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Abstract

Carlson et al. (2022) examine the causal impact of banking competition by investigating a unique circumstance in the National Banking Era of the nineteenth century in the US, where a discontinuity in bank capital requirements occurred. On the one hand, their findings suggest that banks operating in markets with fewer barriers to entry tend to increase their lending activities, promoting real economic growth. On the other hand, banks in less restricted markets also exhibit a higher propensity for risk-taking, posing risks to financial stability.

First, we fully reproduce the paper's outcomes apart from a minor discrepancy in the estimate of Table 9 attributed to issues in the provided codes. Second, we test the robustness of the results by (i) changing the ranges used to select the sample of cities included in the analysis, (ii) adopting different options to address outliers' potential issues and (iii) introducing additional control variables. We observe that the estimation results remain mostly consistent when subjecting them to various robustness checks. However, it is worth highlighting that the results can be partially influenced by the criteria used to select the sample of cities and the inclusion of control variables.

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1 Introduction

Carlson et al. (2022) examine the impact of banking competition on economic growth and financial stability. The authors investigate the unique features of the US National Banking Era's capital regulation to assess how changes in entry barriers for the banking sector impact bank behavior. This era offers an ideal setting to study the causal effects of banking competition, due to the absence of government influence and localized markets with varying entry barriers determined by minimum capital requirements based on the town's population where the bank is established. They build an original dataset comprising the balance sheets of all national banks from 1867 to 1904 and use 1870, 1880, and 1890 censuses to check the changes in entry barriers.

They employ a Regression Discontinuity (RDD) design to study the outcomes in the decade following a census publication and compare banks in towns that crossed the cut-off (6,000 inhabitants) with those that remained below.

The study reveals a discontinuous drop in bank entry when towns face higher entry barriers after a census publication. Markets with increased capital requirements experience fewer banks entering, with an average reduction of 0.21–0.27 banks. Moreover, incumbent banks in markets with higher entry barriers show slower loan portfolio growth, around 12–15 percentage points lower than their peers in markets with lower entry barriers, and higher failure rates, approximately 8 percentage points lower in less competitive towns. The authors also find evidence that a decrease in credit provision by national banks is associated with reduced economic activity.

In the present paper, we investigate whether their empirical results are reproducible and replicable, and further test their robustness to three specification checks: (i) changing the ranges used to select the sample of cities included in the analysis, (ii) adopting different techniques to address outliers' potential issues and (iii) introducing additional control variables.

We would like to acknowledge that our examinations confirm the robustness of the original paper's findings, with only a few exceptions.

In their original analysis, Carlson et al. (2022)'s paper provides a range of bandwidth selection methods, including both symmetric and asymmetric Mean Squared Error (MSE)-optimized bandwidth selectors. Additionally, the original study displays slight inconsistencies in the approach to treat potential outliers. Our robustness checks include a comprehensive examination to address these decisions made by the authors. We modify the city population ranges and employ different techniques to manage potential outlier concerns. Our analysis sheds light on the impact of these choices on the study's findings. For example, trimming the data does indeed influence the results, particularly in the case of Tables 4, 5 and 8, whose coefficients generally become non-significant.

Regarding reproducibility, the original study is effectively reproduced, although we discover a minor discrepancy in the magnitude of the main point estimates of Table 9. This discrepancy resulted from coding errors, which are comprehensively detailed in the "Reproducibility" section.

We then turn to further robustness checks by introducing the lag of the dependent variable as a control variable in the analysis. In our view, the current value of the dependent variable can be related to its past value in the estimated models. The inclusion of the lag of the dependent variable can serve to mitigate potential omitted variables issues. As a result of this robustness test, we observe significant changes in certain models' estimations influencing the interpretation of the findings. Note that, compared to other methods, RDD relies less on control variables, as its assumptions depend instead on variable behavior around the treatment cutoff. While it may be reassuring to be able to show that results are robust when including further controls, it may be less informative when this leads to a massive drop in the effective sample size (this occurs, when adding the control variable in one of the robustness checks of both Tables 4 and 5).

