HIBOR by 14.3 basis points. On the other hand, the boosting effect of IPOs on interbank rates is less apparent for smaller-scale IPOs and also for the overnight HIBOR. The 1-month HIBOR did show some upward response during the subscription period, though this result is not entirely consistent with intuition and not as significant as the others.

Table 2: Effects of explanatory variables on short term HIBORs

Variables	Change in variables	Response of short term HIBORs			
		Overnight HIBOR	1-week HIBOR	2-week HIBOR [^]	1-month HIBOR
Overnight/ 1-week/ 1-month LIBOR in the previous trading day	+100 bp	18.7 ***	28.5 ***	34.0 ***	42.7 ***
Funding pressure (dummy) FP≤0.2	Yes (from 0 to 1)	0.6	2.1	2.9	4.0 *
Funding pressure (dummy) 0.2<FP≤0.4	Yes (from 0 to 1)	0.9	8.8	10.3	7.5
Funding pressure (dummy) 0.4<FP≤0.6	Yes (from 0 to 1)	8.1	9.8	4.7	8.3*
Funding pressure (dummy) FP>0.6	Yes (from 0 to 1)	8.1	22.4 **	14.3 **	-3.0
Total Aggregate Balance	+\$1 billion	-0.2 ***	-0.2 ***	-0.2 ***	-0.2 ***
Last three trading days of the month (dummy)	Yes (from 0 to 1)	17.4 ***	14.4 ***	7.4 **	0.1
Last five trading days of the year (dummy)	Yes (from 0 to 1)	50.1	42.4 *	48.1 ***	32.5 ***
Five trading days prior to the Chinese New Year (dummy)	Yes (from 0 to 1)	-7.4	-4.4	-2.4	2.6
Adjusted R-squared		0.431	0.643	0.727	0.820
Number of observations		983			

Notes: Effects on HIBORs are expressed in basis points.

([^]) As there is no 2-week LIBOR, the 1-week LIBOR is used for the 2-week HIBOR equation.

* p<0.10, ** p<0.05, *** p<0.01

12. As for other factors influencing the short term interbank rates, the coefficients of the LIBORs and the Aggregate Balance are statistically significant and in line with intuition. In general, HIBORs across tenors tracked the movement of LIBORs, and they fell by 0.2 basis point when interbank liquidity increased by \$1 billion. As to systematic liquidity effects, month-end and year-end effects are both detected for 1-week and 2-week HIBORs, while the overnight HIBOR only responds to the month-end effect and the one-month HIBOR only responds to the year-end effect. No apparent changes in HIBORs can be observed prior to the Chinese New Year.

13. Based on the regression results above, it can be concluded that the funding pressures generated from IPO activities are reflected in the 1-week and 2-week HIBORs. The second econometric exercise is to quantify the magnitude of the effect on HIBORs arising from the IPO activities and remove the insignificant variable, the Chinese New Year effect, in the previous specification. The specifications for 1-week and 2-week HIBORs are as follows:

$$\text{HIBOR}_t = \beta_0 + \beta_1 \text{LIBOR}_{t-1} + \beta_2 \text{IPO}_{\text{FP} \leq 0.2} \times \text{FP}_t + \beta_3 \text{IPO}_{0.2 < \text{FP} \leq 0.4} \times \text{FP}_t + \beta_4 \text{IPO}_{0.4 < \text{FP} \leq 0.6} \times \text{FP}_t + \beta_5 \text{IPO}_{\text{FP} > 0.6} \times \text{FP}_t + \beta_6 \text{AB}_t + \beta_7 \text{MD} + \beta_8 \text{YD} + \varepsilon$$

where FP_t : Estimated funding pressure at time t
 ε : HAC robust standard error

14. The regression results (*Table 3*) show that the models are relatively robust with adjusted R^2 values of 0.65 to 0.73 and all coefficients are in line with economic reasoning and intuition. For the IPO-related variables, the results suggest that when the level of locked-up capital of an IPO is at least 0.6 times of the Aggregate Balance (i.e. $\text{IPO}_{\text{FP} > 0.6} = 1$), a unit increase in funding pressure (FP_t) would boost the 1-week HIBOR by 12.0 basis points and the 2-week HIBOR by 8.4 basis points on average during the subscription period. Yet if the funding pressure does not reach the threshold of 0.6 times of the Aggregate Balance, the effect of funding pressure on HIBORs is not statistically significant.

Table 3: Effect of explanatory variables on 1-week and 2-week HIBORs

Variable	Change in variables	Response of HIBORs	
		1-week HIBOR	2-week HIBOR
1-week LIBOR in the previous trading day	+100 bp	28.7***	34.5***
Funding pressure for $FP \leq 0.2$	+1x Aggregate Balance	-7.9	27.3
Funding pressure for $0.2 < FP \leq 0.4$	+1x Aggregate Balance	21.0	30.9
Funding pressure for $0.4 < FP \leq 0.6$	+1x Aggregate Balance	16.2	6.7
Funding pressure for $FP > 0.6$	+1x Aggregate Balance	12.0***	8.4***
Total Aggregate Balance	+\$1 billion	-0.2***	-0.2***
Last three trading days of the month (dummy)	Yes (from 0 to 1)	14.6***	7.4**
Last five trading days of the month (dummy)	Yes (from 0 to 1)	42.1**	48.1***
Adjusted R-squared		0.645	0.728
Number of observations		983	

Note: Effects on HIBORs are expressed in basis points.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

VI. CONCLUDING REMARKS

15. Regression analysis suggests that large funding pressure arising from IPO activities pushes up 1-week and 2-week HIBORs during the entire subscription period. Model results also indicate that when the locked-up capital of IPOs rises by one times the Aggregate Balance, 1-week and 2-week HIBORs increase by 12.0 and 8.4 basis points respectively on average. Apart from funding pressures, the magnitudes of upticks in 1-week and 2-week HIBORs are also affected by other factors, including lagged LIBORs and systematic funding needs at month-end and year-end.