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ABSTRACT

China's stock market greatly outperformed other national markets during the first several months of the COVID-19 pandemic, and it did so even before it became evident that early containment efforts would flounder in the United States and many other countries. As to why, one view holds that aggressive monetary and credit easing propped up Chinese equity values. To assess this view, we consider several interventions that eased monetary and credit conditions in the first six months of 2020. Our analysis finds clear evidence that these interventions raised implied stock market volatility but little evidence that they influenced stock price levels. We also consider policy actions that restricted short selling, limited stock sales, and boosted stock purchases. These efforts to raise net equity demand were small in scale and highly time-limited, as we discuss, suggesting that any direct effects on stock prices were also modest. Neither our study nor other work known to us provides a ready explanation for the extraordinary performance of China's stock market in the first half of 2020. This performance is even more striking in hindsight, given later developments in China's economy and stock market.

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1. Introduction

China's stock market greatly outperformed other national markets over the first several months of the COVID-19 pandemic. From 17 February to 23 March 2020, for example, stocks fell 40 percent in the advanced economies on a value-weighted basis and 45 percent in emerging market and developing economies, excluding China (Davis, Liu and Sheng, 2022). Over the same period, the Shanghai Stock Exchange fell only 11 percent. Some part of China's strong market performance in this period reflects its relative success in suppressing the spread of the SARS-CoV-2 virus. A closer look at the data, however, reveals that this explanation is incomplete. Like China, South Korea was relatively successful in containing the spread of the virus, and it did so without draconian lockdowns. Yet the equity prices of listed firms in South Korea fell nearly 50 percent from 17 February to 23 March 2020.

For "domestic" Chinese firms, the contrast to stock market performance in other countries is even starker. Figure 1 shows the daily path of stock prices in the United States and China from 26 December 2019 to 8 July 2020. For the U.S., we consider the S&P 500 expressed in U.S. Dollars.[1] For China, we consider "A shares" – the equity securities of companies listed on mainland exchanges, denominated in Renminbi (RMB), and traded by mainland investors – and exclude firms that also list in Hong Kong and trade in HK Dollars. These domestic-only A shares are less exposed to sentiment shifts among foreign investors and to policy moves by foreign governments. They are also likely to be more responsive to policy interventions by Chinese authorities.

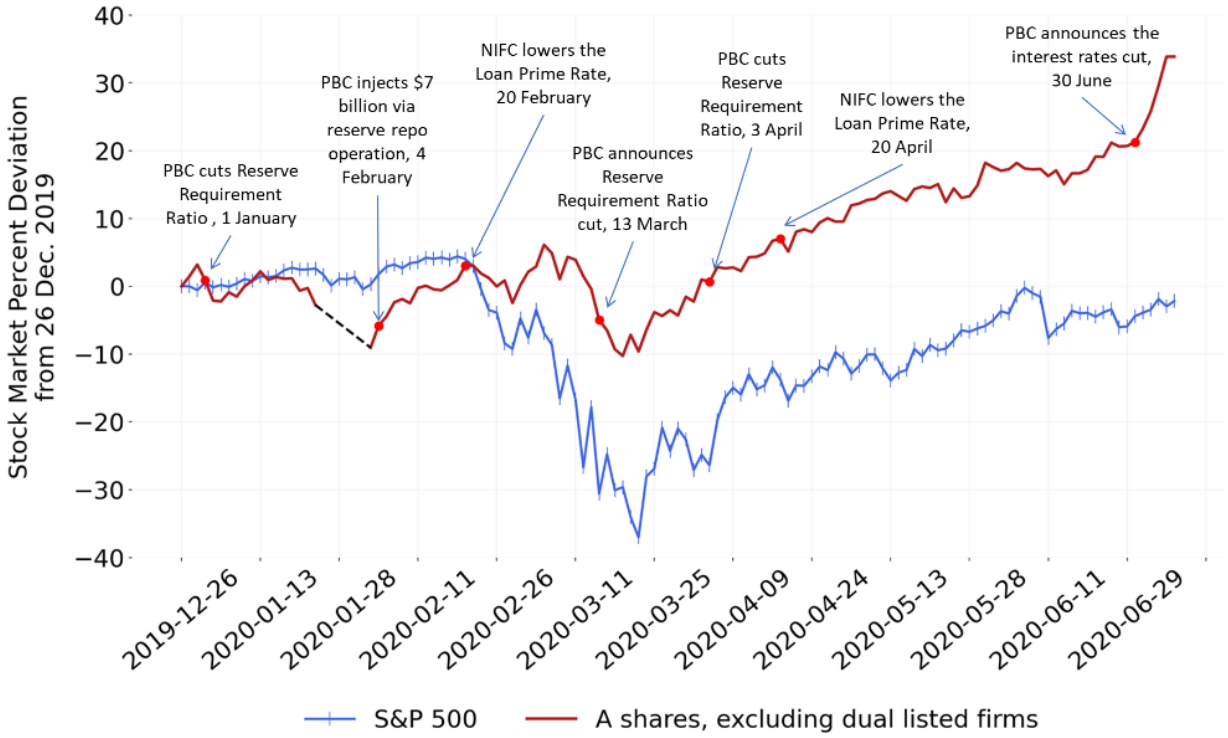
Figure 1 makes three points. First, China's market underperformed the U.S. market in January 2020. This is no surprise, because the pandemic disrupted China's economy in January 2020 at a time when the virus barely registered in other countries. Second, domestic A shares increased in value by about 40 percent from early March 2020 to early July, outperforming the S&P 500 by a spectacular margin.[2] Third, China's market outperformed long before it became evident that pandemic containment efforts would flounder in the United States and many other countries. Like the comparison to South Korea, this third point indicates that China's strong market performance is not fully explained by its early success in suppressing COVID-19.

As to why China's stock performed so well during the first half of 2020, one view holds that aggressive monetary and credit easing propped up Chinese equity values. To assess this view, we consider five monetary policy easing announcements by the People's Bank of China (PBC) in the first six months of 2020 and two announcements of credit policy easing by China's National Interbank Funding Center (NIFC). Our analysis of these interventions, all marked in Figure 1, finds little evidence that they raised the level of stock prices in China. We also find little evidence that these announcements materially altered the relative price of A shares issued by dual-listed versus domestic-only firms, the relative price of A shares and H shares (listed in

[1] The Renminbi depreciated by about 1 percent against the U.S. Dollar in the period covered by Figure 1 and moved within a narrow range of only about 2 percent up or down. See Figure A.1 for the (nearly indistinguishable) S&P 500 series with returns expressed in Renminbi using the daily spot exchange rate. See Figure A.2 for depictions of how various types of Chinese stocks performed in the first half of 2020.
[2] China's stock market performance over this period is almost as strong when we consider all A shares, including shares issued by dual-listed firms. See Appendix Figure A.1.

Hong Kong, traded in HK Dollars, and readily accessible to foreign investors), the relative price of state-owned enterprises (SOEs), or the industry structure of relative stock prices.

Figure 1. Stock market performance: China vs. U.S., from 26 December 2019 to 8 July 2020



Note: This figure plots cumulative value-weighted returns from 26 December 2019 to 8 July 2020, using market capitalization data from 31 December 2019 to determine the weights. For China, we consider A shares and exclude firms with equity securities that also trade in Hong Kong. For the U.S., we consider the S&P 500 expressed in U.S. Dollars. Figure A.1 shows the (nearly indistinguishable) S&P 500 series and expresses returns in Renminbi using the daily spot exchange rate. We linearly interpolate over weekends and holidays and, for China, from 23 January to 3 February due to the closure of mainland exchanges. Chinese data are from Wind. S&P 500 data are from Yahoo Finance. The figure also highlights monetary and credit policy interventions by the People's Bank of China (PBC) and the National Interbank Funding Center (NIFC).

Most of these PBC and NIFC easing announcements occurred at market open on stock trading days or shortly after market close. So, we cannot exclude the possibility that other, overnight, news developments obscured the true market effects of monetary and credit policy interventions. But it is unlikely that surprise, counteracting developments occurred by chance across several episodes. Thus, we see this interpretation as implausible.

Another possibility is that information about these interventions leaked before the official announcements, muting stock price reactions around our announcement date-time stamps. We cannot preclude the possibility of some information leakage, but we can show that our date-time stamps for these interventions capture important announcement effects. In particular, we show that these interventions brought higher levels of implied stock market volatility.

To do so, we compute the implied volatility change for the Shanghai Stock Exchange around the announcement dates and compare it to the contemporaneous implied volatility change for the S&P 500. Relative volatility on the Shanghai exchange rose 12 percent, on average, around these announcements. This difference-in-difference estimate is statistically significant, despite the small number of interventions.[3] The result is nearly unchanged when controlling for U.S. monetary policy interventions and local volatility trends around the PBC and NIFC intervention dates. In short, our evidence says that China's monetary and credit easing interventions in the first six months of 2020 raised stock market volatility while having no discernable systematic effect on the level of stock prices.

China's policy makers also intervened in early 2020 to directly boost equity demand. For example, the China Securities Regulatory Commission (CSRC) took steps to limit short selling. The CSRC also issued "guidance" to mutual fund managers, telling them to forego stock sales except as needed to meet investor redemption demands. As another example, the China Banking and Insurance Regulatory Commission (CBIRC) "encouraged" insurance companies to buy stocks in advance of the market's re-opening on 3 February 2020, following an extended ten-day closure. State media duly reported on 3 February that Chinese insurers stood ready to respond with 100 billion RMB to save the market, if necessary. However, as we show, the scale of these interventions was quite modest relative to market capitalization and average daily turnover. This small scale suggests that any direct impact on the level of stock prices was also small. Moreover, these policy interventions in the stock market were confined to a few weeks in and around February 2020. Thus, they cannot explain why the equity prices of domestic-only Chinese firms increased by about 40 percent from mid-March to early July 2020.

The government also implemented other measures in the first half of 2020 to subsidize borrowing, relax repayment terms on certain loans, reduce the cost of debt and equity financing, and provide fiscal relief to employers and consumers. We summarize these measures, drawing heavily on He and Liu (2020). To our knowledge, no one has fully documented and quantified these other measures, but some of them may be large in scale. Our analysis leaves open the possibility that these other measures played an important role in the remarkably strong performance of China's stock market during the first half of 2020.

The next section offers additional motivation for our study and briefly discusses related research. Section 3 describes several monetary and credit easing actions by Chinese authorities during the early stages of the COVID-19 pandemic and implements an event-study analysis to assess their effects on the level of stock prices. Section 4 considers the evolution of industry-level stock prices in the first half of 2020 and their sensitivity to monetary and credit easing actions. Section 5 examines the impact of these actions on implied stock market volatility. Section 6 considers other policy interventions and pronouncements, and section 7 offers concluding remarks.

[3] When we instead compare implied volatility changes around PBC and NIFC announcement dates on the Shanghai exchange to the contemporaneous volatility changes on the Hang Seng, the average diff-in-diff shrinks by half and is not statistically significant. This result aligns with the view that the PBC and NIFC interventions also raised implied volatility for stocks listed in Hong Kong, but our evidence does not support strong conclusions in this regard.

2. Additional Motivation and Related Research

The Shanghai Stock Exchange Composite Index fell 32 percent from mid-June to early July 2015, leading Chinese authorities to restrict short selling, inhibit stock sales by large shareholders, lend funds to support stock purchases, and order state-sanctioned financial institutions to buy stocks. See Huang et al. (2019) and Allen et al. (2020) for a detailed description of these interventions, which were larger in scale and broader in scope than the ones in 2020 that we consider. Huang et al. (2019) find that state-sanctioned stock purchases had large positive effects on stock prices in the 2015 episode.

Interventions in financial markets in China and elsewhere raise several issues. Proponents point to their potential to improve liquidity, reduce defaults, and promote financial stability. Because actual and anticipated interventions affect trading incentives, however, they can alter the informativeness of stock prices (Bond and Goldstein, 2015). They are also a source of uncertainty and market volatility (Baker et al., 2016, 2024a). Brunnermeier, Sockin and Xiong (2020) show how a policy focus on ensuring financial stability can reduce pricing efficiency.

Many empirical studies investigate the effects of policy interventions on stock prices. Bhanot and Kadapakkam (2006), for example, find that stocks bought by the Hong Kong government in August 1998 enjoyed a 24% abnormal return during the intervention period. Veronesi and Zingales (2010) consider government equity infusions into the nine largest U.S. commercial banks during the 2008 financial crisis. Exploiting data on credit default swap rates, they find that the equity infusions lowered default probabilities and raised debt values at the affected banks but did so at a cost to U.S. taxpayers. Zaremba et al. (2020) consider non-pharmaceutical interventions across 67 countries in response to the coronavirus pandemic and find that, on average, they raised stock market volatility. Baker et al. (2024b) examine next-day newspaper accounts of 8,000 large daily moves in national stock markets across 19 countries. They find that journalists attribute 28 percent of all large moves mainly to policy developments. Davis, Hansen and Seminario-Amez (2021) show that U.S. monetary and fiscal policy responses to the pandemic in early 2020 had powerful effects on firm-level equity returns.

There are reasons to expect policy interventions to be even more important in the Chinese context. Compared to the U.S. market, for example, China's stock market is segmented and has a recent history of aggressive policy interventions. Direct individual ownership also accounts for a larger share of outstanding share values. These features of China's stock market make it less closely tied to the global financial system and more sensitive to domestic policy influences. For both reasons, the stock price effects of government interventions might be more visible in the Chinese setting than in many others. Our study is also motivated by the strikingly distinctive nature of China's stock market performance in the early stages of the pandemic, as we noted at the outset. Carpenter and Whitelaw (2017) and Allen et al. (2020) provide useful descriptions of China's stock market and its development over time.

3. Stock Market Reactions to Central Banking Interventions

To better understand the behavior of China's stock market in the early stages of the pandemic, we examine stock price reactions to central banking actions that eased monetary conditions, credit conditions, or both. From an analytic perspective, there are at least three

reasons to consider these interventions. First, previous studies find that (announcements of) central bank easing actions affect financial conditions and economic performance. Second, unlike many other interventions by Chinese authorities, it is straightforward to pinpoint the dates and times of these announcements and the implementation of easing actions. Third, at least some of the interventions we consider were explicitly motivated by concerns about the stock market.

3.1 Monetary and Credit Easing Actions in the Early Stages of the Pandemic

Table 1 lists seven monetary and credit easing actions announced by the People's Bank of China (PBC) in the first half of 2020. We focus on this period for three reasons. First, many news articles and investor reports treat 2 January 2020 as a starting point for discussions of how COVID-19 affected China's stock market. Second, the PBC announced the last of its key interest rate adjustments in 2020 on 30 June. Third, this period encompasses both the large drop in China's stock market in early 2020 and the spectacular recovery and rise from early March to early July 2020.

The actions in Table 1 include cuts to the reserve requirement ratio for bank deposits (which free up bank reserves), expansionary open market operations, a cut to the interest rate on excess bank reserves, a cut in the discount rate on PBC loans to commercial banks, and cuts to the one-year and five-year Loan Prime Rates (LPR). The LPR is a benchmark interest rate for non-bank borrowers in China. The PBC announced the 4 February action when China's markets were open. Its announcement on 20 February coincided with the opening, and it announced the other five actions while the exchanges were closed. Table 1 excludes two policy actions announced during the ten-day market closure in late January and early February, because it is impossible to isolate their stock market effects in an event-study type of analysis.