2 Reproducibility

2.1 General code structure

We first describe the code structure and note potential issues. For example, variables are not created in a single point and used throughout the tests. Instead, the same variable is created at different points of the code, with different names. It makes it difficult to audit the code. Furthermore, if the code needs maintenance or fixing, it is possible that the final result will be a mix of old and new definitions for the same variable. For instance, the code generates the same agricultural variables repetitively for different purposes: descriptive statistics (Listing 1), plots (Listing 2), and regressions (Listing 3), respectively. Albeit this does not affect the analysis carried by the authors, it is worth having a more compact coding structure for the reasons outlined above.

```
	foreach suffix in value numfarms output area {
		gen pc_agric_`suffix' = .
		qui replace pc_agric_`suffix' = agric_`suffix'_1870 / county_pop_1870 if year==1871
		qui replace pc_agric_`suffix' = agric_`suffix'_1880 / county_pop_1880 if year==1881
		qui replace pc_agric_`suffix' = agric_`suffix'_1890 / county_pop_1890 if year==1891
	}
```

Listing 1: Partial listing of `02_descriptive-stats-city.do`

```
	loc cats manuf_capital manuf_crm manuf_establishments manuf_value manuf_wages agric_area agric_numfarms agric_output agric_value
	loc decades 1870 1880 1890 // 1860
	foreach cat of local cats {
		* We multiply 1870 dollar values by 0.8; see 1880 census for details:
		* BOOK: https://books.google.com/books?id=_sRNAQAAMAAJ&pg=PA49-IA12
		* SNIPPET: https://books.google.com/books/content?id=_sRNAQAAMAAJ&pg=PA49-IA12&img=1&zoom=3&hl=en&sig=ACfU3U2Fd6ihFH5SXHdu_sjiY9NbrcH2nQ&ci=35%2C751%2C897%2C112&edge=0
		if !inlist("`cat'", "agric_numfarms", "manuf_establishments") {
			qui replace `cat'_1870 = `cat'_1870 * 0.8
		}

		gen `cat'_pc_initial = `cat'_1870 / county_pop_1870
		gen `cat'_pc = .
		foreach decade of local decades {
			loc t = `decade'+1
			loc next_decade = `decade'+10
			qui replace `cat'_pc = `cat'_`next_decade' / county_pop_`next_decade' if year==`t'
		}
	}
```

Listing 2: Partial listing of `04_rdplot-city.do`

```
	loc cats manuf_capital manuf_crm manuf_establishments manuf_value manuf_wages agric_area agric_numfarms agric_output agric_value
	loc decades 1870 1880 1890 // 1860
	foreach cat of local cats {
		* We multiply 1870 dollar values by 0.8; see 1880 census for details:
		* BOOK: https://books.google.com/books?id=_sRNAQAAMAAJ&pg=PA49-IA12
		* SNIPPET: https://books.google.com/books/content?id=_sRNAQAAMAAJ&pg=PA49-IA12&img=1&zoom=3&hl=en&sig=ACfU3U2Fd6ihFH5SXHdu_sjiY9NbrcH2nQ&ci=35%2C751%2C897%2C112&edge=0
		if !inlist("`cat'", "agric_numfarms", "manuf_establishments") {
			qui replace `cat'_1870 = `cat'_1870 * 0.8
		}

		gen `cat'_pc_initial = `cat'_1870 / county_pop_1870
		gen `cat'_pc = .
		foreach decade of local decades {
			loc t = `decade'+1
			loc next_decade = `decade'+10
			qui replace `cat'_pc = `cat'_`next_decade' / county_pop_`next_decade' if year==`t'
		}
	}
```

Listing 3: Partial listing of `06_rdrobust-city.do`

2.2 Data winsorization

The authors do not mention in the text that the data is (sometimes) winsorized at the 1% and 99% tails, as Listings 4 and 5 show. The lack of standardization and failure to document the procedure may be related to the issue discussed in Section 2.1.

```
	* Exclude outliers
	gstats winsor pc_agric_value pc_agric_output agric_numfarms, cut(1 99) replace by(year)
```

Listing 4: Partial listing of `02_descriptive-stats-city.do`

Therefore, throughout our robustness tests, we use the non-winsorized version of these variables. We provide an example of the fix in Listing 6. Notice that we drop the `replace` option and add the `trim suffix(_tr)` and the `suffix(_w)` options. Therefore, we present the estimates with the original values, the trimmed values, and the winsorized values.

