Internet Appendix to
"Fiscal Stimulus, Deposit Competition, and the Rise of Shadow Banking: Evidence from China"

December 22, 2023

This internet appendix includes tables/figures as robustness tests and additional results related to the empirical results reported in the paper.

1. Within-bank estimation of deposit creation from loan supply: Table IA1
2. Relationships between BOC competition exposure and bank characteristics: Table IA2
3. Robustness checks of treatment effect of BOC competition on SMBs: unbundling the other three big banks, Table IA3
4. Distribution of new branches of SMBs: Table IA4
5. Refinancing of stimulus loans and the growth of WMPs: Table IA5 and Figure IA8
6. Measurement errors of WMP balance: Figures IA1 and IA6;
7. Size and ROE of BOC versus other big banks: Figure IA2
8. Province-level market (branch) share of the Big Four banks: Figure IA3
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Table IA1 Deposit Creation through Loan Supply

This table shows that if a bank supplies more credit to firms relative to households from 2008 to 2009/2010, the growth of deposit from firm depositors will also be higher relative to that from household depositors from 2008 to 2009/2010. Deposit Growth Gap is defined as the difference between changes of firm deposits and changes of household deposits from 2008 to year t scaled by the bank's asset in 2008, and Loan Growth Gap is defined as the difference between changes of loans to firm borrowers and changes of loans to household borrowers from 2008 to year t scaled by the bank's asset in 2008. Robust *t*-statistics are shown in the parentheses. *** p<0.01, ** p<0.05, and * p<0.1.

Year t	2009	2010
Dep Var: Deposit Growth Gap	(1)	(2)
Loan Growth Gap	0.587*	0.860**
	(1.950)	(2.341)
Constant	0.0746**	0.128*
	(2.340)	(1.941)
Observations	40	40
R-squared	0.198	0.295

Table IA2 Relationships between BOC Competition and SMBs' Characteristics

This table shows the OLS regression results of the bank characteristics in 2010 on their exposure to BOC competition as well as the partial correlation, i.e., the correlation after demeaned at the province level. Robust *t*-statistics are shown in the parentheses. *** p<0.01, ** p<0.05, and * p<0.1.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep Var	DAR	WMP/Assets	NDLAR	Deposit Rate	WMP Yield	ROA
BOCExp	-0.729	-0.0291	0.821	-1.340	0.284	2.342
	(-1.334)	(-0.419)	(1.574)	(-0.289)	(0.0411)	(1.153)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	117	117	117	105	59	117
R-squared	0.300	0.492	0.360	0.415	0.537	0.327
Partial Correlation	-0.1393	-0.0441	0.1636	-0.0318	0.0063	0.1207

	(7)	(8)	(9)
Dep Var	Leverage	LAR	Log(Assets)
	0.0928	-0.699	11.54*
	(0.341)	(-1.306)	(1.844)
Province FE	Yes	Yes	Yes
Observations	117	113	117
R-squared	0.144	0.424	0.587
Partial Correlation	0.0359	-0.1371	0.1908

Table IA3 Treatment effect of BOC competition: Unbundling the Other 3 Big Banks

This table shows the treatment effect of competition from BOC and the other big banks on the SMBs' DAR and WMP issuance after 2010 with the DID specification. We unbundle the other three big banks and add the SMBs' exposure to the competition from each of them separately.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable	DAR	DAR	DAR	WMP/Asset	WMP/Asset	WMP/Asset
BOCExp*1(t>2010)	-0.775***	-0.950***	-0.449	0.836**	0.957**	0.903*
	(-3.113)	(-3.560)	(-1.320)	(2.232)	(2.024)	(1.797)
ABCExp*1(t>2010)	0.212			-0.142		
	(0.994)			(-1.028)		
CCBExp*1(t>2010)		0.511			-0.356	
		(1.626)			(-1.115)	
ICBCExp*1(t>2010)			-0.394			-0.177
			(-1.045)			(-0.583)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	979	979	979	991	991	991
R-squared	0.825	0.825	0.825	0.702	0.703	0.702
N of banks	126	126	126	126	126	126

Table IA4 Distribution of New Branches of SMBs

This table reports the number of new branches established by the sample SMBs during 2007-2015 in different categories of cities. The first column corresponds to new branches located in the banks' headquarter city; for the remaining new branches, we group them by whether the new branch is located in the headquarter province and whether the new branch is located in a city with existing branches of the same city. Branching information is from CBRC's website.