Table 1. Central Bank Easing Actions During the First Half of 2020

Announcement date and time	Event time	Policy Action
15:07, 1 January, Wednesday	09:30, 2 January	PBC cuts Reserve Requirement Ratio (RRR) by 50 bps, freeing up 800 billion yuan ($115 billion) in reserves.
09:46, 4 February, Tuesday	09:46, 4 February	PBC injects 50 billion yuan ($7 billion) via repo operations.
09:30, 20 February, Thursday	09:30, 20 February	With PBC authorization, the National Interbank Funding Center (NIFC) lowers the one-year Loan Prime Rate (LPR) by 10 bps and lowers the five-year LPR by 5 basis points.
17:16, 13 March, Friday	09:30, 16 March	PBC cuts the RRR by 50-100 bps for banks that meet inclusive financing targets, freeing up 550 billion yuan. Qualified joint-stock banks get extra 100 bps cut.
16:57, 3 April, Friday	09:30, 7 April	PBC cuts the RRR for certain small and medium-sized banks by 100 bps, in two tranches on 15 April and 15 May, releasing 400 billion yuan ($57 billion). PBC also cuts the interest rate on excess reserves from 0.72% to 0.35%, effective 7 April, the first such cut since 2008.

09:30, 20 April, Monday	09:30, 20 April	The PBC authorizes the NIFC to lower the one-year LPR by 20 bps and to lower the five-year LPR by 10 bps.
20:59, June 30, Tuesday	09:30, 1 July	The PBC announces a cut of 25 bps in re-discount and re-lending rates, effective 1 July 2020. This cut brought the central bank discount rate to 2 percentage points.

Note: Policy announcement dates and times are for Beijing. We collect these announcements from the PBC's *Highlights of Monetary Policy and the Quarterly Monetary Policy Report.* We exclude two policy announcements during the Spring Festival break, because we cannot isolate their effects on the stock market given the high volume of pandemic-related and other news during the extended closure period.

3.2 Market-Level Event-Study Analysis

To assess whether and how these easing actions affected stock prices, we use an event-study approach applied to returns on Chinese equity securities. For the 4 February and 20 February actions, the event time t is the date and time of the announcement. For the other events, t is the next market open after the announcement. We calculate event-window returns as $R_t = ln(\frac{P_{t-15}}{P_{t+15}}) \times 100$, where P_{t-15} and P_{t+15} are market values 15 minutes of trading time before and after t.[4] For example, if the announcement occurs before the market open, we consider a window that starts 15 minutes before the market's close on the previous trading day and runs through the first 15 minutes of the first trading after the announcement. In our graphical displays and the appendix, we also consider other windows.

Row (1) in Table 2 reports the R_t value for each event and its estimated standard error in parentheses.[5] The event on 7 April (for announcements on 3 April) stands out for a statistically significant return of 1.5 percentage points over the 30-minute event window. This positive return is concentrated as a jump in stock prices at the open on 7 April. See Panel (e) in Figure 2. Thus, this event fits the standard view that a surprise monetary easing raises stock prices on impact. Similar remarks pertain to the event on 2 January (announcement on 31 December), but the event-window return is only half as large. In contrast, we find little support for the standard view in the behavior of stock prices around the other five monetary and credit easing events. Event-window returns are actually negative for the 16 March and 20 April events.

We also use a regression approach to test whether the seven easing actions affected stock prices. To do so, we regress the 30-minute returns on an intercept term and an event dummy in a sample that pools over event and non-event trading days from 2 January to 1 July 2020. The dummy equals one on event days, zero otherwise. For non-event days, we use the return in the 30-minute window from the last 15 minutes of the previous trading day to the first 15 minutes of

[4] We obtain firm-level stock prices from Wind Information Co., Ltd. (www.wind.com.cn/) and aggregate on a value-weighted basis. Wind is one of China's largest financial data platforms.

[5] We obtain an estimated standard error as follows: For each of the *n* trading days from 2 January to 1 July 2020, excluding 3 February, we compute the return in a 30-minute window that covers the last 15 minutes of the previous trading day through the first 15 minutes of the current trading day. We compute the standard error as $s/\sqrt{n}$, where *s* is the sample standard deviation of the *n* return observations.

the current day. We omit 3 February from our regression sample because it was the first trading day after the extended ten-day closure of mainland stock exchanges.

The rightmost column in Row (1) of Table 2 reports the coefficient estimate (standard error) for the event dummy. It provides no evidence that the seven monetary and credit easing actions propped up Chinese stock prices. The coefficient on the event dummy is only 0.22 (0.33) and is statistically insignificant. With 95 percent confidence, we can rule out that the average stock market effect of the easing actions is more than 0.88 percentage points. This result forms the basis for our claim that China's monetary and credit easing actions in the first half of 2020 cannot explain the spectacular rise of its stock market value.

Even if we restrict attention to the events of 2 January and 7 April, while ignoring the other interventions, the estimated effect of the easing actions cumulates to only 2.29 percentage points. This effect is trivial compared to the absolute and relative gains in China's stock market during the first half of 2020, as displayed in Figure 1. This conclusion is not an artifact of our 30-minute windows, as one can easily verify by inspecting the charts in Figure 2. Appendix Tables A.1 and A.2 confirm this claim by re-constructing Table 2 using returns for 10-minute and 60-minute event windows.

3.2 Category-Level Event-Study Analysis

Perhaps Row (1) in Table 2 masks the effects of easing actions on Chinese stock prices, because it lacks a focus on the most sensitive securities and sectors. To take one example, *Caixin* reported on 5 February 2020 that the PBC's liquidity injection announcement on the previous day benefited large and well-operated companies more than small and poorly operated ones. This claim suggests that central bank easing actions have stock price effects that are concentrated on certain groups of firms and industries.

To explore this possibility, we classify Chinese firms and equity securities along three dimensions: state-owned enterprise (SOE) status, listing status, and whether they are "in the Connect." These categories correlate with exposures to foreign investors and stock-price sensitivity to other Chinese policy interventions. SOEs in China are also charged with social, economic and strategic objectives (Lin, Cai and Li, 1998) that might influence how their share prices react to policy interventions.

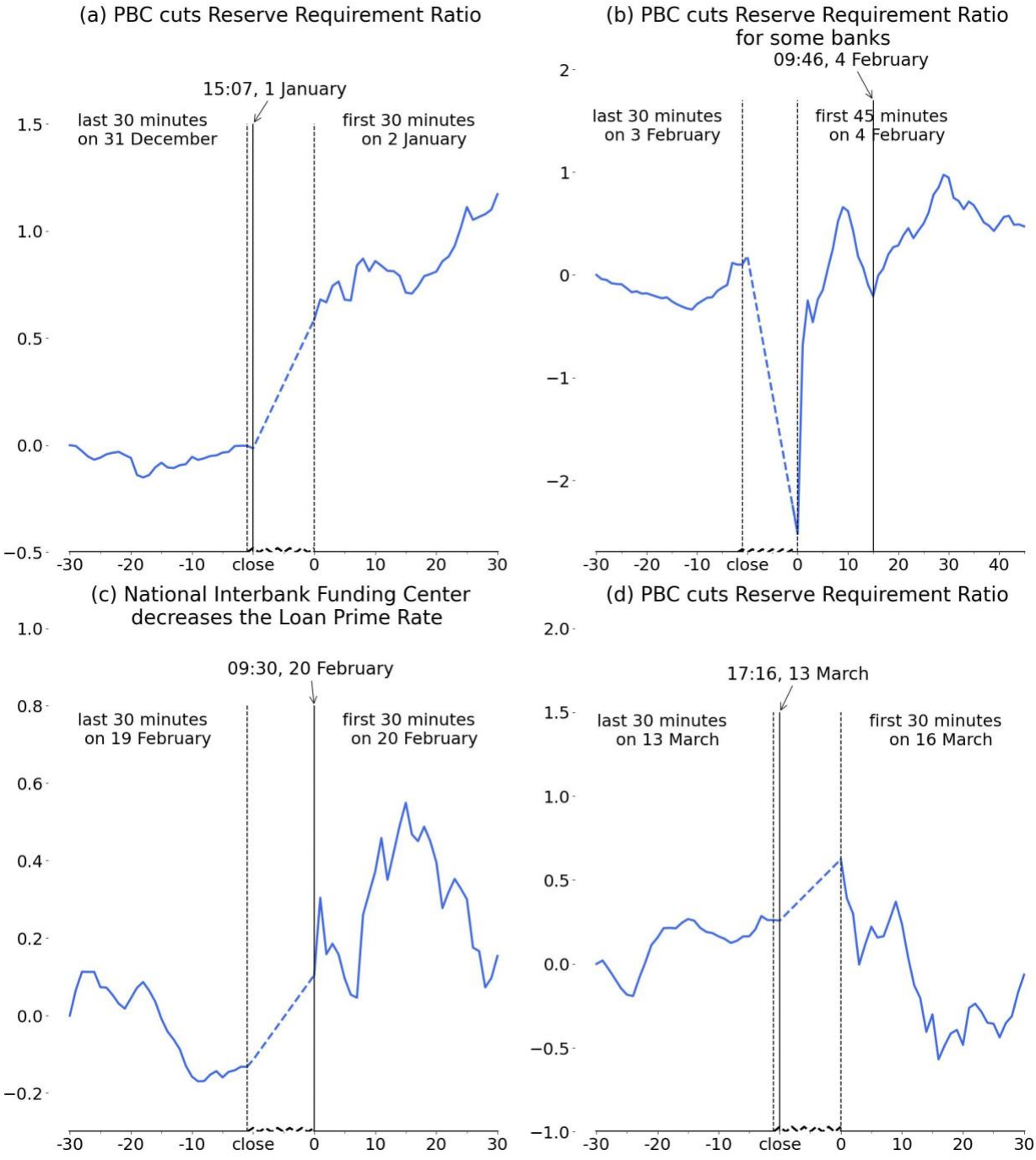
We define SOEs as listed firms with state-ownership shares of 50% or more. Recall that A shares are equity securities listed on mainland China stock exchanges, denominated in Renminbi (RMB), and traded by investors in mainland China. H shares are equity securities listed on the Hong Kong Stock Exchange (HKEX), denominated in HK dollars, and traded by investors outside mainland China. "Dual-listed" firms have both A and H shares outstanding. As reported in Table 3, A shares dominate in terms of both numbers and market cap. Dual-listed firms account for 21% of market cap for A shares and 83% for H shares.

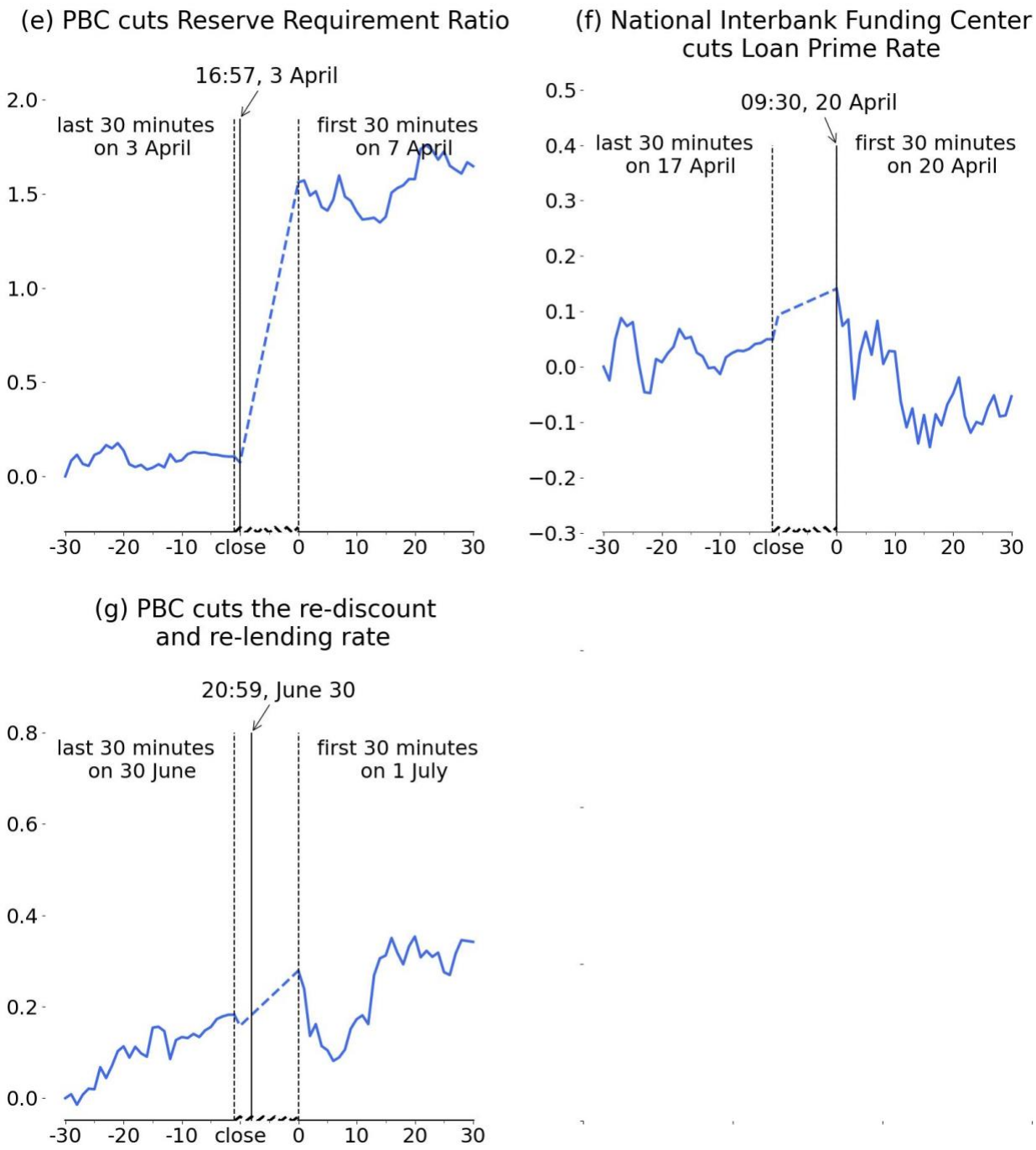
Table 2. Percent Returns in 30-Minute Windows Around Monetary and Credit Easing Events