2.3 Sample and results depend on execution order

Investigating the cause for the results in Table 3.13.2 to Table 3.13.5 (which are related to the original Table 9), we have found that there is an issue with the provided code in `FixBW.ado`, which we reproduce in Listing 7. The first time `FixBW` is called, it executes the command specified (in this case, `rdrobust`) on the original sample, as we can see in

```
	loc cut 1 99 // Winsor cuts


// ----------------------------------------------------------------------------
// Load data, create variables, restrict sample
// ----------------------------------------------------------------------------

	use "$data/bank_level_data" if ok_city, clear

	* Drop banks that had invalid balance sheets (we use ok_bs instead of the laxer approx_ok_bs because regressions are more susceptible to errors than summary stats)
	drop if (ok_bs==0)

	* Drop banks that had not applicable info
	drop if not_reported | relocated | in_vl

	gen default = .
	replace default = inrange(max_receiver_date, mdy(1, 1, 1872),mdy(12, 31, 1881)) if year==1871
	replace default = inrange(max_receiver_date, mdy(1, 1, 1882),mdy(12, 31, 1891)) if year==1881
	replace default = inrange(max_receiver_date, mdy(1, 1, 1892),mdy(12, 31, 1900)) if year==1891 // 1900 had a change in law; but results are unchanged if we use 1901
	tab default if inlist(year, 1871, 1881, 1891), m

	* We only have a loss ratio if we have default in a given period (else, loss ratio corresponds to subsequent defaults outside the ten-year period)
	replace loss_ratio = 0 if default==0

	* Generate vars before dropping
	loc vars loans capital equity deposits cash reserves assets
	foreach var of local vars {
		gen gr_`var' = 100 * (log(F10.`var') - log(`var'))
		gstats winsor gr_`var', by(year) replace cut(`cut')
	}

	drop leverage equity_ratio equity2loans loan_ratio deposit_ratio cash2deposits reserves_ratio cash_ratio cash2loans liquid_ratio

	gen leverage			= 100 * (assets  - equity) / equity // "Liabilities / Equity"
	gen equity_ratio		= 100 * equity / assets
	gen equity2loans		= 100 * equity / loans
	gen loan_ratio			= 100 * loans / assets
	gen deposit_ratio		= 100 * deposits / assets
	gen reserves_ratio		= 100 * reserves / reserve_requirement
	gen cash_ratio			= 100 * cash / assets
	gen cash2loans			= 100 * cash / loans
	gen cash2deposits		= 100 * cash / deposits
	gen liquid_ratio		= 100 * liquid/assets

	* Dummy for significant OREO exposure (above 15k)
	gen byte oreo = oreo_and_mortgages >= 15000 if !mi(oreo_and_mortgages)

	* Dummy for significant rediscounts (above 15k)
	replace rediscounts = (rediscounts + bills_payable >= 15000) if !mi(rediscounts + bills_payable)

	loc vars leverage equity_ratio equity2loans loan_ratio reserves_ratio cash_ratio cash2loans deposit_ratio cash2deposits liquid_ratio oreo rediscounts
	gstats winsor `vars', by(year) replace cut(`cut')
	foreach var of varlist `vars' {
		gen F10_`var' = F10.`var'
	}
```

Listing 5: Partial listing of `08_rdrobust-bank.do`

```
	* Exclude outliers
	gstats winsor pc_agric_value pc_agric_output agric_numfarms, cut(1 99) suffix(_w) by(year)
	gstats winsor pc_agric_value pc_agric_output agric_numfarms, trim cuts(1 99) suffix(_tr) by(year)
```

Listing 6: Partial listing of modified version of `02_descriptive-stats-city.do` line 3 (highlighted), and then modifies the sample in line 20 (highlighted). The second time `FixBW` is called, `rdrobust` (line 3) executes on the modified sample.