	Headquarter City	Different Province		Headquarter Province		
Year		No Pre-branch	Pre-branch	No Pre-branch	Pre-branch	Total
2007	269	33	247	36	177	762
2008	238	77	392	104	64	875
2009	229	116	415	303	102	1165
2010	232	186	486	155	152	1211
2011	242	135	533	71	221	1202
2012	266	90	760	42	377	1535
2013	348	95	991	120	420	1974
2014	1027	99	3493	97	847	5563
2015	934	94	2894	65	1103	5090
Total	3,785	925	10,211	993	3,463	19377

Table IA5 Refinancing of Stimulus Loans and the Growth of WMPs

This table reports the relationship between the estimated stimulus loans extended by a bank and its subsequent WMP balance. To estimate the stimulus loan, we first fit a bank-specific linear trend to the quarterly loan balance for each of the largest 25 banks from 2006 Q4 to 2008 Q4, and then predict the loan balance in 2010 Q4 assuming such trend continues, and use the difference between the actual loan balances and the predicted loan balances in 2010 Q4 as the estimated stimulus loan. The first (second) panel uses principal-floating (principle-guaranteed) WMP balance as the dependent variable. Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel A: Principal-floating WMPs

Year t	2010	2011	2012	2013	2014
Dep Var: (WMP Bal. in t)/(Loan Bal. in 2008)	(1)	(2)	(3)	(4)	(5)
Stimulus loan/Loan bal. in 2008	0.0237	-0.000119	1.227***	1.364***	2.093***
	(0.354)	(-0.00240)	(5.547)	(5.174)	(3.068)
Constant	0.0463	0.0865***	-0.116	-0.0959	-0.0997
	(1.637)	(3.287)	(-1.022)	(-0.744)	(-0.383)
Observations	25	25	25	25	25
R-squared	0.006	0.000	0.448	0.485	0.391

Panel B: Principal-guaranteed WMPs

Year t	2010	2011	2012	2013	2014
Dep Var: (WMP Bal. in t)/(Loan Bal. in 2008)	(1)	(2)	(3)	(4)	(5)
Stimulus loan/Loan bal. in 2008	-0.00646	0.00559	0.252	0.398	0.202
	(-0.708)	(0.149)	(1.233)	(1.166)	(0.558)
Constant	0.0149**	0.0316*	0.0230	0.0227	0.234
	(2.322)	(1.950)	(0.280)	(0.173)	(1.570)
Observations	25	25	25	25	25
R-squared	0.004	0.001	0.161	0.150	0.029

Figure IA1 Sample WMP Balances vs Actual Aggregate WMP Balances

Figure IA1.1 compares the sample WMP balances with the actual WMP balances reported by CBRC for all urban commercial banks. Figure IA1.2 compares the sample WMP balances of Big Four and joint-equity commercial banks with the total WMP balances reported by CBRC minus the total WMP balance of urban commercial banks reported by CBRC.[1] The sample WMP balances is first based on our survey data on the Big Four, joint-equity and the eight largest urban commercial banks, then on the banks' financial reports available from WIND, and complemented by adding up either the actual or the targeted issuing amounts of all individual WMPs in WIND.

Figure IA1.1: Sample WMP vs. Actual WMP Balances for Urban Commercial Banks

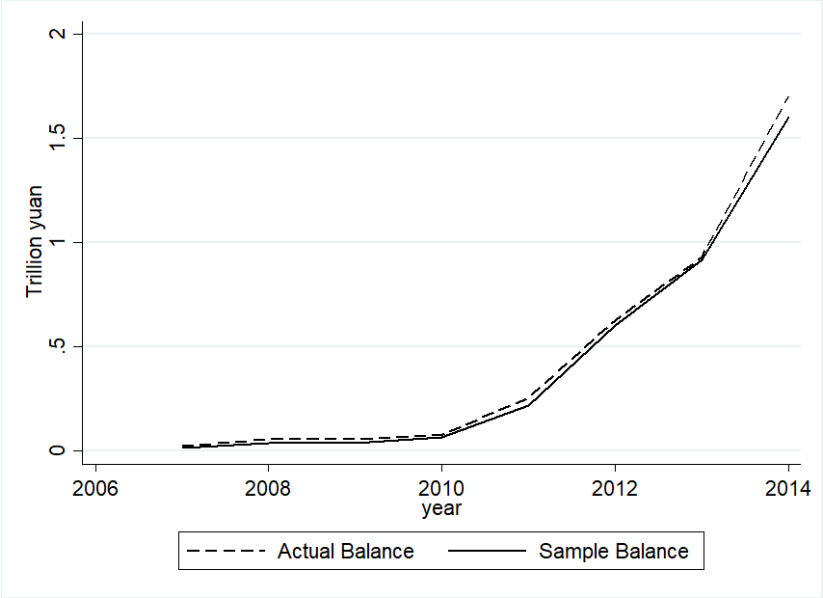
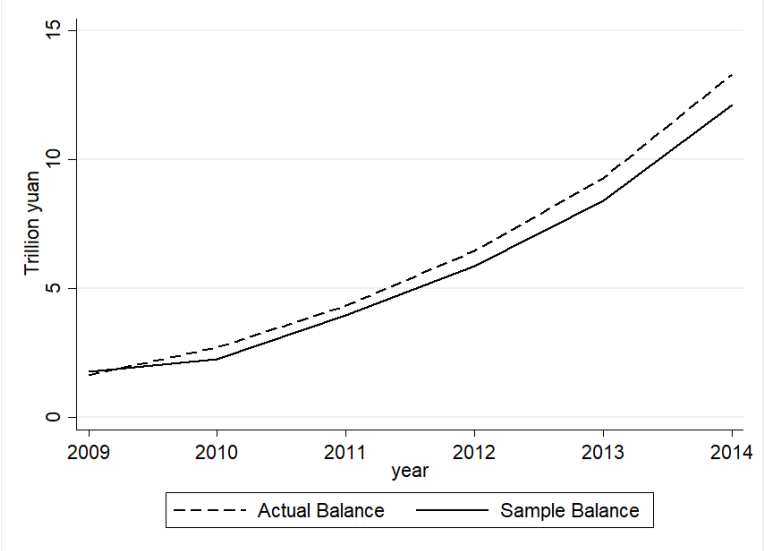