Event Time	09:30 2 Jan.	09:46 4 Feb.	09:30 20 Feb.	09:30 16 Mar.	09:30 7 Apr.	09:30 20 Apr.	09:30 1 Jul.	All Events
(1) All firms	0.79* (0.30)	0.05 (0.30)	0.56 (0.30)	-0.58 (0.30)	1.50*** (0.30)	-0.08 (0.30)	0.27 (0.30)	0.22 (0.33)
(2) Dual-listed	1.23*** (0.29)	1.11*** (0.29)	0.38 (0.29)	-0.61* (0.29)	0.98*** (0.29)	-0.27 (0.29)	-0.01 (0.29)	0.44 (0.30)
(3) Not dual-listed	0.55 (0.33)	-0.56 (0.33)	0.66* (0.33)	-0.56 (0.33)	1.80*** (0.33)	0.04 (0.33)	0.44 (0.33)	0.31 (0.34)
(4) Δ Dual-listed	0.68* (0.18)	1.68*** (0.18)	-0.28 (0.18)	-0.04 (0.18)	-0.82*** (0.18)	-0.31 (0.18)	-0.45* (0.18)	0.13 (0.18)
(5) In the Connect	0.79* (0.31)	0.31 (0.31)	0.56 (0.31)	-0.64* (0.31)	1.49*** (0.31)	-0.09 (0.31)	0.28 (0.31)	0.38 (0.31)
(6) Not in the Connect	0.78* (0.35)	-1.06*** (0.35)	0.67* (0.35)	-0.52 (0.35)	1.86*** (0.35)	0.09 (0.35)	0.51 (0.35)	0.29 (0.36)
(7) Δ Connect	0.02 (0.10)	1.38*** (0.10)	-0.11 (0.10)	-0.12 (0.10)	-0.37* (0.10)	-0.19 (0.10)	-0.23 (0.10)	0.08 (0.11)
(8) SOEs	1.73*** (0.32)	-1.30*** (0.32)	0.12 (0.32)	-0.27 (0.32)	1.28*** (0.32)	-0.12 (0.32)	0.05 (0.32)	0.22 (0.33)
(9) Non SOEs	0.76* (0.31)	0.10 (0.31)	0.58 (0.31)	-0.59* (0.31)	1.51*** (0.31)	-0.07 (0.31)	0.28 (0.31)	0.36 (0.32)
(10) Δ SOEs	0.98*** (0.15)	-1.41*** (0.15)	-0.46* (0.15)	0.32* (0.15)	-0.24 (0.15)	-0.05 (0.15)	-0.23 (0.15)	-0.14 (0.16)

Note: The top row lists the event date and time for the seven monetary and credit easing actions described in Table 1. Row (1) reports the 30-minute market-level event-window return (standard error) for each event, except in the rightmost column. "All Firms" refers to all A Shares traded on mainland exchanges. For each event, we also implement a two-tailed *t*-test of the null hypothesis that the event-window return equals μ, where μ is the mean return in the 30-minute windows that cover the last 15 minutes of the previous trading day through the first 15 minutes of the current trading day from 2 January to 1 July 2020, excluding 3 February. One, two, and three asterisks denote rejection of the null at the 10, 5, and 1 percent significance levels, respectively. To assess the overall effect of the seven easing actions, we fit an OLS regression of returns on an intercept term and an event dummy in a sample that pools over event and non-event days from 2 January to 1 July 2020, excluding 3 February. The dummy equals one on event days, zero otherwise. For non-event days, we use the return in the 30-minute window that covers the last 15 minutes of the previous trading day through the first 15 minutes of the current trading day. For event days, we use the event-window return. The rightmost column reports the coefficient (standard error) on the event dummy. Rows (2) to (10) have the same structure as Row (1), but they consider selected types of shares or return differentials between selected types of shares.

Figure 2. A-Share Percent Returns in Sixty-Minute Event Windows





Note: Each graph shows market-level percent returns (A shares) in a 60-minute window around the event time for the indicated monetary policy or credit easing action. The solid vertical line shows the policy announcement time in relation to when the market operates, and the dashed vertical lines show the market close and open. In panels (c) and (f), the announcement coincides with the market open. The horizontal scale shows time in minutes relative to the close and open. The A-share market operates from 09:30 - 11:30 and 13:00 - 15:00 on trading days. See Table 1 for a description of each easing action.

Table 3. Number and Market Cap of Listed Chinese Firms

Firm Type	Number of Firms	Market Capitalization, Trillions of RMB	Market Cap % of Share Type
Firms with A-Share Listings and Their A-Share Capitalization			
All	3740	59.49	100
Excluding those with H-Share listings in Hong Kong	3621	46.70	79
Dual listed: A shares on mainland and H shares in HK	119	12.79	21
Firms with H-Share Listings and Their H-Share Capitalization			
All	258	5.09	100
Excluding those with A-Share listings	139	0.83	17
Dual listed: A shares on mainland and H shares in HK	119	4.26	83

Note: We consider firms that actively trade from 26 December 2019 to 8 July 2020. Market capitalization reflects the value on 26 December 2019. Data for A shares are from Wind. Data for H shares are downloaded from Yahoo Finance. We use 1HKD = 0.9 RMB to convert currencies. The total Hong Kong market cap is 37.98 trillion RMB, and H shares account for 13.48%.

The CSRC launched a cross-border investment channel in November 2014 that links the Shanghai and Hong Kong stock markets. In particular, the channel lets Hong Kong and foreign investors trade eligible shares listed in the Shanghai market, including all stocks in the SSE 380 Index and all SSE-listed A shares of firms with H shares listed in Hong Kong. It also lets institutional and qualified individual investors in mainland China trade stocks listed in Hong Kong. Two years later, a similar cross-border investment channel opened between the Shenzhen and Hong Kong stock markets. Following custom, we refer to stocks that are accessible to investors via these cross-border investment channels as "in the Connect." Firms that participate in the Connect account for about 30% of A-shares market capitalization. Previous studies find evidence of tighter cross-market financial integration for stocks in the Connect. See, for example, Fan and Wang (2017), Chong and Kwok (2019), and Ma, Rogers and Zhou (2024).[6] Thus, it's reasonable to hypothesize that Chinese central bank actions have weaker effects on firms in the Connect, because they are less captive to China's domestic credit market conditions.

Figure A.2 displays the evolution of stock prices from 26 December 2019 to 8 July 2020 for several share categories. Shares in the Connect and dual-listed firms rose much more than other A shares from early April to early July, suggesting that exposure to foreign investors and financial conditions may have propelled stronger returns in this period. The returns for SOEs and non-SOEs were similar from late December 2019 to early March 2020, but diverged from early

[6] Fan and Wang (2017) find that the Connect channel reduces the A-H share price premium for dual-listed firms. Chong and Kwok (2019) provide evidence that Connect status alleviates the delayed price discovery problem associated with price-move limits in Chinese stock markets. Ma, Rogers and Zhou (2024) find that firms in the Connect are more sensitive to contractionary U.S. monetary policy shocks.

March, with non-SOEs experiencing much higher returns. These comparisons lead to the mundane conclusion that returns varied across these categories in the first half of 2020.

We now repeat our event-study analysis at the category level to assess whether central bank easing actions affected stock prices in certain categories and, relatedly, whether they altered the cross-sectional structure of equity prices. Rows (2) to (10) in Table 2 report the main results for returns in 30-minute windows, and Tables A.1 and A.2 report analogous results for 10-minute and 60-minute event windows. Appendix Figures A.3, A.4 and A.5 display the category-level analogs to Figure 2.

This collection of results reveals little systematic evidence that China's monetary and credit easing actions boosted share prices for certain categories of firms and securities in the first half of 2020. Consider the regression results reported in the rightmost column of Table 2. The coefficient on the event dummy is statistically insignificant for all categories and between category differences. A similar pattern holds when using returns for 10-minute and 60-minute event windows. Based on these results, it does not appear that our earlier focus on "All Firms" masks the effects of easing actions on the prices of certain categories of Chinese equities.

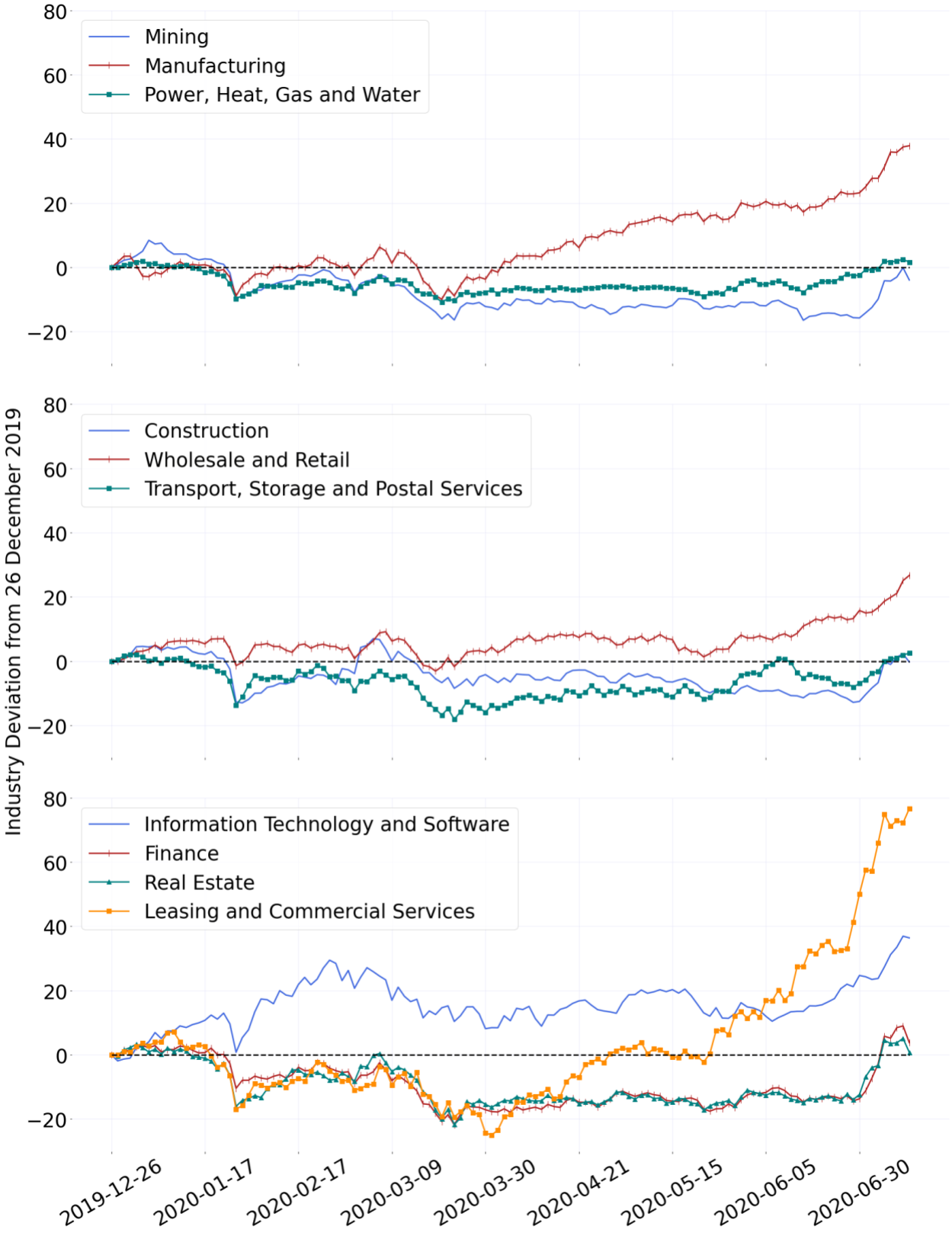
Several easing actions are associated with statistically significant return movements for particular categories or between-category differences, but these results are often inconsistent with the hypothesis that firms with more foreign exposure exhibit less sensitivity to China's domestic easing actions. For example, Row (2) in Table 2 reports statistically significant gains for dual-listed firms in the 30-minute windows around the events on 2 January, 4 February and 7 April. Firms that are not dual listed exhibit smaller and statistically insignificant returns on 2 January and 4 February, which is opposite to the expected pattern under the hypothesis. And firms not in the Connect exhibit a statistically significant negative return in the 30-minute window around the event on 4 February. Taken as a whole, we read rows (2) through (10) in Table 2 (and in Tables A.1 and A.2) as reinforcing our earlier conclusion that central bank easing actions in the first half of 2020 had little systematic effect on the price level of Chinese equities.

4. Industry Stock Prices and Their Reactions to Central Bank Interventions

Figure 3 displays the cumulative percent returns on A shares from 26 December 2019 to 8 July 2020 for ten major industry sectors.[7] Manufacturing, Leasing and Commercial Services enjoyed especially attractive returns from March 2020 to the end of our sample period. Information Technology and Software sector experienced relatively strong returns in January and February 2020 and again towards the end of our sample period. Several other industries experienced poor returns in the early months of 2020 and over the first half of the year.

[7] Here, we follow the Guidelines for the Industry Classification of Listed Companies issued by the CSRC in 2012. See Table A.3 for information about market cap and firm numbers in each industry.

Figure 3. Cumulative Percent Stock Returns from 26 December 2019 to 8 July 2020 by Industry



Note to Figure 3: For each industry, we plot the cumulative value-weighted return from 26 December 2019 to 8 July 2020. See the notes to Figure 1 for an explanation of how we calculate these returns. We omit eight industry sectors that each account for less than one percent of aggregate capitalization. We omit three companies (Ticker: 002714, 300498 and 603259) that issued additional stock during the sample period. Two companies (Ticker: 000668 and 300015) were suspended for a few days, resulting in abnormal daily returns that we smoothed by interpolation. Individual A-shares are subject to daily return limits of positive and negative 10 percent.

Table 4 investigates whether the monetary and credit easy actions covered by Tables 1 and 2 have systematic effects on the structure of industry returns, following the same event-study approach as before. Here as well, we find no statistically discernable effects on stock prices. This evidence further reinforces the conclusion that central bank easing actions in the first half of 2020 had little systematic impact on Chinese stock price levels.

5. Stock Market Volatility Reactions to the Easing Actions

Sections 3 and 4 uncover no systematic effects of China's monetary and credit easing actions in the first half of 2020 on the level of Chinese stock prices. This collection of results makes us wonder whether information about the easing actions leaked out before the official announcements, thereby muting stock price reactions around our event date-time stamps. Because it's hard to directly prove the negative of no information leakage, we take an indirect approach to the matter. Specifically, we consider the behavior of implied stock market volatility in windows around the announcements of easing actions. Evidence that these announcements affected volatility provides confidence in the adequacy of our event date-time stamps. The impact of central bank actions on market volatility is also interesting in its own right.

We compute daily percent changes in implied volatility as $\ln\left(\frac{Implied\ Volatility_t}{Implied\ Volatility_{t-1}}\right) \times 100$, where $t-1$ and t denote consecutive trading dates. The broadest available volatility measure for the Shanghai Stock Exchange is the SSE 50 implied volatility measure, which covers fifty large-cap equities. Figure 4 reports daily implied volatility log changes for the SSE 50 relative to the S&P 500 and relative to the Hang Seng. The red dots report the between-exchange *differentials* in the daily log volatility changes around the seven easing announcements. By way of comparison, the blue dots report the corresponding between-exchange *differentials* for the five trading days before and after each easing event.