As a consequence, results will not be consistent across subsequent calls of `FixBW` if the included county, Fredericksburg, influences the bandwidth selection algorithm, and therefore, the effective sample. Although we have discovered this issue when reproducing Table 9, it also affects the reproduction of Table 8 and Table F4. If Fredericksburg is to be considered in the sample, we suggest moving line 20 to between lines 1 and 2, to assure estimations always use the correct sample. In this way, the sample is always fixed before executing any other command.

```
1  program define FixBW
2          di as error `"`0'"'
3          `0' // Run command as-is
4          loc bw = e(bwselect)
5          if ("`bw'" == "msetwo") loc bw "MSE Two"
6          if ("`bw'" == "msesum") loc bw "MSE Sum"
7          if ("`bw'" == "mserd") loc bw "MSE Common"
8          estadd local bwselect = "`bw'", replace
9
10         gen byte sample = e(sample) // 2021 UDPATE: RDROBUST NOW SAVES e(sample)
11         gen byte effective_sample = sample & inrange(`e(runningvar)',  e(c) - e(h_l), e(c) + e(h_r))
12
13         * Uncomment this to compute everything on the "effective sample"
14         *replace sample = 0 if !inrange(`e(runningvar)', e(c) - e(h_l), e(c) + e(h_r))
15
16         tab sample effective_sample, m
17         *tab sample, m
18
19         * Add county count
20         cap replace county_id = -1 if county_id == . & city_name == "Fredericksburg" // Independent city
   ↪   since 1879 (TODO: Fix later in code)
21         qui gdistinct county_id if sample
22         estadd scalar NCounty  = `r(ndistinct)'
23
24         * Add city count
25         qui gdistinct city_id if sample
26         estadd scalar NCity  = `r(ndistinct)'
27
28         * Add bank count
29         cap de bank_id
30         if (!c(rc)) {
31                 qui gdistinct bank_id if sample
32                 estadd scalar NBank  = `r(ndistinct)'
33         }
34
35         * Add mean of depvar in sample AND effective sample
36         su `e(depvar)' if sample, mean
37         estadd scalar mean = r(mean)
38
39         su `e(depvar)' if effective_sample, mean
40         estadd scalar mean_bw = r(mean)
41
42         drop sample effective_sample
43
44 end
```

Listing 7: Listing of `FixBW.ado`

3 Replication and Robustness checks

Before proceeding with this section, it is important to emphasize that we find the paper to be exceptionally interesting and innovative, both in terms of its research question and its unique approach to addressing it. The analysis conducted is robust, and the chosen methodology is well-suited to the characteristics of the variables under investigation. However, we have identified certain areas where further analysis would have been useful and we provide them.

In the replication of the paper, we follow its structure and perform robustness checks. These checks are aimed at assessing the sensitivity of the paper's results to certain choices made by the authors that we consider crucial, as well as addressing certain discrepancies we identified within the paper.

Specifically, we have detected some inconsistencies related to the selection of data samples based on population ranges and the treatment of potential outliers. In our view, the authors should provide more comprehensive explanations and justifications for these aspects in the paper. Moreover, a clear explanation for the chosen data treatment method would enhance the transparency and reproducibility of the methodology.

We noted that the descriptive statistics in the paper regarded cities with populations ranging from 5,000 to 7,000 inhabitants. However, for the empirical analysis, the paper expanded this range to include cities with populations from 4,000 to 8,000 inhabitants, aligning with the range used in the corresponding regression (3.4.1). This specific range was chosen as it was determined to be MSE-optimal. We consider that the selection of population ranges deserved a throughout sensitivity analysis, which we have conducted. Figures 2, 3, and 5 exhibit relevant changes following the analysis with distinct sample sets, consequently impacting the interpretation of the findings.