Figure IA1.2: Sample WMP vs Actual WMP Balances for Big Four and Joint-Equity Commercial Banks



[1] Note that the latter group includes not only WMPs issued by the Big Four and joint-equity commercial banks, but also those issued by other types of banks such as rural commercial banks.

Figure IA2 Size and Profitability of Big Four Banks

Figure IA2.1 shows the time series of big four banks' asset size and Figure IA2.2 shows the time series of their Return on Equity (ROE).

Figure IA2.1: Big Four Bank Asset

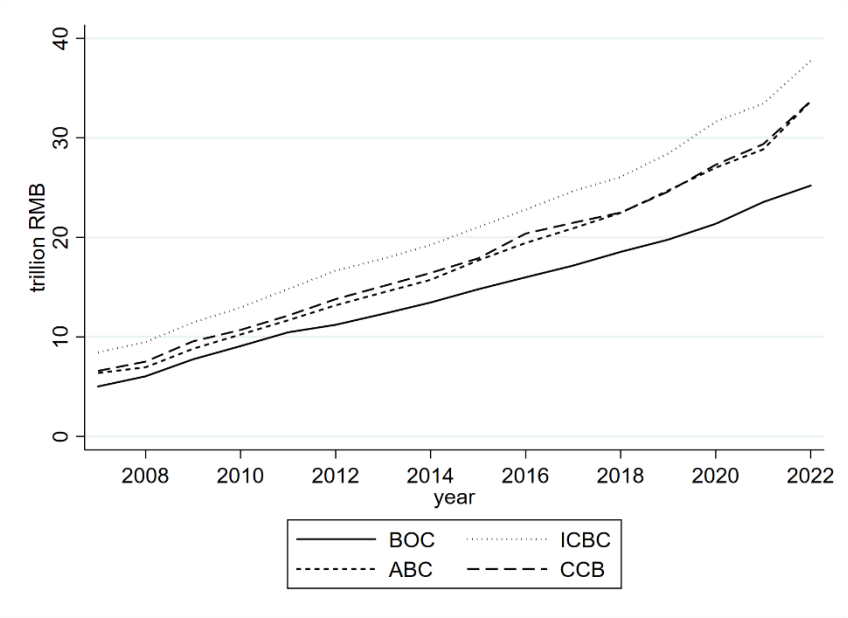


Figure IA2.2: Big Four Bank ROE

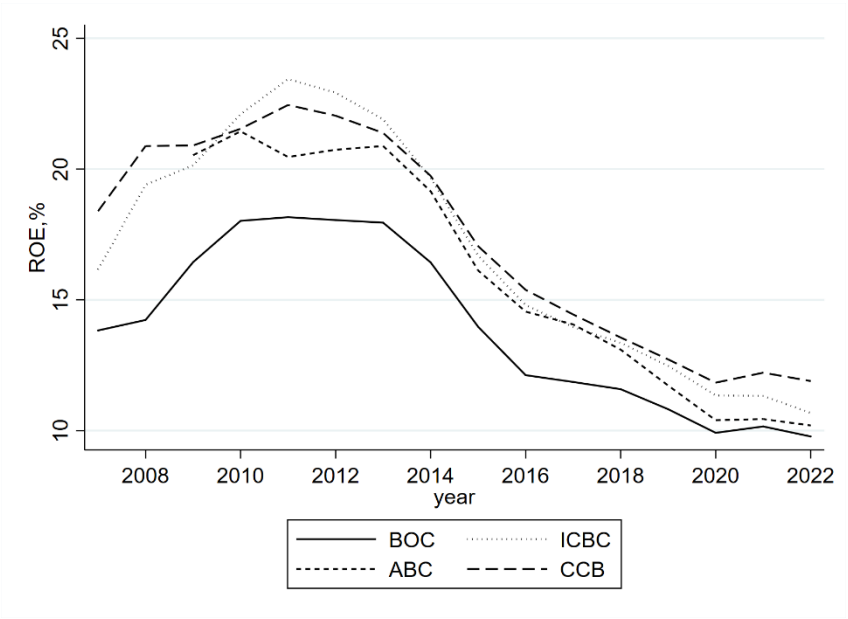
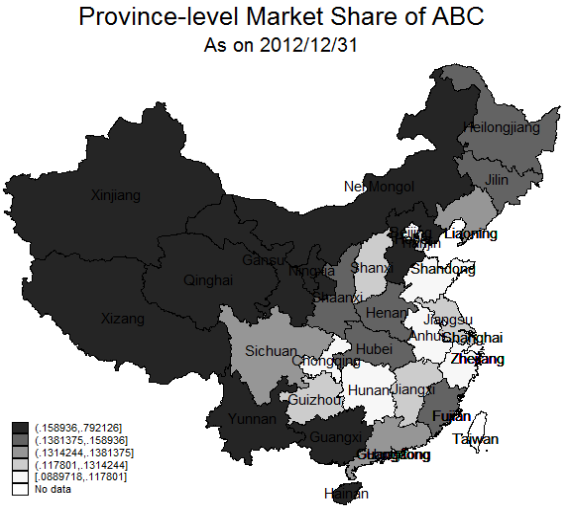
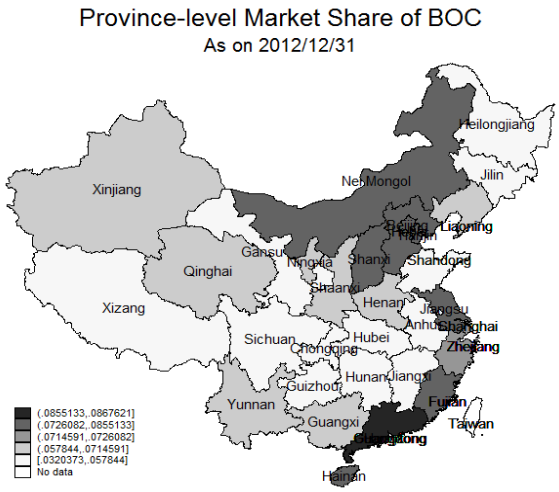
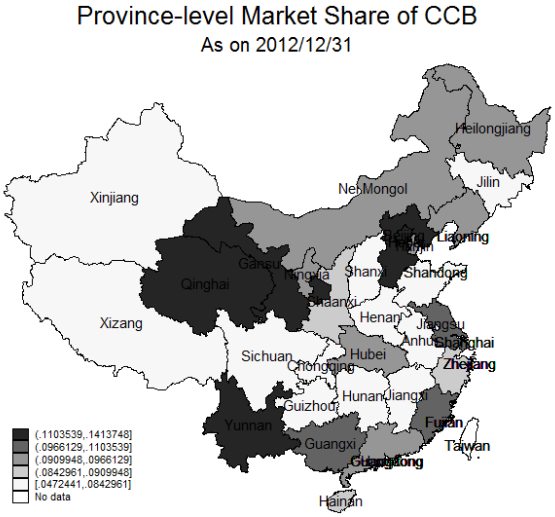


Figure IA3 Province-level Market (Branch) Share of the Big Four Banks

The following four figures present the province-level market (branch) share of the Big Four Banks, ABC, BOC, CCB, and ICBC, respectively.







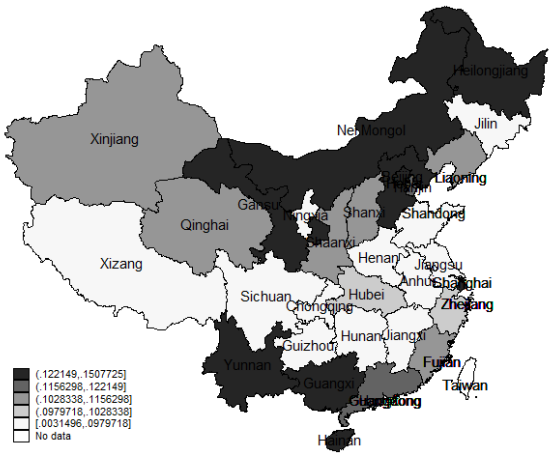
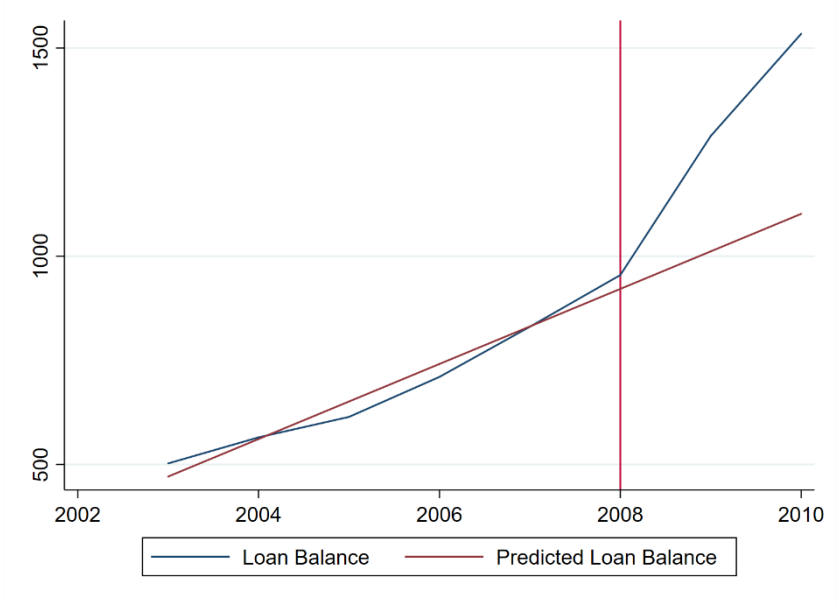