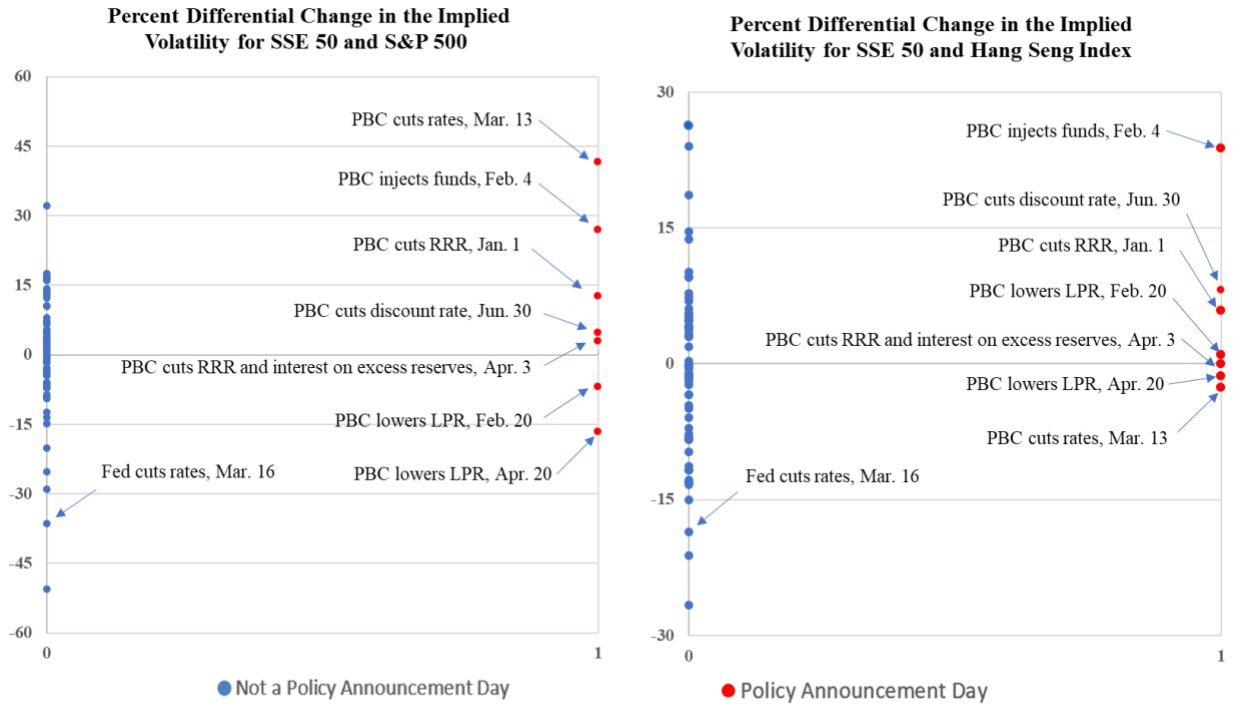
The left side of Figure 4 shows that five of the seven easing actions involve an increase in the implied volatility of the SSE 50 relative to that of the S&P 500. Three of these easing actions involve large one-day increases in the relative volatility of the SSE 50, ranging from 12 to 42 percent. In contrast, the SSE 50/S&P 500 volatility change differentials are more symmetrically distributed around zero for trading days five days before and after the easing events. The same pattern holds when we consider all trading days from 26 December 2019 to 8 July 2020 (excluding 3 February), as shown in Figure A.6. It's also worth noting that the largest one-day percentage rise in the relative volatility of the SSE 50 occurred around the PBC's announcement of a cut in reserve requirements on 13 March.

Table 4. Percent Returns by Industry Sector in 30-Minute Windows Around Monetary and Credit Easing Events

Event Time →	09:30 2 Jan.	09:46 4 Feb.	09:30 20 Feb.	09:30 16 Mar.	09:30 7 Apr.	09:30 20 Apr.	09:30 1 Jul.	All Events
Manufacturing	0.31 (0.36)	-0.34 (0.36)	0.75 (0.36)	-0.68 (0.36)	2.01*** (0.36)	0.15 (0.36)	0.53 (0.36)	0.34 (0.37)
Financial	1.24*** (0.31)	1.22*** (0.31)	0.35 (0.31)	-0.81*** (0.31)	1.03*** (0.31)	-0.36 (0.31)	-0.15 (0.31)	0.37 (0.32)
Mining	0.75* (0.31)	0.57 (0.31)	0.44 (0.31)	0.17 (0.31)	1.01*** (0.31)	-0.60 (0.31)	0.41 (0.31)	0.57 (0.32)
Information	1.42*** (0.44)	-0.85 (0.44)	0.32 (0.44)	-0.49 (0.44)	2.57*** (0.44)	0.41 (0.44)	0.11 (0.44)	0.40 (0.46)
Real Estate	1.74*** (0.37)	-0.60 (0.37)	-0.01 (0.37)	-0.25 (0.37)	1.24*** (0.37)	-1.07*** (0.37)	1.36*** (0.37)	0.31 (0.39)
Transport	0.50 (0.35)	-1.77*** (0.35)	1.46*** (0.35)	-0.41 (0.35)	0.96*** (0.35)	0.00 (0.35)	-0.27 (0.35)	0.19 (0.36)
Energy	0.65*** (0.23)	-0.14 (0.23)	0.32 (0.23)	-0.02 (0.23)	0.84*** (0.23)	-0.31 (0.23)	-0.03 (0.23)	0.28 (0.23)
Construction	2.02*** (0.34)	-0.99*** (0.34)	0.24 (0.34)	0.10 (0.34)	0.88*** (0.34)	1.13*** (0.34)	0.15 (0.34)	0.50 (0.35)
Wholesale, Retail	0.38 (0.30)	-1.63*** (0.30)	0.33 (0.30)	0.16 (0.30)	1.00*** (0.30)	-0.01 (0.30)	0.37 (0.30)	0.08 (0.31)
Leasing	1.49*** (0.47)	-1.45*** (0.47)	1.70*** (0.47)	-1.81*** (0.47)	1.97*** (0.47)	0.52 (0.47)	1.43*** (0.47)	0.45 (0.49)
Others	0.62 (0.45)	-0.86 (0.45)	0.45 (0.45)	-0.25 (0.45)	1.60*** (0.45)	0.41 (0.45)	0.44 (0.45)	0.38 (0.46)

Note: In classifying firms by industry, we follow the Guidelines for the Industry Classification of Listed Firms issued by the CSRC in 2012. We group nine small industries under "Others." They account for less than 1% of market capitalization weight. We obtain the 1-minute stock market price of each firm from Wind. We calculate standard errors using the same method as in Table 2.

Figure 4. Daily Implied Volatility Percent Change Differentials, China's Easing Announcement Dates (Red) Compared to Other Dates (Blue)



In Table 5, we take a more formal approach to our investigation of how China's central bank actions affected the volatility of its domestic stock market. To do so, we implement difference-in-difference regressions that relate the between-exchange differentials in daily log volatility changes to the easing announcement dates and other variables. Columns (1) and (4) in Table 5 are exact regression analogs to the left and right sides, respectively, of Figure 4. Columns (2) and (5) expand the sample to all trading dates from 26 December 2019 to 8 July 2020. The regressions reported in these columns include controls for the market re-open on 3 February 2020, the first two trading days before each announcement date, and the first two trading days after each announcement date. Finally, in columns (3) and (6), we further control for U.S. monetary policy easing announcement dates.

Chinese central bank interventions significantly raised the implied volatility of the SSE 50 relative to that of the S&P 500. In contrast, these interventions had a muted effect on the implied volatility of the SSE 50 relative to the Hang Seng, possibly because both the mainland and Hong Kong stock markets are heavily influenced by Chinese monetary policy. These results hold after: (i) controlling for the market reopening after the Spring Festival, which significantly increased mainland China's stock market volatility, reflecting the accumulation of news impacts over this extended holiday period; (ii) including U.S. monetary policy easing actions; and (iii) adding the first two trading days before and after each announcement date. Interestingly, the coefficient on PA Lead (i.e., the first two trading days before each announcement date) is not significant, indicating the absence of information leakage. Our finding that Chinese central bank interventions raised stock market volatility contrasts with the broader cross-country pattern

found in Baker et al. (2024b), which indicates that stock market jumps driven by monetary policy news tend to dampen volatility compared to jumps triggered by other types of news.

Table 5. Implied Volatility Difference-in-Difference Regressions, Comparing the Shanghai Stock Exchange to the S&P 500 and the Hang Seng Exchange

Daily Implied Volatility Changes, $\Delta\text{Vol}\%_{t,}$ is measured as $\ln\left(\frac{Implied\ Volatility_t}{Implied\ Volatility_{t-1}}\right) \times 100$

	(1)	(2)	(3)	(4)	(5)	(6)
Explanatory Variables	Dependent Variable: SSE 50 $\Delta\text{Vol}\%_t$ minus S&P 500 $\Delta\text{Vol}\%_t$			Dependent Variable: SSE 50 $\Delta\text{Vol}\%_t$ minus Hang Seng $\Delta\text{Vol}\%_t$		
Easing Announcement Dummy	9.3**	8.9*	8.7*	4.5	4.6	4.4
	(4.5)	(4.8)	(4.8)	(3.4)	(3.6)	(3.5)
Market Reopen After Spring Festival		25.7**	25.7**		22.7**	22.7**
		(12.6)	(12.6)		(9.5)	(9.3)
U.S. Policy			-6.2			-12.2**
			(7.2)			(5.3)
PA Lag		-5.0	-4.7		-0.2	0.4
		(3.6)	(3.6)		(2.6)	(2.6)
PA Lead		-2.7	-2.8		-2.4	-2.7
		(3.6)	(3.6)		(2.7)	(2.7)
Intercept	0.1	0.5	0.7	0.4	0.4	0.1
	(1.2)	(1.3)	(1.3)	(0.9)	(1.0)	(0.8)
N	105	119	119	96	124	124
adj. R^2	0.03	0.05	0.05	0.01	0.03	0.04
Sample mean	0.85	0.39	0.39	0.78	0.51	0.51
Sample St. Dev.	11.65	12.48	12.48	8.76	9.25	9.25
Subsample Excluding Market Reopen St. Dev.	11.65	12.34	12.34	8.76	9.10	9.10

Note: In the regression, the dependent variable is the between-exchange differential in the daily log change in the exchange-level implied volatility. If the announcement occurred in the morning on day *t*, we denote $PA_t = 1$ and 0 elsewhere. If the announcement occurred in the late afternoon or in the evening on day t, it would affect Chinese stock market on day $t + 1$ and affect the U.S. stock market on day *t*. For this latter case, we calculate log volatility of SSE as $ln(Implied\ Volatility_{t+1}) - ln(Implied\ Volatility_{t-1})$. We assign U.S. policy as 1 on the first trading day after the U.S. policy announcement. OLS Standard errors are in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

6. Other Policy Interventions and Pronouncements

In addition to monetary and credit easing actions, Chinese policy makers supported the domestic stock market in early 2020 by restricting the securities-lending business, instructing mutual fund managers and stock brokerages to limit stock sales, and encouraging insurers to buy more equities. We describe these interventions, quantify their scale, and assess their effects. We also discuss other government-orchestrated efforts to reassure stock market investors, and we summarize other measures to stimulate the economy.

6.1 Interventions that Directly Boosted Net Equity Demand

A. Restrictions on Securities Lending

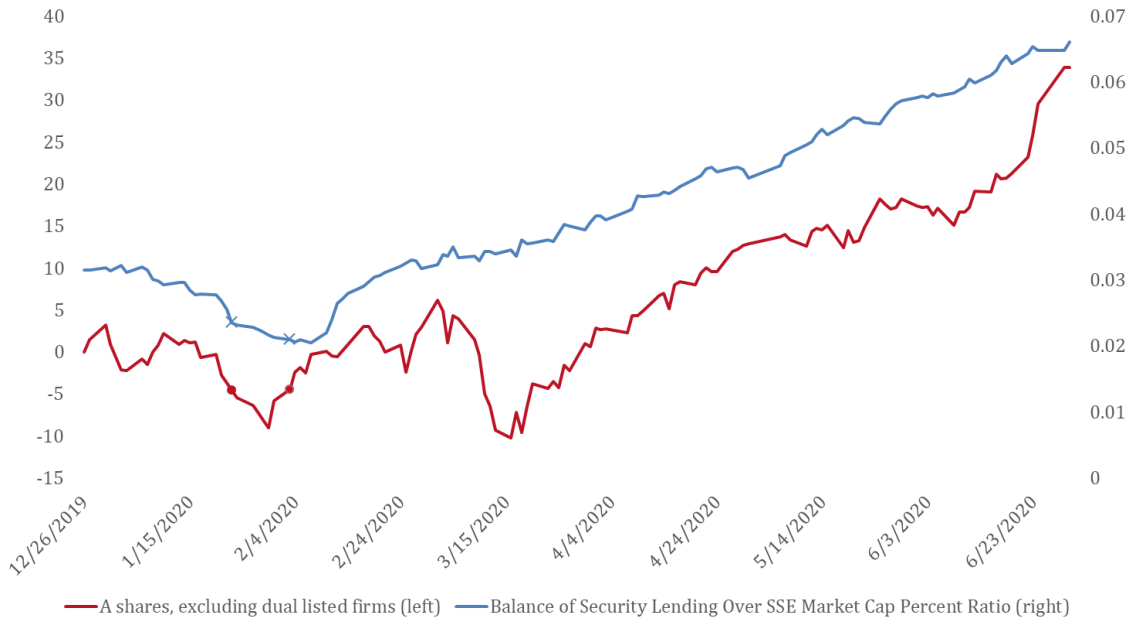
The China Securities Regulatory Commission (CSRC) curtailed the lending of securities by stock market brokers from 3 February to 12 February 2020 and continued to place restrictions on securities lending for a time thereafter. The purpose was to prevent short selling by investors who would otherwise bet on falling stock prices.[8] No official announcement accompanied these restrictions. Rather, the CSRC informed brokers and hedge fund managers of the restrictions, and news about them found its way into media reports. See Zhang and Woo (2020b).

Figure 5 presents a daily time series for the balance of securities lending, expressed as a percent of market capitalization for the Shanghai Stock Exchange. This ratio moved in a narrow range of 3.0 to 3.4 percent during the last few months of 2019. It drifted down from 3.0 percent on 9 January 2020 to 2.5 percent on 24 January, the last trading day before the Spring Festival. The ratio then fell discontinuously to 2.0 percent on 3 February, when the market reopened after an extended closure for the Spring Festival. A few days later, the securities-lending ratio began a long climb, reaching 3.0 percent within two weeks and exceeding 6 percent by mid-June.

The data in Figure 5 support four inferences: First, the CSRC restrictions suppressed securities lending (and short selling) from mid-January 2020 through late February, and possibly longer. At no point, however, did the CSRC fully shut down the securities-lending business. Second, from 9 January to 3 February, the balance of securities lending fell by roughly one percent of market capitalization. It is highly unlikely that the demand for securities borrowing fell during this period. Thus, we infer that CSRC restrictions lowered securities lending by at least one percent of market capitalization during this period (relative to a counterfactual with no restrictions). Third, the CSRC relaxed restrictions on securities lending before the stock market began to recover. Fourth, as stock prices rebounded from mid-March onwards and continued to rise, the CSRC let the volume of securities lending rise well above pre-pandemic levels.

[8] In a short sale, an investor borrows equity shares from a current holder and sells them on the open market. If the security price falls after the short sale, the investor can buy the shares back, repay the initial loan, and earn a per-share profit equal to the price decline minus interest and transaction costs. Thus, equity short sales offer a means for investors with pessimistic views to bet on falling stock prices.

Figure 5. China's Stock Market Performance and Securities-Lending Balance as a Fraction of Market Capitalization from 26 December 2019 to 8 July 2020



Note: See the notes to Figure 1 for a description of the stock price series. The (Balance of Securities Lending)/(SSE Market Cap) ratio is the volume of securities lending on Shanghai Stock Exchange equities divided by their negotiable market capitalization. The negotiable market capitalization is the market value of shares issued to private investors, which excludes the value of shares held by the Chinese government. We obtained the data from the Shanghai Stock Exchange website at http://www.sse.com.cn/market/othersdata/margin/sum/.

In principle, investors can circumvent restrictions on securities lending (and outright bans on short selling) by taking long positions in equity puts.[9] In practice, markets for equity options may be poorly developed or adversely affected by short-sale restrictions. Grundy et al. (2012) study the effects of short-sale bans in U.S. markets during the 2008-09 crisis. They find that these bans raised the costs of trading equity options – to such an extent the bans actually reduced equity option trading volumes. This finding implies that short-sale restrictions matter, and it reinforces a recurring theme in the literature: Short-sale restrictions reduce market liquidity.