Moreover, the authors opted to employ winsorization, as a technique to deal with potential outlier issues for most of their analysis. This is rather a common approach, however it was surprising to us that they did not apply winsorization when reproducing Tables 8 and 9. We considered this inconsistency to be of significant concern and decided to test the robustness of the results by employing different outlier treatment methods. Specifically, we conducted a sensitivity analysis using the original dataset, winsorized data, and trimmed data (1% and 99% tails) to reproduce the tables. The results of these robustness tests indicate that trimming the data does indeed impact the results, particularly in the case of Tables 4, 5, and 8. It is important to underscore that the choice between winsorization and data trimming depends on the specific goals of the analysis and the characteristics of the dataset. Trimming, while effective in addressing outliers, can lead to a reduction in the number of sample observations and alters its distribution, potentially introducing a bias in the estimations, as there is a loss of information. In our opinion, the authors could (even briefly) mention the motivations behind their choice.

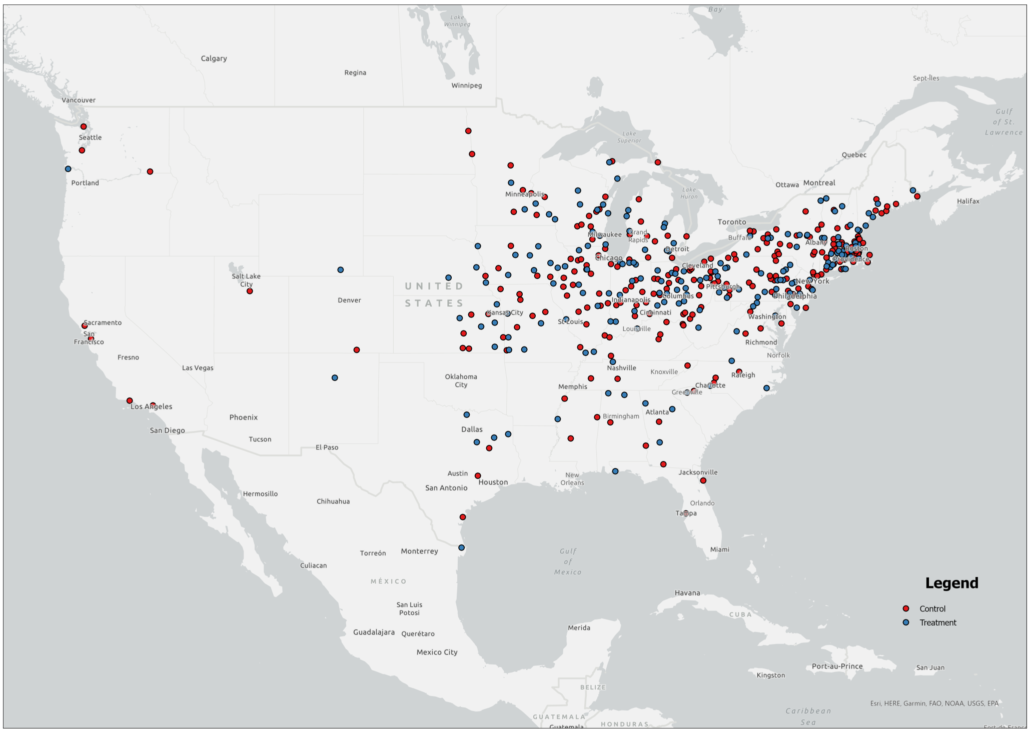
Finally, we conduct a robustness check by including the lag of the dependent variable as a control in the analysis, In our view, the models estimated in this paper can involve dynamic or time-dependent processes, where the current value of the dependent variable can be related to its past values. Including the lagged dependent variable can address potential omitted variable issues. This robustness test results in changes in certain model estimations and, in some cases, might affect the interpretation of the findings. It is important to underline that RDD methodology places less emphasis on the use of control variables, as its assumptions primarily rely on how the variables behave around the treatment cutoff. Additionally, the robustness of results by introducing additional control variables can be less informative when this substantially reduces the effective sample size, as observed in one of the robustness checks for both Tables 4 and 5.