Figure IA4: Loan Balances and Fixed Capital - Predicted vs. Actual

This figure illustrates our estimation of the stimulus loan and stimulus investment. For each city, we first fit a linear trend to the time series of bank loan balances (fixed capital) during 2003-2008, and then apply the trend to predict the bank loan balances (fixed capital) at the end of 2010 assuming such pre-trends continued, and finally calculate the ratio between the actual and the predicted values in 2010. Panel A shows the average trend of the actual and predicted values for bank loan balances, and Panel B shows that for fixed capital investment.

Panel A: Bank Loan Balances



Panel B: Fixed Capital Investment

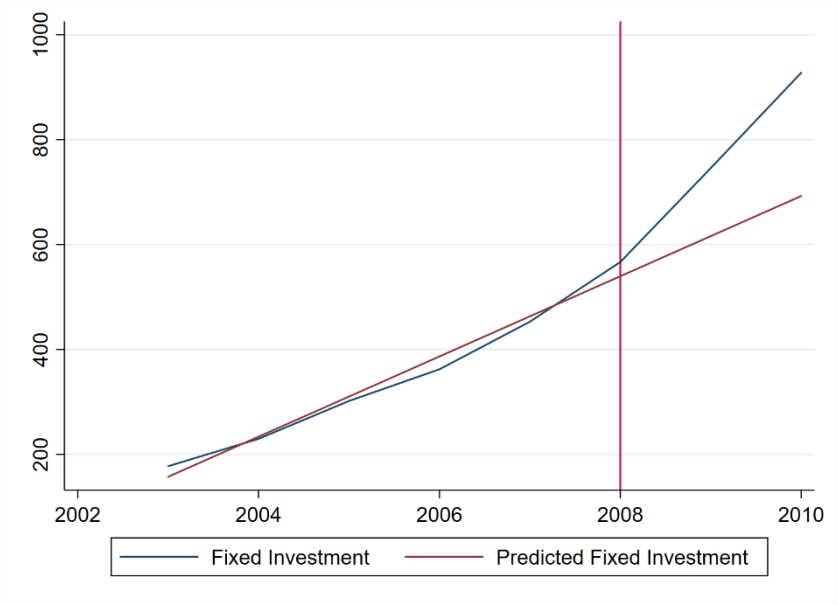
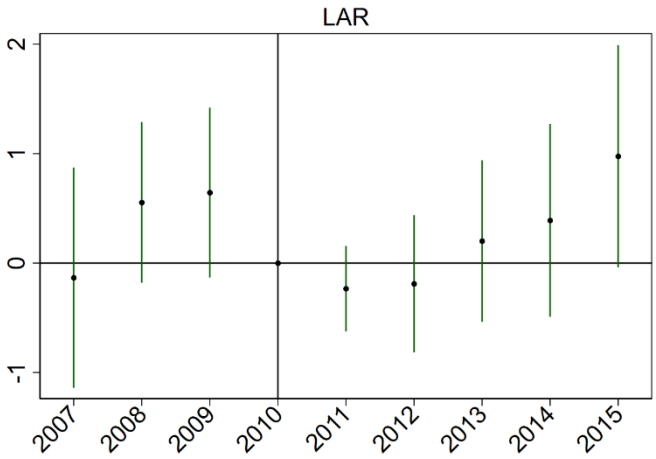
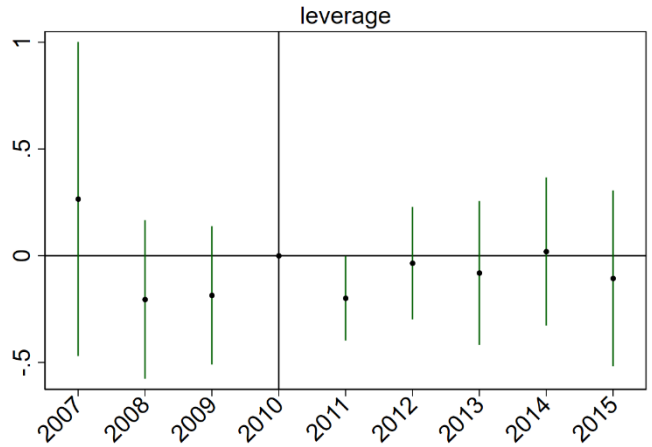


Figure IA5 Parallel Trend between SMBs and BOC Competition

The graphs below plot the 95% confidence interval for the coefficient estimates of the treatment effect of BOC competition on the corresponding bank variables in each year (using 2010 as the base year). The sample includes all the sample SMBs with data available in 2010. Standard errors are clustered by bank.