Bris et al. (2007) exploit cross-sectional differences in short-sale restrictions using data for 46 stock markets around the world from 1990 to 2001. Among other results, they find that short-sale restrictions reduce negative skewness in market-level returns. In another many-country study, Beber and Pagano (2013) exploit the large number and variety of restrictions on short sales put into place during the 2007-09 financial crisis. In contrast to Bris et al. (2007), Beber and Pagano rely entirely on within-country time variation in short-sale restrictions to estimate their effects. They find that short-sale bans reduced market liquidity (raising bid-ask spreads), slowed price discovery, and "failed to support prices, except possibly for U.S. financial stocks."

[9] See Wigglesworth (2020) on the high costs of shorting Chinese equities in early 2020, and how those costs prompted investment banks to develop synthetic means of betting against Chinese stocks.

Su et al. (2022) consider arguably exogenous changes in the supply of loanable securities for individual Chinese stocks. They find that greater supply improves liquidity but raises the frequency of extreme negative returns. As Beber and Pagano (2013) and Su et al. (2022) discuss, the broader literature also finds mixed results with respect to the question of whether short-sale restrictions help support the level of stock prices.

What then can we conclude about the impact of the CSRC restrictions on securities lending in early 2020 on the level of stock prices? Based on our narrative analysis, perhaps the (partial) suppression of securities lending helped support domestic stock prices from late January to mid or late February 2020 – a period of intense concerns about the impact of the coronavirus. However, this claim is best seen as a provisional one, given the mixed findings in previous research on the price impact of short-sale restrictions. Indeed, the literature also provides support for the view that, by reducing market liquidity, the CSRC restrictions raised the sensitivity of equity prices to bad economic news. That may be why the CSRC relaxed its restrictions on securities lending after mid-February 2020, even as stock prices continued to fall. In any event, the CSRC restrictions in February 2020, lasting not more than several weeks, do not offer a plausible explanation for the spectacular run-up in Chinese equity prices from March to July 2020. An explanation for that rise must lie elsewhere.

B. Regulatory Pressures on Mutual Funds, Stock Brokerages, and Insurance Companies

In advance of the market reopening on 3 February 2020, the CSRC pressured mutual funds and brokers to limit their stock sales. According to news reports, CSRC "window guidance" directed some mutual fund managers to avoid equity sales, except as required to meet redemption demands (Yu et al., 2020, and Zhang and Woo, 2020a).[10] Other news accounts say the CSRC informed some stock brokerages that "their proprietary traders aren't allowed to be net sellers of equities" in the week of 3 February 2020 (Bloomberg News, 2020, and Lockett and Yu, 2020). In addition, the Chinese Banking and Insurance Regulatory Commission (CBIRC) encouraged insurers to buy equities before the market reopening. After the market closed on 3 February, state media confirmed that a group of insurance companies stood "ready to plough 100 billion RMB into the stock market if necessary."[11] (Lockett and Yu, 2020).

Perhaps these interventions reassured investors about the market outlook at a critical juncture. However, their modest scale implies that any direct effect on net equity demand was also small. The market value of negotiable stocks on the Shanghai Stock Exchange (SSE) stood at 30,125 billion RMB at the end of 2019.[12] Thus, SSE market capitalization was roughly 140 times the insurer funds "ready to plough" into the market. The average daily trading volume of 800 billion RMB in the first ten days after the market re-opening was nearly eight times as large as those funds. Since the CSRC directives to mutual funds and stock brokerages covered only their proprietary accounts, the impact of these directives on net equity demand is also small.

[10] Mutual funds held about 6 percent of the market value of domestic Chinese stocks (Huaxi, 2021, page 4, line 1.1).
[11] See Lockett and Yu (2020) and http://www.xinhuanet.com/politics/2020-02/03/c_1125525747.htm (accessed 24 April 2023).
[12] See http://www.sse.com.cn/market/stockdata/overview/yearly/index_his.shtml, and select "2019". This figure excludes Chinese equity securities held by the government and not circulated in the market.

Indeed, one contemporary observer lauded the Chinese policymakers for resisting the impulse to undertake large-scale stock market interventions in February 2020. See Howie (2020).[13]

6.2 Government Efforts to Reassure Investors and Dampen Negative Sentiment

While the interventions to directly boost net equity demand in early 2020 were modest in scale and limited in duration, the government also deployed several other tools to dampen negative sentiment and reassure investors about the outlook for the stock market and the broader economy. One day ahead of the market re-opening on 3 February, the PBC announced it would inject 1.2 trillion RMB into the financial system by buying short-term bonds to support bank lending (Russolillo et al., 2020). The CSRC assured investors that it would "keep fully alert" and "study and launch hedging tools" to prevent investors from panicking.[14] Reporting about other developments on 3 February, Russolillo et al. (2020) write:

> China's top economic planner said on Monday the virus's impact would be temporary and wouldn't alter the positive long-run outlook. In a front-page editorial, the state-owned China Securities Journal urged investors to maintain hope, saying authorities had acted swiftly to offset pressure on the economy.
>
> Financial bloggers were encouraged not to add to the gloom. Hou Anyang, chairman of Shenzhen-based FrontSea Asset Management and a popular financial commentator, posted a message he received from Weibo on Monday that urged him to "watch out for comments and avoid spreading negative information and mood" during this "special time."

In mid-February, the government orchestrated announcements by large asset managers to bolster investor confidence. According to Flood and Li (2020), "At least 39 asset management companies operating in China have injected a total of about Rmb2.4bn ($350m) of their own capital into their funds,… China watchers said the fund buying by asset managers was clearly approved by the government." However, these funds are even smaller, much smaller, than the "ready to plough" funds announced nearly two weeks earlier.

6.3 Other Government Measures to Stimulate Economic Activity

The government also took several other steps in February and March 2020 to support economic activity, as reviewed in He and Liu (2020). For example, regulatory authorities instructed banks to roll over the debts of commercial enterprises, and many small and mid-sized firms did so by late March 2020. The CSRC relaxed restrictions on issuing new corporate bonds. The PBC also created special low-interest loan programs for "frontline" firms involved in the "production, transport, and sales of epidemic-related medical supplies and daily necessities." These frontline firms included more than 1,600 large companies, as He and Liu (2020) note. The CSRC revised its regulations to make it easier for listed firms to raise new equity capital.

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[13] Chinese authorities directly intervened in the stock market at scale in reaction to the 2015 crash, as discussed in Miao and Wang (2019) and Allen et al. (2020). Some observers speculated that the Chinese authorities would respond just as aggressively in reaction to the coronavirus concerns in early 2020. As it turns out, they did not.

[14] See the interview of a CSRC official at http://www.gov.cn/xinwen/2020-02/02/content_5474005.htm.

Finally, several national authorities and local governments implemented temporary cuts in taxes, fees, road tolls, and employer contributions to social security. As one example, small businesses were exempted from value-added taxes from March to May in Hubei, and the value-added tax rate was cut from 3 percent to 1 percent in other regions. Small and mid-sized firms were exempted from social security payments for five months in Hubei, and large firms saw their social security payments cuts by half.

He and Liu (2020) do not quantify the overall scale of subsidized lending and fiscal relief associated with these efforts to support economic activity in early 2020, nor do we know of any fuller account and quantification. He and Liu characterize the overall effort as "massive and targeted to help infected entrepreneurs/individuals, smaller firms, regions in trouble, and [frontline firms]."

6.4 Assessment

Based on the evidence set forth above, one can reasonably argue that government efforts to directly boost net equity demand in and around February 2020 – via restrictions on securities lending and regulatory pressures on mutual funds, stock brokerages and insurance companies – moderated the fall in stock prices during a critical few weeks as China wrestled with the near-term economic and financial impact of the coronavirus. Based on prior research, one can also reasonably argue that the restrictions on securities lending were unhelpful or counterproductive in this regard. In short, it is hard to reach a confident conclusion about the near-term effects of the policy actions to directly boost net equity demand, although we see little reason to think they had a large, positive impact on the level of stock prices.

Perhaps these regulatory interventions, in combination with the other confidence-building pronouncements described above, helped support the level of stock prices by reassuring investors and inspiring positive beliefs about the market outlook. Since this hypothesis rests heavily on assertions about beliefs, and what drove them, it is hard to reject this view. Assessing the independent role of government actions and pronouncements on beliefs would seem to require survey-based or other data on investor beliefs over time.

Given their short duration, however, these regulatory interventions and confidence-building pronouncements do not offer a viable explanation for why China's stock market so greatly outperformed other national markets over the full course of the first several months of 2020. The timing does not fit, and the scale of the interventions is too small. Nor can monetary policy easing actions explain the performance of China's stock market during this period, judging from our analysis in Sections 3 and 4. We conclude that explanations for the spectacular performance of China's stock market in the first half of 2020, absolutely and relative to other national markets, must lie elsewhere.

It's possible that government measures to subsidize borrowing, relax loan repayment terms, reduce the cost of debt and equity financing, and provide several forms of fiscal relief to employers played an important role in the remarkably strong performance of China's stock market during the first half of 2020. That topic warrants attention in future research.

Section 7. Concluding Remarks

China's stock market performance in the first half of 2020 is extraordinary in at least two respects. First, it greatly outperformed other national markets during the global stock market crash triggered by the COVID-19 pandemic. Second, the mainland market increased in value by about 40 percent from early March to early July 2020 and outperformed the U.S. S&P 500 by a spectacular margin. The performance of China's stock market is all the more remarkable in hindsight. From January 2021 to January 2024, its value fell more than 40 percent (Soon and Feng, 2024), creating intense political pressures, and prompting government officials to intervene in multiple ways to support equity values.[15] Thus, questions about the impact of policy interventions on equity prices remain as salient as ever.

Some part of China's strong market performance reflects its early success in suppressing the spread of the SARS-CoV-2 virus. However, this explanation is incomplete at best. Like China, South Korea was relatively successful in containing the spread of the virus, and it did so without draconian lockdowns. Yet South Korean stocks fell nearly 50 percent from 17 February to 23 March 2020, as compared to 11 percent for the Shanghai Stock Exchange.

It's also hard to discern a fundamentals-based explanation for the more than 30 percent gain in the value of mainland Chinese stocks from late 2019 to early July 2020. This period encompasses the most dramatic global output collapse in decades and enormous uncertainty about the economic outlook. In Davis, Liu and Sheng (2022), we show that the U.S. stock market crash in February-March 2020 is many times larger than implied by a standard asset-pricing model. There is little point in conducting a similar exercise for China over the first half of 2020, because *even the direction* of change in Chinese stock prices from late 2019 to July 2020 is at odds with the deterioration in economic fundamentals and prospects over this period.

What, then, explains the behavior of China's stock market during this period? We consider two views about policy interventions that plausibly offer part of the explanation.

One view holds that aggressive monetary and credit easing propped up China's equity values. To assess this view, we consider seven PBC and NIFC interventions that eased monetary and credit conditions in the first six months of 2020. Our event-study analysis of these easing actions finds no evidence that they raised the level of China's stock prices. Moreover, our estimates are precise enough to reject, with high confidence, the claim that these easing actions explain more than a tiny fraction of the absolute or relative rise in China's stock market during this period. In contrast, we find clear evidence that these easing actions raised the implied volatility of Chinese stocks. This result suggests that the easing actions had a de-stabilizing effect on financial markets, which may explain the lack of positive effects on stock price levels.

Another view holds that policy actions to restrict short selling, limit stock sales, and boost stock purchases supported stock prices. The plausibility of this view flows partly from China's earlier experience, when massive policy interventions to boost net equity demand helped contain China's stock market crash in 2015. As we discuss, however, these sorts of policy interventions

[15] The interventions in 2023 and 2024 drew from a similar playbook as ones in the first half of 2020. See, for example, IP (2023), Douglas (2024), and Feng and Douglas (2024).

in 2020 were too small in scale and too time-limited to provide a plausible explanation for the extraordinary performance of China's stock market in the first half of 2020.

In short, our study casts considerable doubt on both views about the role of policy interventions by Chinese authorities. We conclude that the explanation must lie elsewhere. To our knowledge, no other study has offered an evidence-based explanation for the remarkable performance of China's stock market in the first of half of 2020. We see this episode of tremendous upward repricing in Chinese equities during a global output contraction as one that begs for further study.