3.1 Figure 1

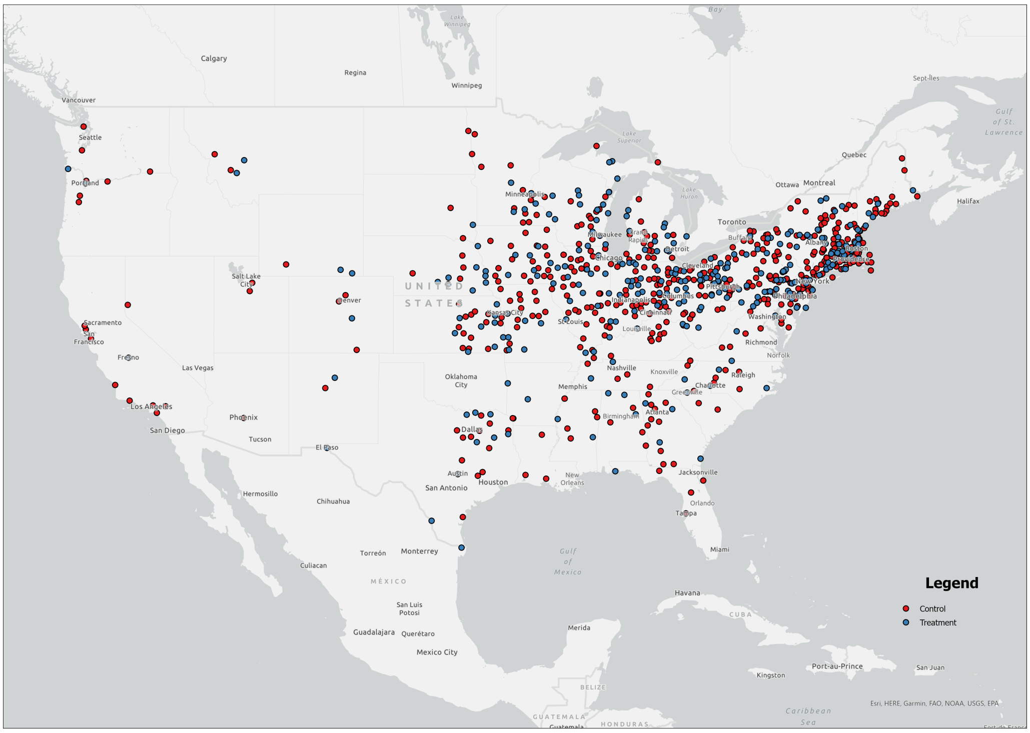
Figure 1 is fully replicable, so we will not report it, but we provide it in the light of the effective samples used in this study's main regressions. We first investigate the difference in the distributions of samples in the paper's analysis. We replicate Figure 1 (Figures 3.1.1a, 3.1.1b) by plotting the towns that make up the effective observations in columns (1) and (6) in Table 3. We observe a substantial reduction in the number of towns included in column (1) due to the adoption of the "uniform" kernel. On the contrary, the kernel used in column (6), Epanechnikov, is less restrictive in terms of the number of towns effectively selected.

Figure 3.1.1 with city samples from column (1) shows a similar distribution as Figure 1 in the original paper, however, whether the difference in the density of cities across the regions is similar to that of the original map is unclear.

Figure 3.1.1: Figure 1 – Effective sample



(a) Table 3, Model (1)



(b) Table 3, Model (6)

3.2 Tables 1 and 2

The original Table 1 (Table 3.2.1) and Table 2 (Table 3.2.3) are fully replicable, and upon replication, we obtain identical results. The replicated original tables are shown in below.

It is worth noting that the descriptive statistics in the paper pertain only to cities with populations ranging from 5,000 to 7,000 inhabitants. However, for the analysis, the paper extends the range to include cities with populations from 4,000 to 8,000 inhabitants. Consequently, we replicated Tables 1 and 2 once more, this time with samples of cities having populations ranging from 4,000 to 8,000. As illustrated in Tables 3.2.2 and 3.2.4, respectively, the values of descriptive statistics for various variables exhibit differences when using samples of cities within the 4,000 to 8,000 population range. Notably, while the means and standard deviations below (above) the threshold exhibit minimal changes, the t-statistics display more significant variations. Lastly, if we exclude the town "Fredericksburg" from the data sample, the tables remain unaltered compared to the original one. This is because Fredericksburg's population falls outside the 5,000-7,000 interval but is within the 4,000-8,000 interval.