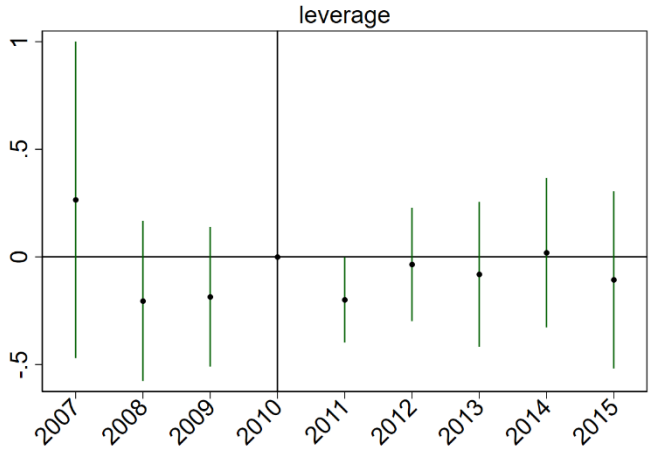
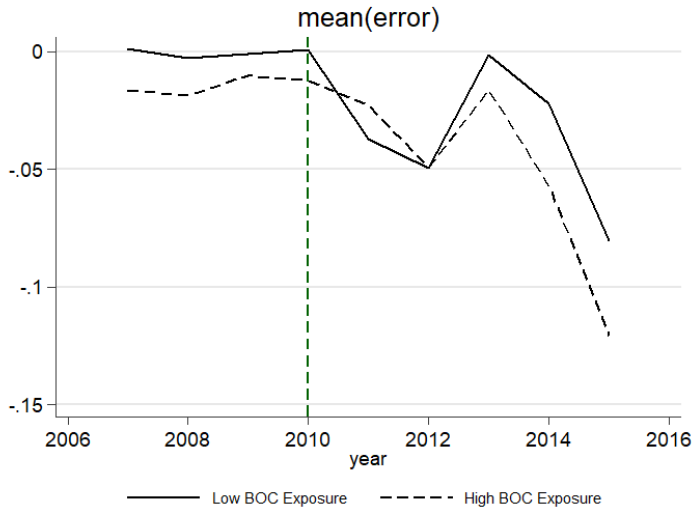


Figure IA6 Measurement Errors of SMBs' WMP Balances

This figure examines whether the measurement error of WMP balance can potentially bias our estimates. We calculate the "measurement error" variable as the difference between estimated WMP balance (i.e., the sum of either the actual or the targeted issuing amount of WMPs) and the true WMP balance (i.e., the value reported in our surveys or disclosed in the bank's financial statements) divided by the bank's assets. We group the SMBs equally into two groups: high BOC exposure and low BOC exposure, and then for each group, plot the mean and median of the error term over time.



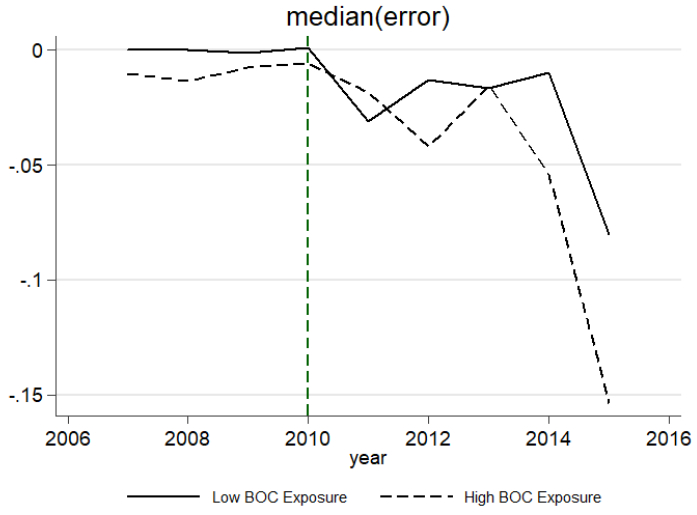


Figure IA7 New Branch Establishment of the sample SMBs

Figure IA7.1 plots the change of new branch establishment from 2007 to 2015 for a given bank against the market share of BOC across different cities, after absorbing the bank fixed effect. Figure IA7.2 shows the total number of new branch establishment by our sample SMBs in each year.