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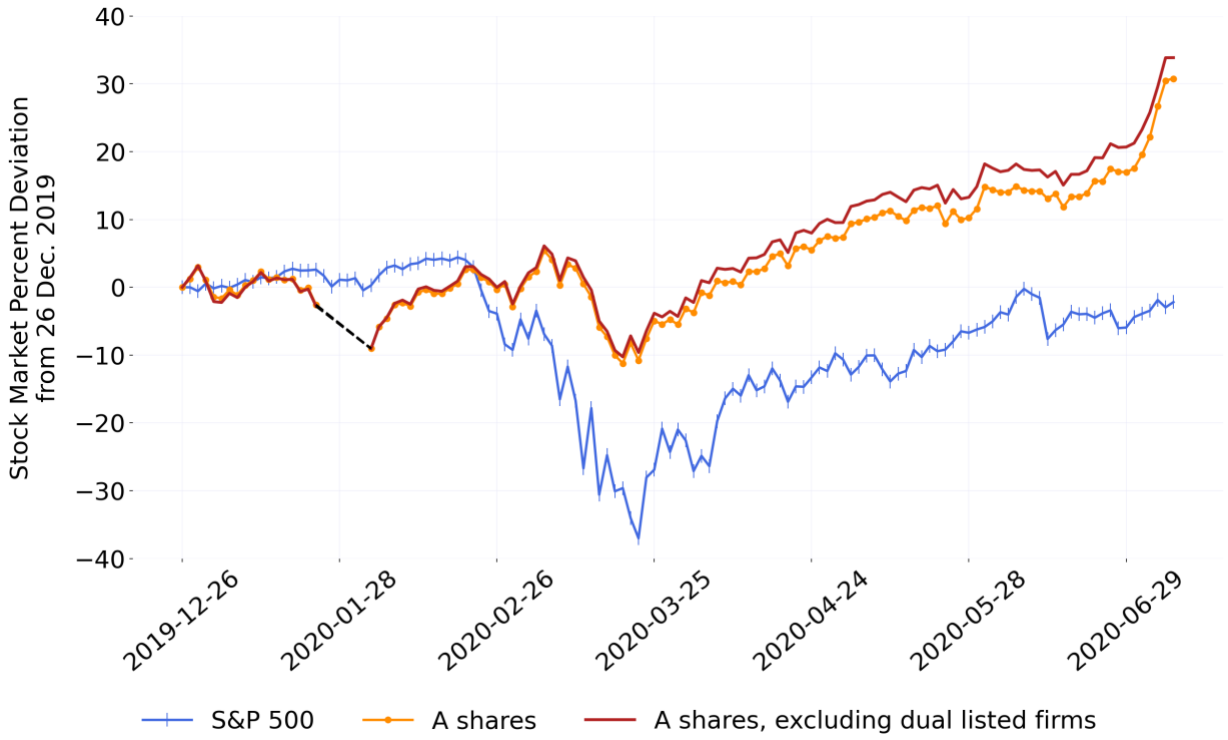
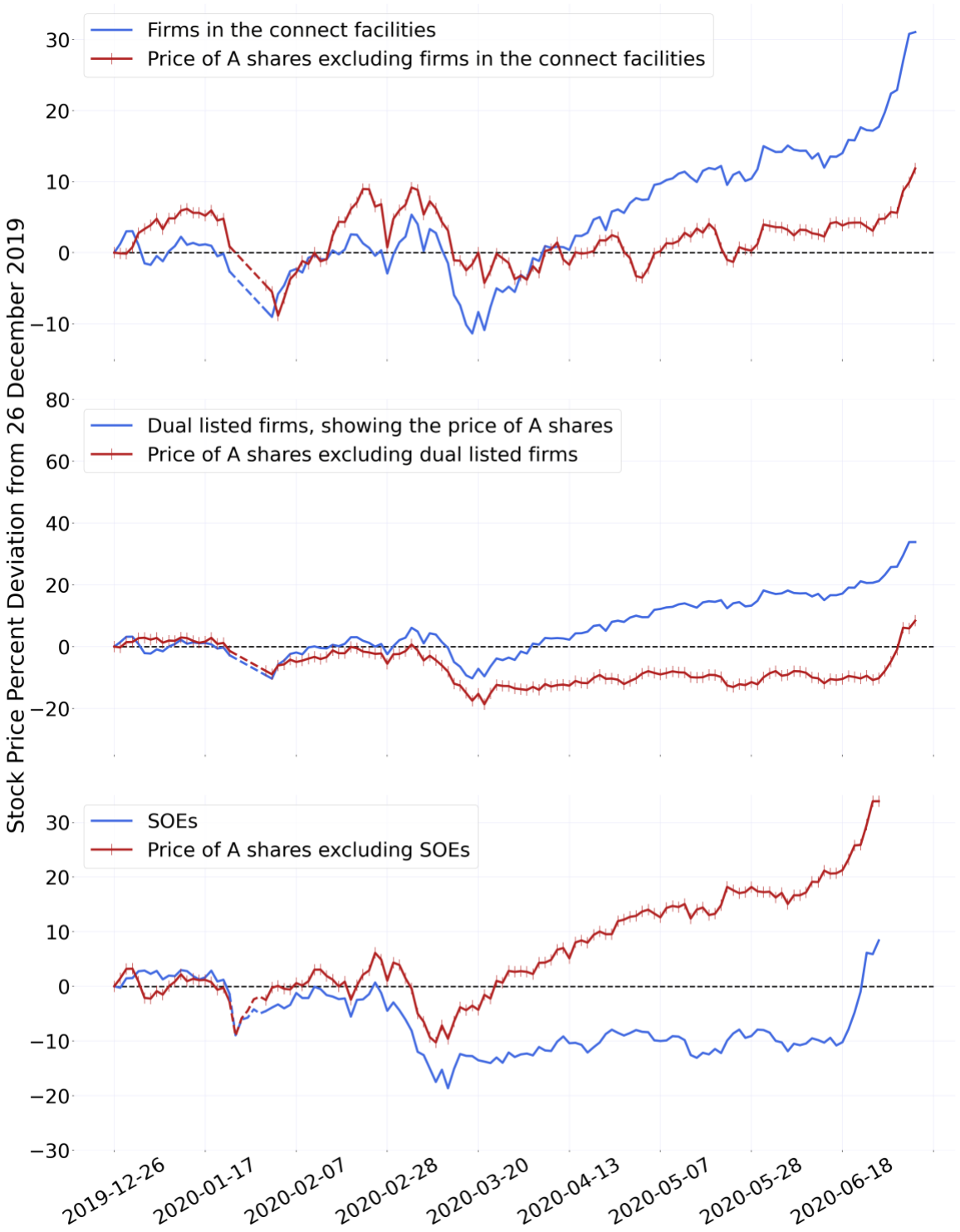
Appendix A. Additional Figures and Tables

Figure A.1. The Stock Market Performance of U.S. vs China, Adjusted for Dollar-RMB Exchange Rate, from 26 December 2019 to 8 July 2020



Note: We plot the cumulated percent deviations in average stock prices from 26 December 2019 to 8 July 2020. For China, we use Chinese firms operating in Mainland China and listed on domestic stock market only. We linearly interpolate stock prices from 23 January to 3 February, given that mainland China stock markets were closed from 24 January to 2 February, inclusive. For the U.S., we consider the S&P 500 series and express returns in Renminbi using the daily spot exchange rate. Chinese stock market data are from Wind, the Chinese analogy of WRDS. S&P 500 and exchange rate data are downloaded from Yahoo Finance.

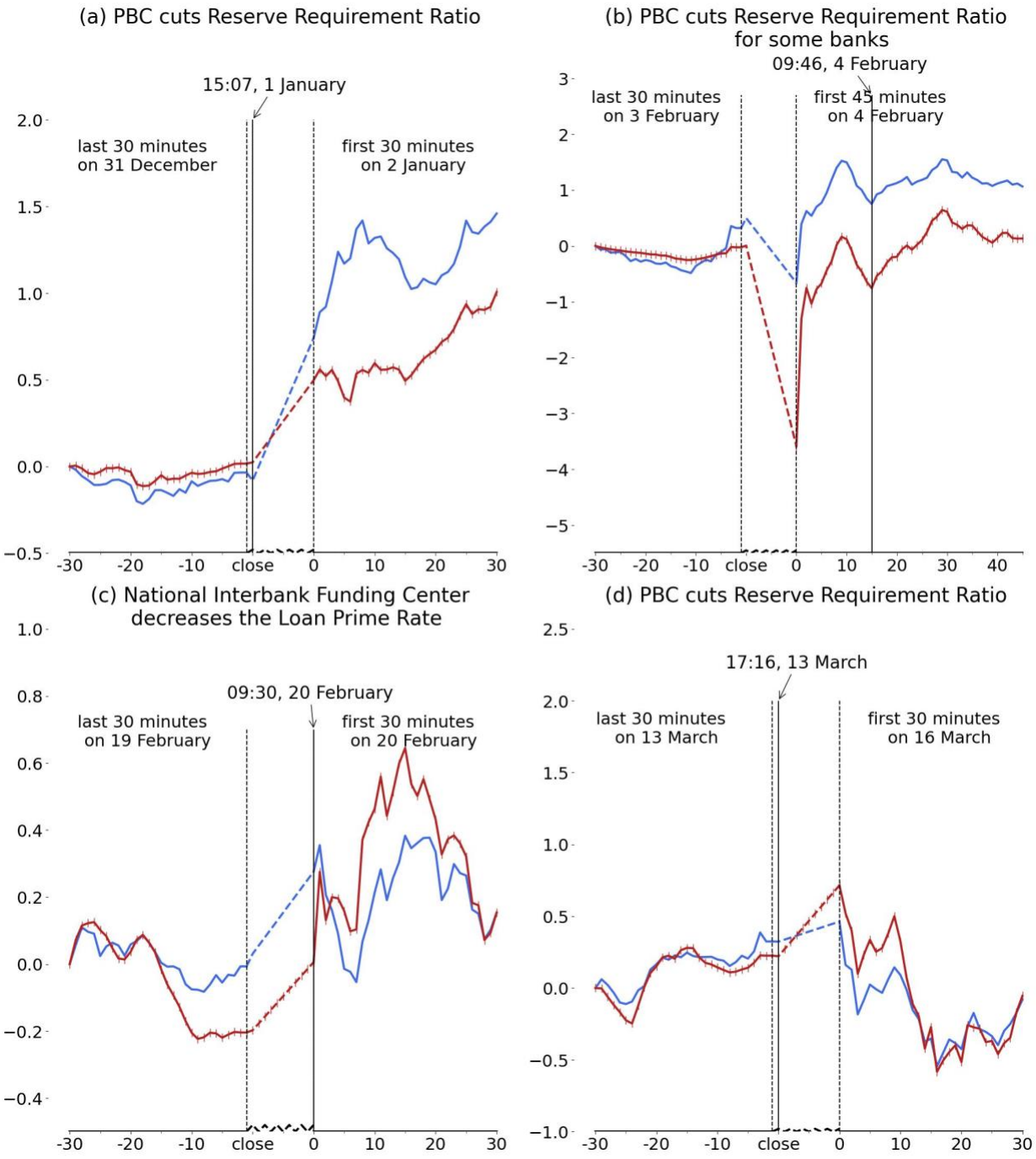
Figure A.2. Stock Price Percent Deviation from 26 December 2019, Selected Categories

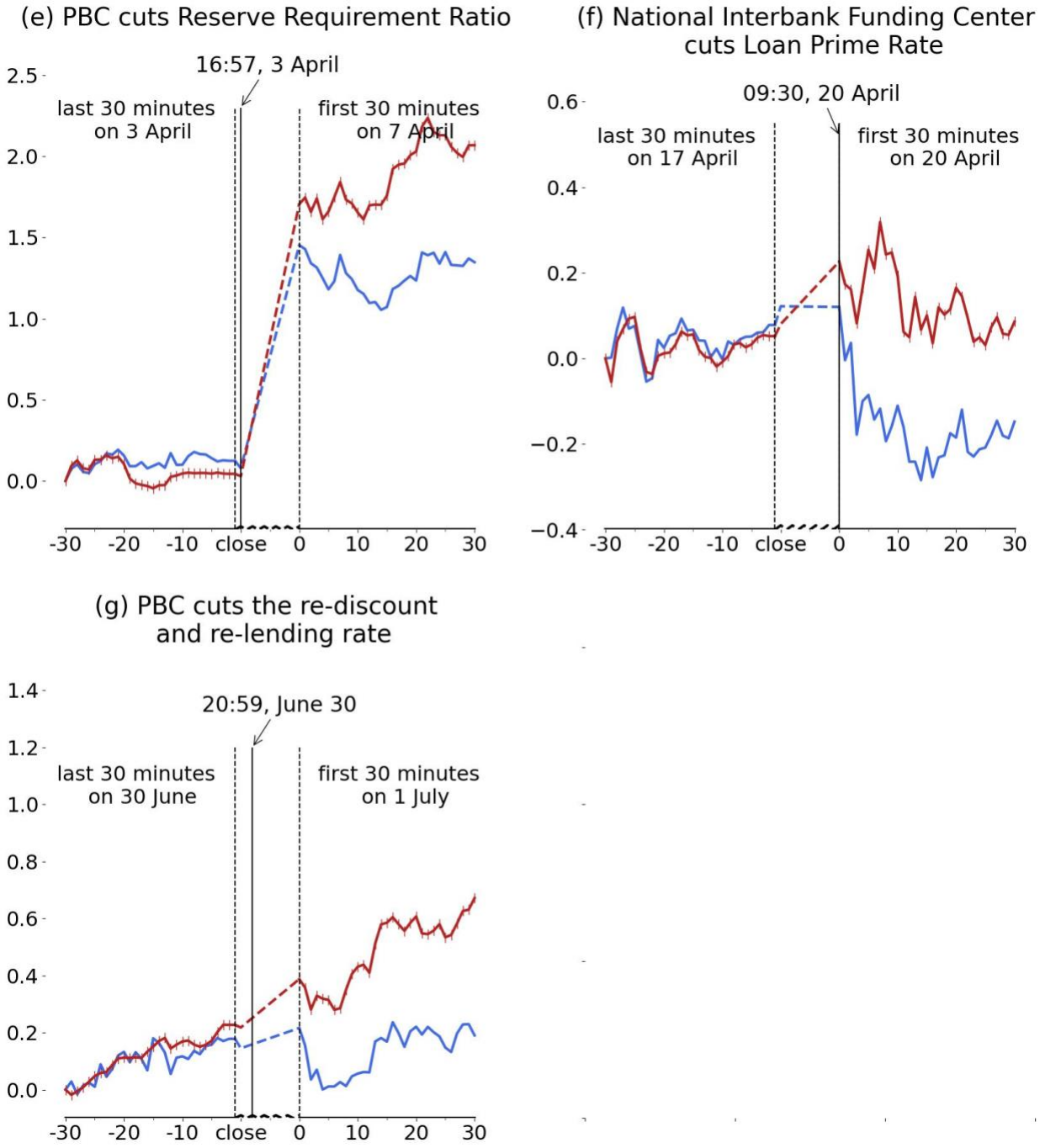


Notes to Figure A.2: We define Connected Companies as those who participate in the Shanghai-Hong Kong or Shenzhen-Hong Kong stock connect facilities. We define Dual listed firms as those who have both A-share listings in mainland China and H-share listings in Hong Kong. We define SOEs as those whose state-owned share is higher than or equal to 50%. The sample period is from 26 December 2019 to 8 July 2020.

We linearly interpolate stock prices from 23 January to 3 February, given that mainland China stock markets were closed from 24 January to 2 February, inclusive.

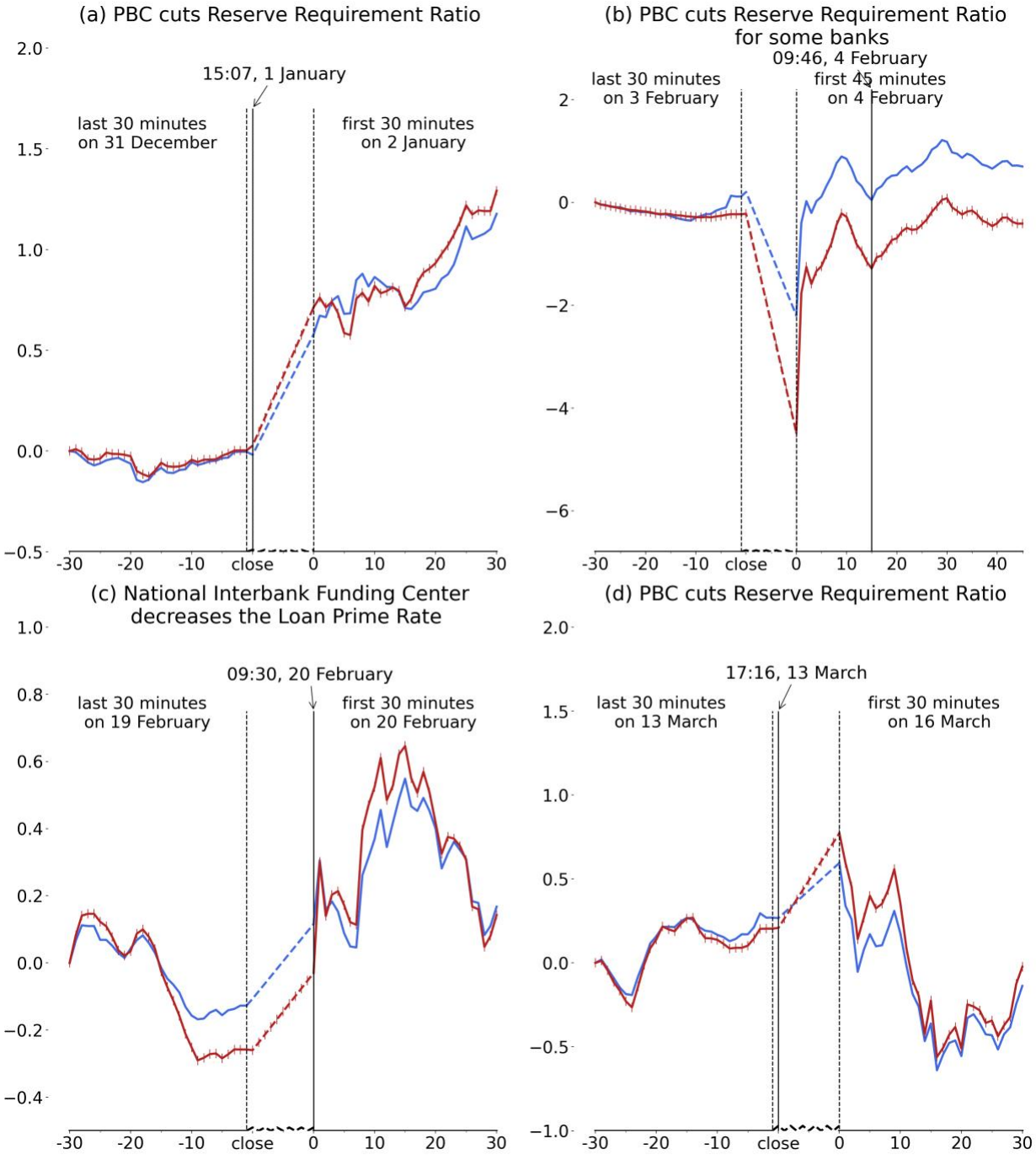
Figure A.3. Cumulative Returns on A Shares for Dual-listed (blue) and Other Firms (red), [-30 minutes, +30 minutes]