Table 3.2.1: Reproducing the original Table 1

	Population $\leq$ 6000			Population > 6000			Difference	
	Mean	Std	N	Mean	Std	N	Diff	t-stat
Population	5,472.8	276.1	196	6,435.3	291.4	120	962.5	29.448
Δ Population during previous decade	58.0	95.3	196	62.3	83.1	120	4.3	0.409
Δ_{harm} Population during previous decade	35.1	30.3	196	39.0	29.9	120	3.9	1.127
Number of National Banks	1.6	0.7	196	1.6	0.8	120	0.1	0.819
National Bank entries in previous decade	0.7	0.7	196	0.7	0.8	120	0.1	0.745
Number of State Banks	0.6	0.8	196	0.8	0.9	120	0.1	1.401
State Bank entries in previous decade	0.2	0.7	142	0.2	0.7	90	-0.0	-0.222
Δ Capital during previous decade	15.1	41.9	98	16.8	58.6	67	1.7	0.216
Δ Loans during previous decade	43.3	47.5	98	46.9	59.8	67	3.6	0.432
Δ Assets during previous decade	23.3	41.5	98	29.8	50.4	67	6.5	0.910
Per capita bank capital	39.2	27.5	196	38.6	30.0	120	-0.5	-0.153
Per capita bank loans	64.4	48.6	196	63.2	45.2	120	-1.2	-0.227
Per capita bank assets	120.2	78.7	196	117.6	74.9	120	-2.6	-0.292
Number of manufacturing establishments	394.0	538.9	194	486.6	845.5	120	92.7	1.186
Per capita manufacturing capital	82.9	81.2	194	92.8	98.3	120	9.9	0.963
Per capita farm value	343.7	193.4	194	306.6	206.0	120	-37.2	-1.614
Number of farms	3,047.2	1,447.2	194	2,631.1	1,470.2	120	-416.1	-2.461
Years of railroad access	24.3	9.0	196	24.0	9.8	120	-0.4	-0.357
Railroad access (%)	97.4	15.8	196	97.5	15.7	120	0.1	0.028
Number of railroad connections	6.0	4.3	196	6.3	4.2	119	0.3	0.524
Distance to New York City (in km)	854.9	701.7	196	885.3	710.8	120	30.4	0.372
Distance to next city with more than 50k inhabitants	93.1	76.8	196	102.8	100.4	120	9.7	0.972
Distance to next populated location	9.7	9.4	196	11.7	11.3	120	2.0	1.676

Table 3.2.2: Producing Table 1 allowing towns within 4,000-8,000 population – City level

	Population ≤ 6000			Population > 6000			Difference	
	Mean	Std	N	Mean	Std	N	Diff	t-stat
Population	4,877.6	587.0	455	6,793.6	553.1	190	1,916.0	38.427
Δ Population during previous decade	53.8	118.3	455	73.9	115.2	190	20.0	1.973
Δ_{harm} Population during previous decade	30.6	31.5	455	43.5	30.4	190	13.0	4.819
Number of National Banks	1.5	0.7	455	1.6	0.8	190	0.1	1.670
National Bank entries in previous decade	0.6	0.7	455	0.7	0.8	190	0.1	1.315
Number of State Banks	0.6	0.8	455	0.8	0.9	190	0.2	2.865
State Bank entries in previous decade	0.1	0.7	338	0.1	0.7	145	0.0	0.264
Δ Capital during previous decade	10.3	38.7	239	11.1	57.9	98	0.8	0.140
Δ Loans during previous decade	35.8	43.1	239	42.1	64.0	98	6.4	1.061
Δ Assets during previous decade	19.0	38.8	239	20.0	52.8	98	1.0	0.193
Per capita bank capital	42.1	29.0	455	35.7	28.2	190	-6.4	-2.569
Per capita bank loans	67.3	48.3	455	63.0	50.8	190	-4.3	-1.009
Per capita bank assets	126.6	81.3	455	112.6	79.6	190	-14.0	-2.002
Number of manufacturing establishments	447.3	726.7	452	508.3	844.4	190	60.9	0.923
Per capita manufacturing capital	85.6	80.4	451	100.2	104.2	190	14.6	1.915
Per capita farm value	333.4	197.1	452	302.8	194.0	190	-30.6	-1.802
Number of farms	2,994.0	1,516.3	452	2,830.2	1,543.1	190	-163.7	-1.242
Years of railroad access	24.4	9.2	455	24.0	9.0	190	-0.4	-0.457
Railroad access (%)	96.5	18.4	455	97.9	14.4	190	1.4	0.942
Number of railroad connections	5.9	4.1	455	6.5	4.4	189	0.7	1.828
Distance to New York City (in km)	812.0	689.8	455	878.1	658.3	190	66.1	1.125
Distance to next city with more than 50k inhabitants	89.5	75.9	455	101.1	92.7	190	11.6	1.654
Distance to next populated location	9.0	7.7	455	10.5	9.6	190	1.5	2.097