Figure IA7.1: New Branch Establishment and BOC's Market (Branch) Share

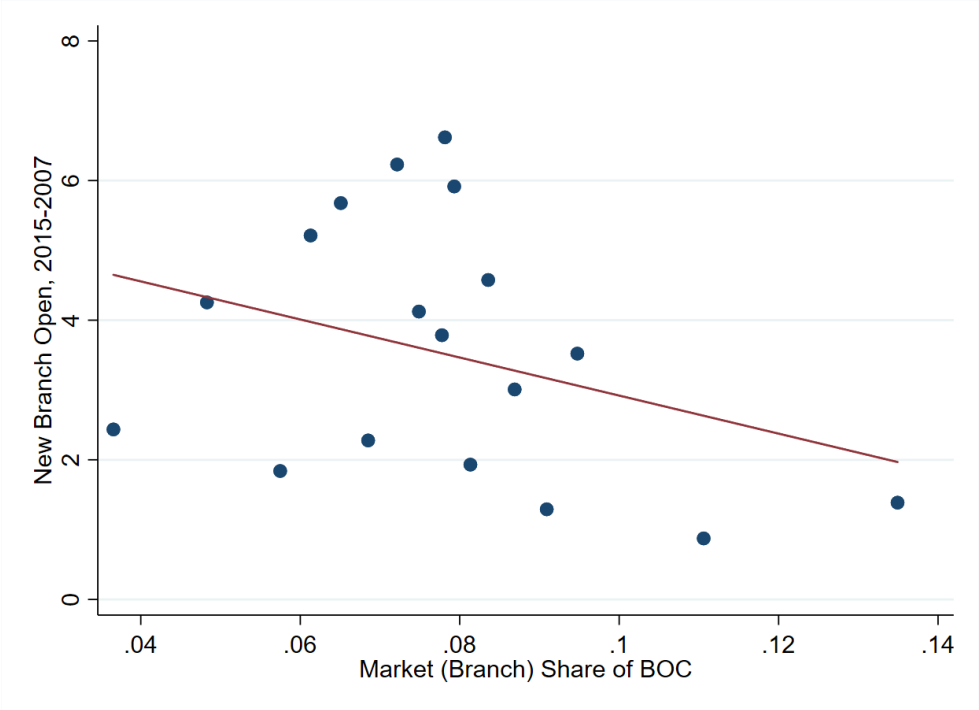


Figure IA7.2: Total Number of New Branch Established by sample SMBs Over Time

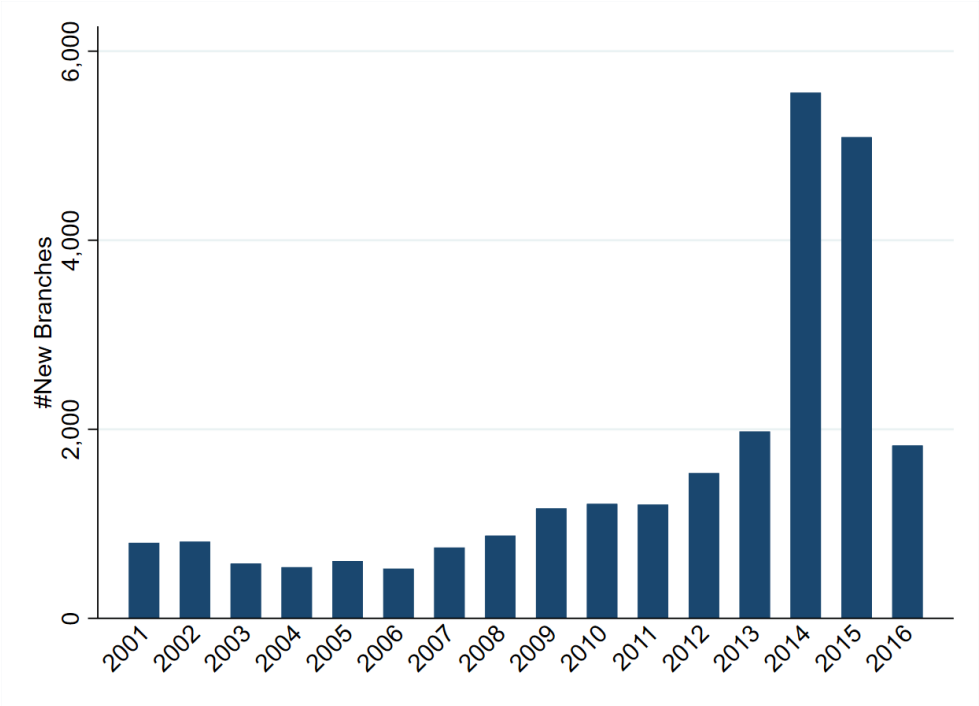


Figure IA8 Bank Loans and WMP Balances Before and After the Stimulus

Figure IA5.1 plots the percentages of medium and long-term bank loans from 2009 to 2014 for all banks and for the Big Four banks only. Figure IA5.2 shows for the largest 25 banks, the relationship between a bank's WMP balance at the end of 2013 and its estimated stimulus loan, both scaled by the loan balance at the end of 2008. Data for Figure 8.1 is from PBC.