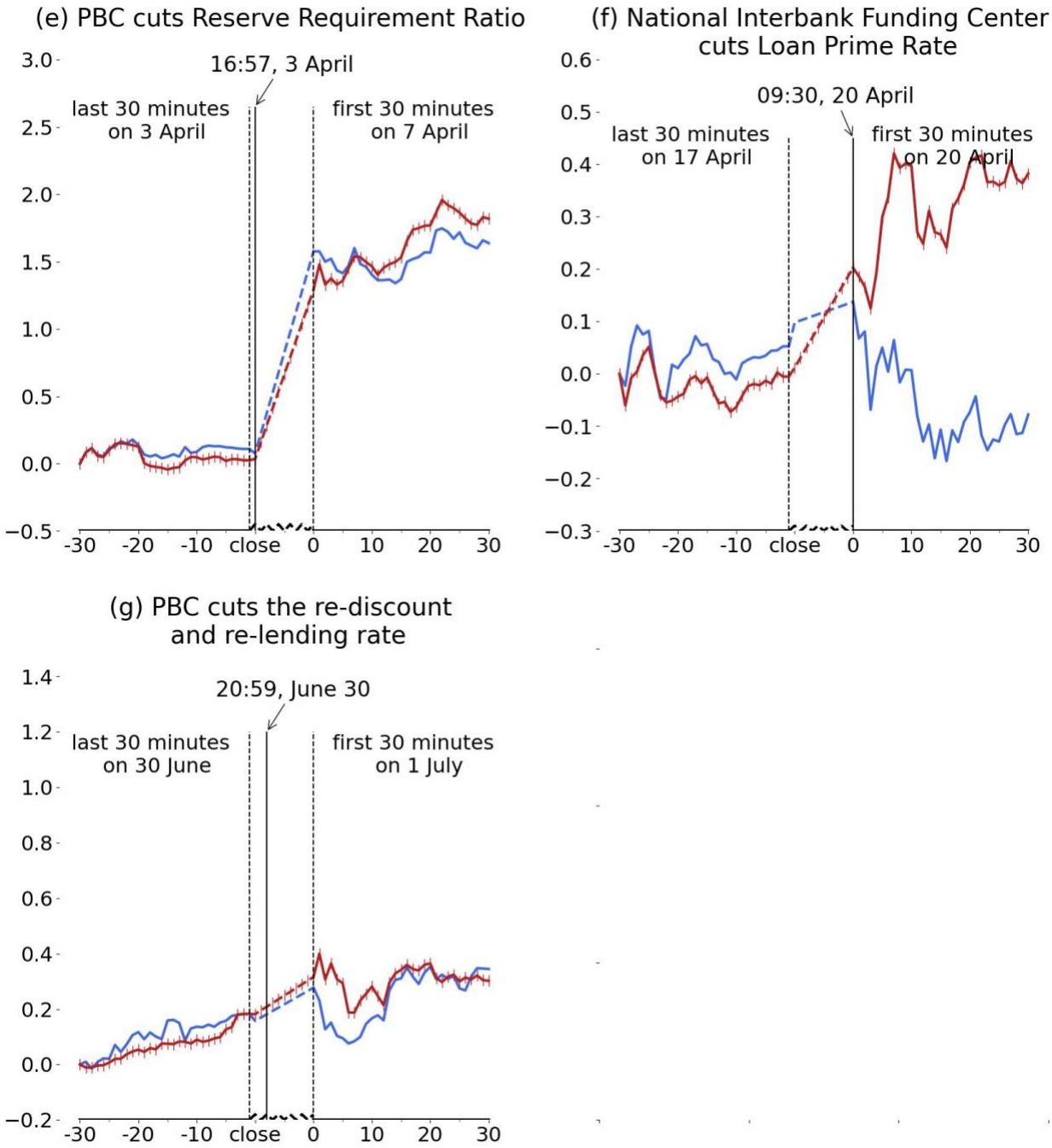




Note: Each graph shows the cumulative returns in A-share market for dual-listed firms and other firms in the A-share market. For other notes, see Figure 2.

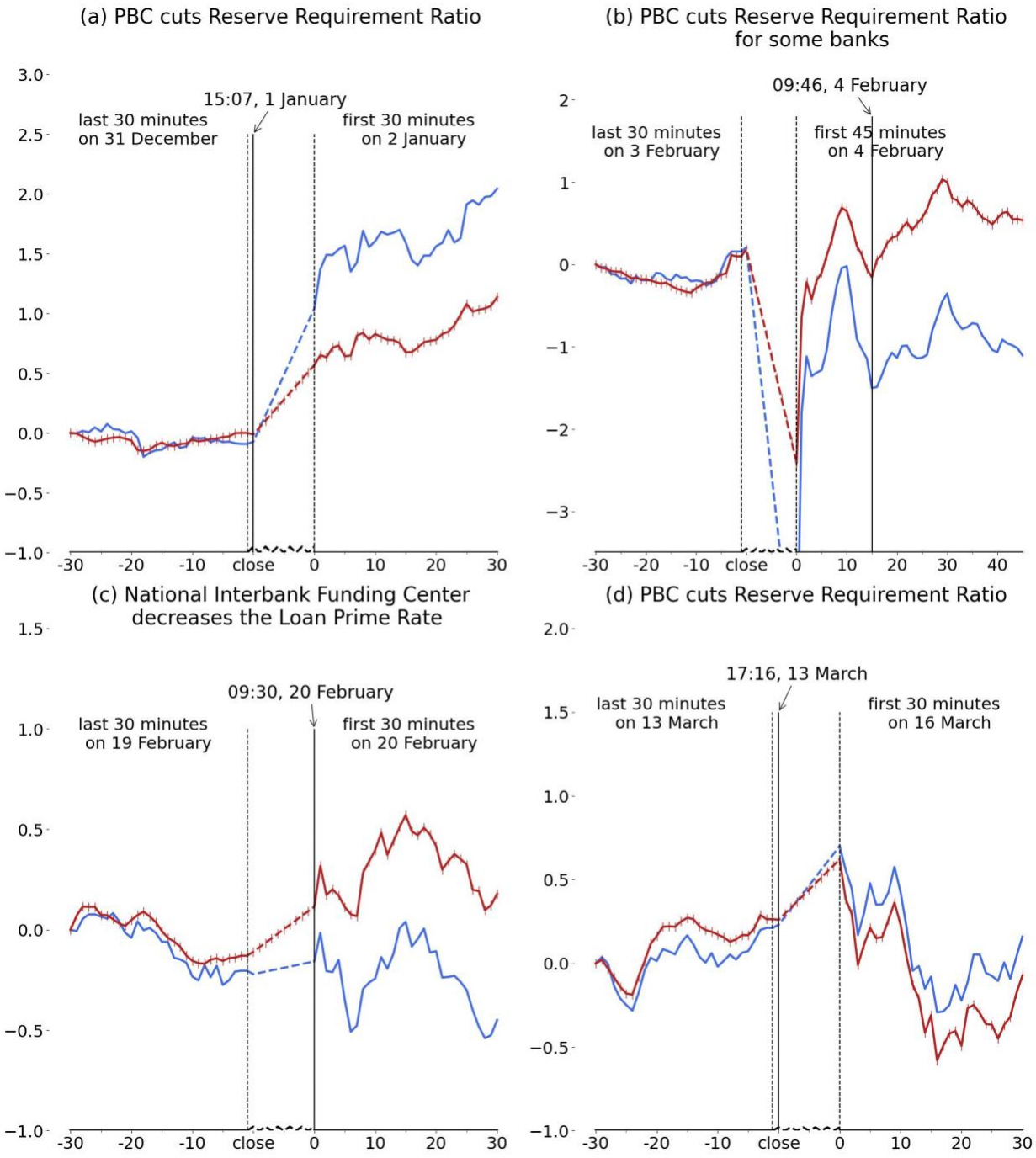
Figure A.4. Cumulative Returns on A Shares for Firms in the Connect (blue) and not in the Connect (red), [-30 minutes, +30 minutes]

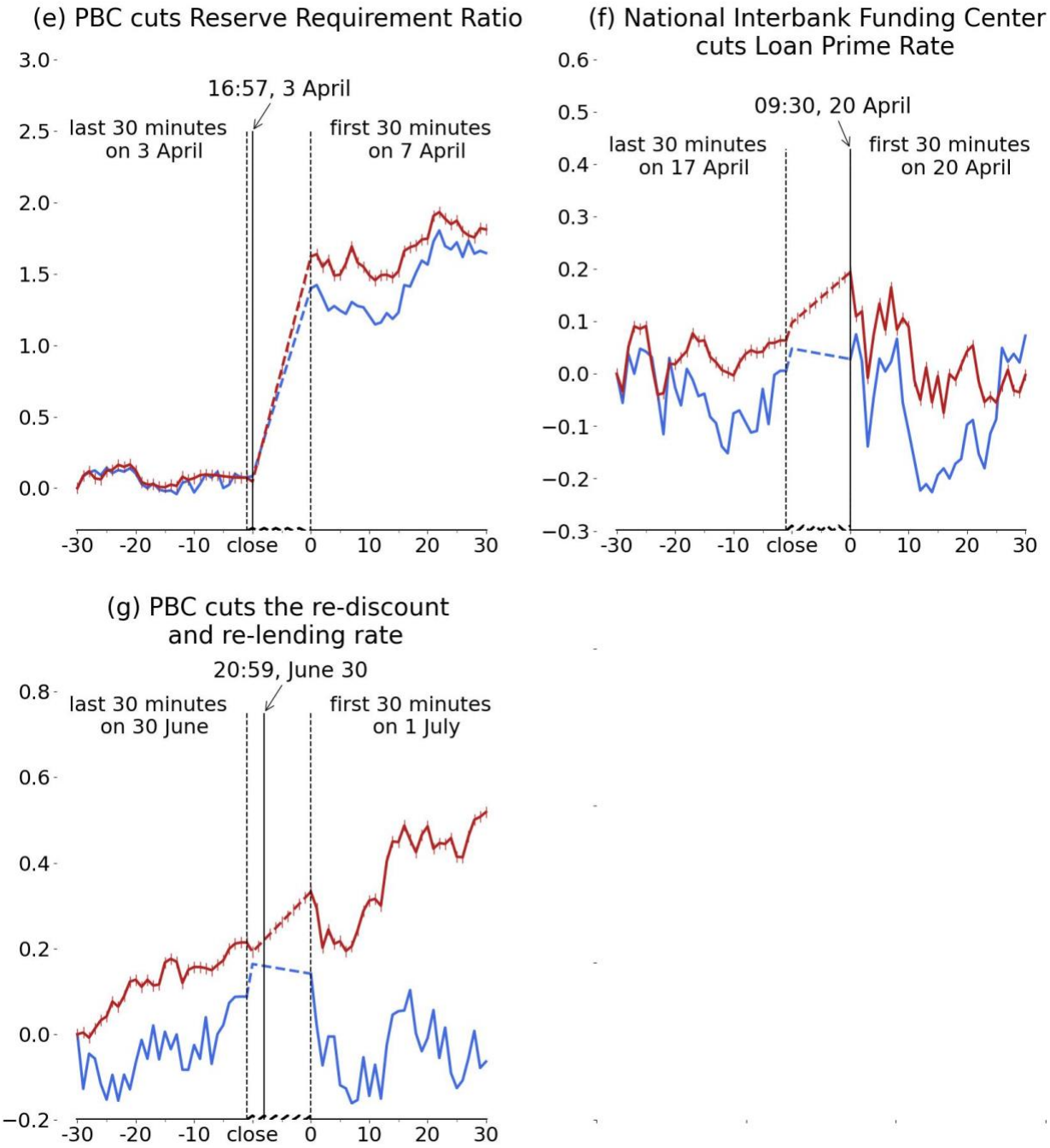




Note: Each graph shows the cumulative returns in A-share market for firms in the connect facilities and for firms not in the connect facilities. For other notes, see Figure 2.

Figure A.5. Cumulative Returns on A Share for SOEs (blue) and non-SOEs (red), [-30 minutes, +30 minutes]

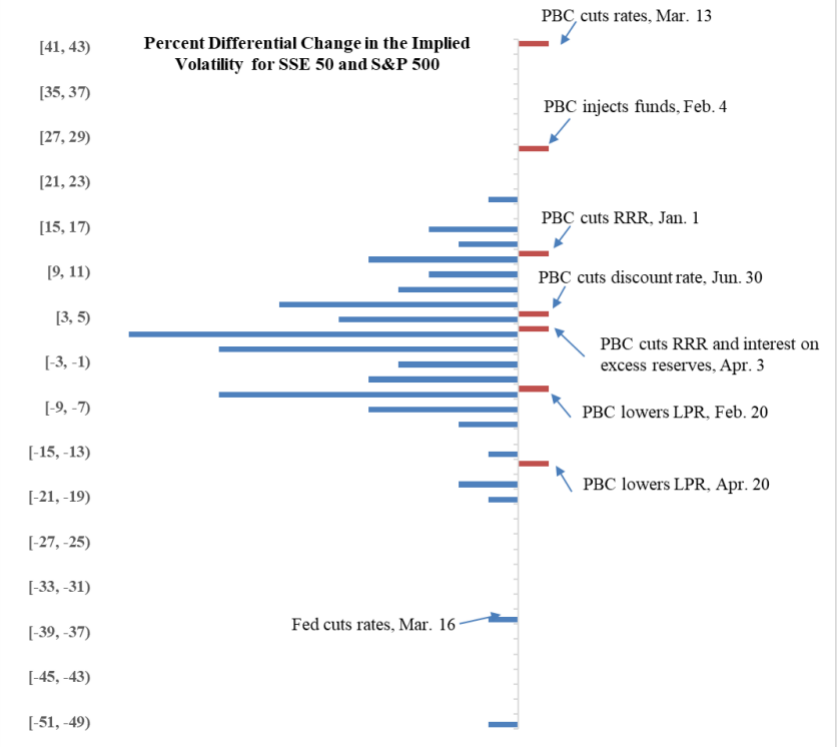




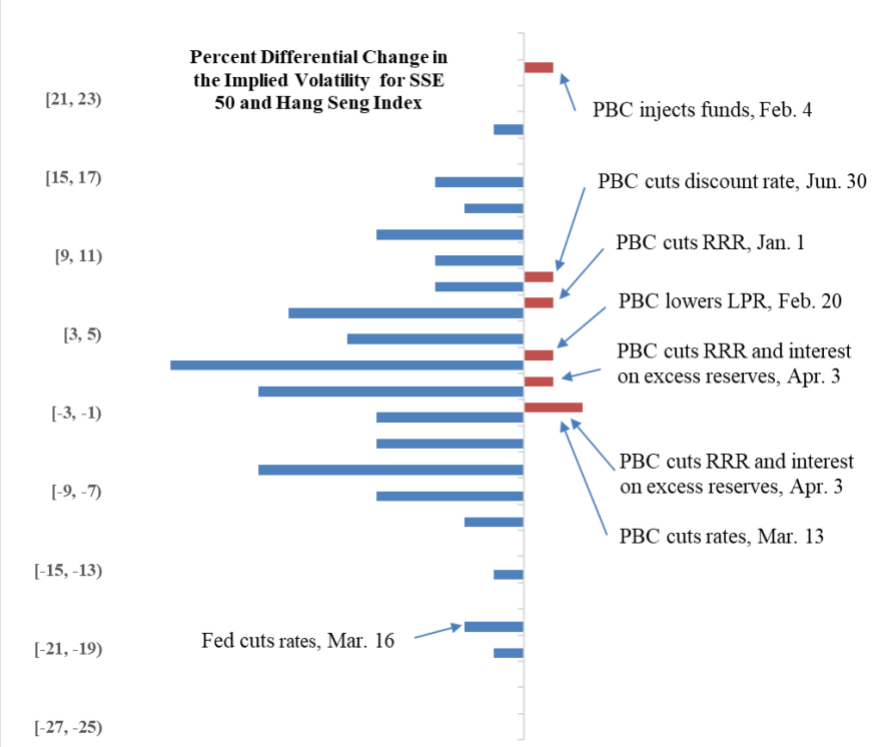
Note: Each graph shows the cumulative returns in A-share market for SOEs and non-SOEs. For other notes, see Figure 2.

Figure A.6. Histograms of Daily Implied Volatility Percent Change Differentials from 26 December 2019 to 8 July 2020, China's Monetary and Credit Easing Announcement Dates (Red) Compared to All Other Dates (Blue)

SSE 50 Minus S&P 500 Implied Volatility Change Differential



SSE 50 Minus Hang Seng Implied Volatility Change Differential



Note: These charts complement the ones in Figure 4 by considering the full set of trading days from 26 December 2019 to 8 July 20, except 3 February.

Table A.1. Percent Returns in 10-Minute Windows Around Monetary and Credit Easing Events

Event Time	09:30 2 Jan.	09:46 4 Feb.	09:30 20 Feb.	09:30 16 Mar.	09:30 7 Apr.	09:30 20 Apr.	09:30 1 Jul.	All
All Firms	0.72* (0.29)	-0.02 (0.29)	0.25 (0.29)	0.06 (0.29)	1.40*** (0.29)	0.08 (0.29)	0.03 (0.29)	0.45 (0.30)
Dual-listed	1.25*** (0.27)	0.88*** (0.27)	0.04 (0.27)	-0.19 (0.27)	1.04*** (0.27)	-0.14 (0.27)	-0.15 (0.27)	0.50 (0.27)
Non dual-listed	0.41 (0.31)	-0.54 (0.31)	0.38 (0.31)	0.20 (0.31)	1.62*** (0.31)	0.21 (0.31)	0.14 (0.31)	0.41 (0.32)
Δ Dual-listed	0.83*** (0.15)	1.42*** (0.15)	-0.34* (0.15)	-0.39*** (0.15)	-0.58*** (0.15)	-0.34* (0.15)	-0.29 (0.15)	0.09 (0.16)
In the Connect	0.72* (0.29)	0.24 (0.29)	0.24 (0.29)	0.01 (0.29)	1.41*** (0.29)	0.07 (0.29)	0.03 (0.29)	0.47 (0.30)
Not in the Connect	0.62 (0.33)	-0.98*** (0.33)	0.46 (0.33)	0.31 (0.33)	1.62*** (0.33)	0.22 (0.33)	0.22 (0.33)	0.42 (0.34)
Δ Connect	0.10 (0.09)	1.22*** (0.09)	-0.21* (0.09)	-0.30*** (0.09)	-0.22* (0.09)	-0.14 (0.09)	-0.19* (0.09)	0.05 (0.09)
SOEs	1.68*** (0.30)	-1.27*** (0.30)	-0.06 (0.30)	0.41 (0.30)	1.25*** (0.30)	0.08 (0.30)	-0.17 (0.30)	0.42 (0.31)
Non SOEs	0.68* (0.29)	0.03 (0.29)	0.27 (0.29)	0.05 (0.29)	1.41*** (0.29)	0.08 (0.29)	0.04 (0.29)	0.45 (0.30)
Δ SOEs	1.00*** (0.14)	-1.30*** (0.14)	-0.33* (0.14)	0.37*** (0.14)	-0.16 (0.14)	0.00 (0.14)	-0.21* (0.14)	-0.03 (0.15)

Note: This table follows Table 2 in the main text in all respects, except that it considers percent returns in a 10-minute windows that run from five minutes before to five minutes after the indicated event. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table A.2. Percent Returns in 60-Minute Windows Around Monetary and Credit Easing Events

	09:30 2 Jan.	09:46 4 Feb.	09:30 20 Feb.	09:30 16 Mar.	09:30 7 Apr.	09:30 20 Apr.	09:30 1 Jul.	All Events
All firms	1.17*** (0.34)	0.94 (0.34)	0.15 (0.34)	-0.07 (0.34)	1.81*** (0.34)	0.00 (0.34)	0.50 (0.34)	0.66 (0.35)
Dual-listed	1.46*** (0.32)	1.53*** (0.32)	0.15 (0.32)	-0.09 (0.32)	1.35*** (0.32)	-0.15 (0.32)	0.19 (0.32)	0.7* (0.33)
Non dual-listed	1.01*** (0.37)	0.61 (0.37)	0.15 (0.37)	-0.06 (0.37)	2.07*** (0.37)	0.08 (0.37)	0.67 (0.37)	0.64 (0.38)
Δ Dual-listed	0.45* (0.20)	0.92*** (0.20)	0.00 (0.20)	-0.03 (0.20)	-0.72*** (0.20)	-0.23 (0.20)	-0.48* (0.20)	0.05 (0.13)
In the Connect	1.18*** (0.34)	1.17*** (0.34)	0.16 (0.34)	-0.14 (0.34)	1.80*** (0.34)	-0.02 (0.34)	0.51 (0.34)	0.68 (0.35)
Not in the Connect	1.29*** (0.40)	0.07 (0.40)	0.13 (0.40)	-0.04 (0.40)	2.13*** (0.40)	0.14 (0.40)	0.79* (0.40)	0.64 (0.41)
Δ Connect	-0.11 (0.12)	1.10*** (0.12)	0.03 (0.12)	-0.10 (0.12)	-0.33*** (0.12)	-0.16 (0.12)	-0.28* (0.12)	0.05 (0.13)
SOEs	2.04*** (0.37)	-0.36 (0.37)	-0.45 (0.37)	0.12 (0.37)	1.64*** (0.37)	0.10 (0.37)	-0.07 (0.37)	0.49 (0.38)
Non SOEs	1.14*** (0.34)	1.00*** (0.34)	0.17 (0.34)	-0.08 (0.34)	1.81*** (0.34)	-0.01 (0.34)	0.52 (0.34)	0.67 (0.35)
Δ SOEs	0.91*** (0.17)	-1.36*** (0.17)	-0.62*** (0.17)	0.19 (0.17)	-0.17 (0.17)	0.11 (0.17)	-0.59*** (0.17)	-0.19 (0.17)

Note: This table follows Table 2 in the main text in all respects, except that it considers percent returns in a 60-minute windows that run from 30 minutes before to 30 minutes after the indicated event. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table A.3. Percent Ratio of Each Industries in A-share Market

Industry	Number of Firms	Market Cap	Number of Firms		Market cap	
			Dual-listed	A shares except for Dual-listed	Dual-listed	A shares except for Dual-listed
Agriculture, forestry, animal husbandry and fishery	1.04	0.42	-	1.22	-	0.57
Mining Industry	2.03	5.79	8.13	1.83	16.00	1.80
Manufacturing Industry	62.73	45.46	37.40	63.54	10.72	58.72
Industry of electric power, heat, gas and water production and supply	3.05	3.30	5.69	2.82	1.07	4.16
Construction Industry	2.57	2.35	4.07	2.44	2.91	2.10
Wholesale and retail Industry	4.28	2.32	1.63	4.38	0.26	3.10
Transport, storage and postal service Industry	2.78	3.33	12.20	2.47	3.03	3.34
Accommodation and catering Industry	0.24	0.12	-	0.28	-	0.18
Industry of information transmission, software and information technology services	8.11	4.83	-	8.50	-	6.81
Financial Industry	3.13	24.06	25.20	2.29	63.46	9.12
Real estate Industry	3.21	4.20	1.63	3.18	2.39	4.86
Leasing and commercial service Industry	1.47	1.13	0.81	1.48	0.03	1.56
Scientific research and technical service Industry	1.28	0.38	1.63	1.27	0.03	0.51
Water conservancy, environment and public facility management Industry	1.50	0.52	0.81	1.63	0.02	0.72
Industry of resident service, repair and other services	0.03	0.00	-	0.03	-	0.00
Education	0.21	0.09	-	0.20	-	0.13
Health and social work	0.32	0.56	-	0.31	-	0.77
Industry of culture, sports and entertainment	1.55	0.93	0.81	1.45	0.08	1.28
Diversified Industries	0.45	0.20	-	0.69	-	0.27

Note: We show the number ratio and market capitalization ratio of each industry in the A-share market. We use the market cap on 31 December 2019. The Industry Classification for A shares is based on the Guidelines for the Industry Classification of Listed Companies issued by China Securities Regulatory Commission in 2012. Dual-listed firms are those listed both in A-share and H-share markets. The data are from Wind, the Chinese analogy of WRDS.

Table A.4. Percent Returns by Industry Sector in 10-Minute Windows Around Monetary and Credit Easing Events

	09:30 2 Jan.	09:46 4 Feb.	09:30 20 Feb.	09:30 16 Mar.	09:30 7 Apr.	09:30 20 Apr.	09:30 1 Jul.	All Events
Manufacturing	0.09 (0.34)	-0.31 (0.34)	0.43 (0.34)	0.19 (0.34)	1.76*** (0.34)	0.33 (0.34)	0.23 (0.34)	0.43 (0.35)
Financial	1.42*** (0.28)	0.88*** (0.28)	-0.04 (0.28)	-0.26 (0.28)	1.04*** (0.28)	-0.21 (0.28)	-0.27 (0.28)	0.44 (0.29)
Mining	0.68* (0.30)	0.79*** (0.30)	0.11 (0.30)	0.08 (0.30)	1.12*** (0.30)	-0.73* (0.30)	0.15 (0.30)	0.55 (0.31)
Information	0.71 (0.41)	-0.58 (0.41)	0.36 (0.41)	0.69 (0.41)	2.35*** (0.41)	0.40 (0.41)	-0.04 (0.41)	0.55 (0.42)
Real Estate	2.42*** (0.36)	-0.60 (0.36)	-0.21 (0.36)	0.06 (0.36)	1.23*** (0.36)	-0.40 (0.36)	0.33 (0.36)	0.42 (0.37)
Transport	0.33 (0.32)	-1.68*** (0.32)	1.01 (0.32)	0.04 (0.32)	1.06*** (0.32)	0.09 (0.32)	-0.25 (0.32)	0.27 (0.33)
Energy	0.58*** (0.21)	-0.10 (0.21)	0.13 (0.21)	0.11 (0.21)	0.93*** (0.21)	0.00 (0.21)	-0.04 (0.21)	0.38 (0.22)
Construction	1.02*** (0.31)	-0.45 (0.31)	0.01 (0.31)	0.43 (0.31)	1.05*** (0.31)	1.71*** (0.31)	-0.01 (0.31)	0.63* (0.31)
Wholesale, Retail	0.32 (0.28)	-1.71*** (0.28)	0.22 (0.28)	0.59* (0.28)	0.96 (0.28)	0.01 (0.28)	-0.02 (0.28)	0.14 (0.29)
Leasing	1.11*** (0.42)	-1.75*** (0.42)	1.65*** (0.42)	-0.67 (0.42)	2.00*** (0.42)	0.10 (0.42)	0.45 (0.42)	0.47 (0.43)
Others	0.54 (0.43)	-1.22*** (0.43)	0.60 (0.43)	0.45 (0.43)	1.32*** (0.43)	0.44 (0.43)	0.35 (0.43)	0.52 (0.44)

Note: This table follows Table 4 in the main text in all respects, except that it considers percent returns in a 10-minute windows that run from five minutes before to five minutes after the indicated event. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

Table A.5. Percent Returns by Industry Sector in 60-Minute Windows Around Monetary and Credit Easing Events

	09:30 2 Jan.	09:46 4 Feb.	09:30 20 Feb.	09:30 16 Mar.	09:30 7 Apr.	09:30 20 Apr.	09:30 1 Jul.	All Events
Manufacturing	0.73 (0.40)	0.96* (0.40)	0.26 (0.40)	-0.20 (0.40)	2.23*** (0.40)	0.19 (0.40)	0.82* (0.40)	0.68 (0.41)
Financial	1.59*** (0.34)	1.57*** (0.34)	0.08 (0.34)	-0.33 (0.34)	1.37*** (0.34)	-0.27 (0.34)	0.03 (0.34)	0.63 (0.34)
Mining	0.93*** (0.35)	1.12*** (0.35)	0.08 (0.35)	0.86* (0.35)	1.66*** (0.35)	-0.36 (0.35)	0.46 (0.35)	0.85* (0.35)
Information	1.98*** (0.51)	0.70 (0.51)	-1.09* (0.51)	0.09 (0.51)	2.95*** (0.51)	0.40 (0.51)	0.28 (0.51)	0.68 (0.53)
Real Estate	2.02*** (0.42)	0.10 (0.42)	-0.05 (0.42)	0.47 (0.42)	1.49*** (0.42)	-0.97* (0.42)	1.83*** (0.42)	0.71 (0.43)
Transport	0.82* (0.39)	-0.93* (0.39)	0.98* (0.39)	-0.19 (0.39)	1.38*** (0.39)	0.39 (0.39)	-0.15 (0.39)	0.45 (0.40)
Energy	0.90*** (0.26)	1.10*** (0.26)	0.16 (0.26)	0.45 (0.26)	1.06*** (0.26)	-0.30 (0.26)	-0.13 (0.26)	0.56* (0.27)
Construction	2.60*** (0.42)	0.16 (0.42)	-0.20 (0.42)	0.88* (0.42)	1.26*** (0.42)	0.72 (0.42)	0.25 (0.42)	0.88* (0.43)
Wholesale, Retail	0.79* (0.37)	-0.86* (0.37)	-0.03 (0.37)	1.10*** (0.37)	1.22*** (0.37)	0.19 (0.37)	0.39 (0.37)	0.43 (0.39)
Leasing	1.83*** (0.52)	-0.52 (0.52)	1.49*** (0.52)	-1.16* (0.52)	2.06*** (0.52)	0.38 (0.52)	2.31*** (0.52)	0.84 (0.53)
Others	0.97 (0.50)	-0.05 (0.50)	0.09 (0.50)	0.00 (0.50)	1.90*** (0.50)	0.61 (0.50)	0.84 (0.50)	0.68 (0.52)

Note: Note: This table follows Table 4 in the main text in all respects, except that it considers percent returns in a 60-minute windows that run from 30 minutes before to 30 minutes after the indicated event. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.