Figure IA8.1: Percentages of Medium and Long-term Bank Loans Over Time

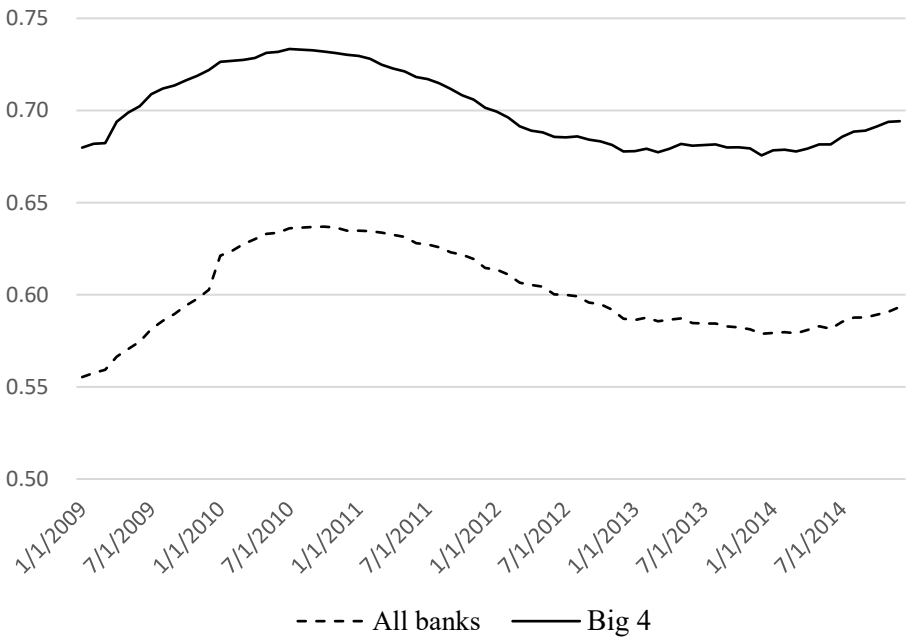


Figure IA8.2: Relation between WMP Balances in 2013 and Estimated Loan Increases

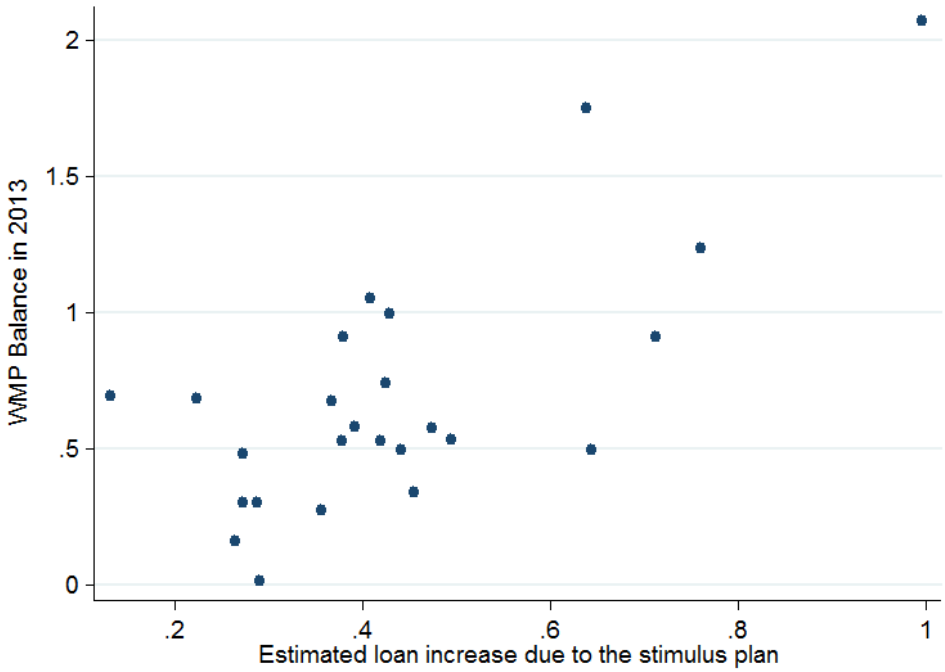


Figure IA9 Rollover Risks and Stock Market Response

This figure shows the binned scatter of stock returns versus the amount of WMPs due over bank equity on days when both the daily overnight and one-week SHIBOR increase by more than 1% during 2009-2015. Stock returns are calculated as the percentage change of closing prices from previous trading days. The explanatory variable is the total amount of WMPs due in that month over bank equity at the end of previous quarter.