Table 3.2.3: Reproducing the original Table 2

	Population ≤ 6000			Population > 6000			Difference	
	Mean	Std	N	Mean	Std	N	Diff	t-stat
Total assets (thousands)	414.7	214.8	307	461.2	239.4	197	46.5	2.264
Capital paid in	108.3	58.4	307	120.1	78.8	197	11.8	1.925
Surplus fund	26.8	25.8	307	31.9	31.2	197	5.1	1.980
Deposits	191.9	132.7	307	209.8	140.7	197	17.9	1.443
National bank notes	63.0	57.2	307	71.1	68.8	197	8.1	1.438
Cash (specie and legal tender)	24.3	19.0	307	26.1	17.5	197	1.8	1.076
Liquid assets	71.7	57.1	307	79.3	63.2	197	7.6	1.390
Loans and discounts	223.0	127.8	307	248.1	150.8	197	25.1	2.006
Debt/Assets	66.1	10.2	307	66.7	10.7	197	0.6	0.680
Equity/Assets	33.9	10.2	307	33.3	10.7	197	-0.6	-0.680
Capital/Assets	28.0	9.9	307	26.9	10.0	197	-1.1	-1.170
Loans/Assets	54.0	14.1	307	53.7	14.5	197	-0.3	-0.260
Deposits/Assets	45.1	17.0	307	45.5	18.6	197	0.4	0.224
Cash/Assets	6.1	3.6	307	5.9	3.6	197	-0.2	-0.480
Liquid Assets/Assets	17.1	8.9	307	16.9	9.1	197	-0.2	-0.281
Reserves/(Required reserves)	250.3	234.3	307	229.2	138.6	197	-21.1	-1.144
Bank president turnover (%)	8.3	15.3	288	7.2	13.2	191	-1.2	-0.868
Bank cashier turnover (%)	8.2	16.2	288	8.2	18.5	191	0.0	0.002
Officers are related (%)	8.3	25.6	307	5.9	21.2	197	-2.4	-1.087
Age	12.2	8.4	307	12.5	8.1	197	0.3	0.393

Table 3.2.4: Producing Table 2 including towns within 4,000-8,000 population – Bank level

	Population ≤ 6000			Population > 6000			Difference	
	Mean	Std	N	Mean	Std	N	Diff	t-stat
Total assets (thousands)	408.7	211.5	677	474.8	251.9	304	66.1	4.263
Capital paid in	108.5	61.6	677	118.8	73.3	304	10.3	2.274
Surplus fund	26.9	29.4	677	31.7	33.1	304	4.8	2.276
Deposits	184.6	129.7	677	229.2	165.6	304	44.6	4.554
National bank notes	64.4	57.5	677	65.6	62.2	304	1.2	0.294
Cash (specie and legal tender)	22.9	18.1	677	27.5	19.2	304	4.7	3.673
Liquid assets	70.1	57.9	677	82.7	67.4	304	12.6	2.979
Loans and discounts	217.5	124.6	677	266.9	167.7	304	49.4	5.130
Debt/Assets	65.9	10.7	677	67.4	10.6	304	1.5	1.991
Equity/Assets	34.1	10.7	677	32.6	10.6	304	-1.5	-1.991
Capital/Assets	28.2	10.1	677	26.6	10.2	304	-1.6	-2.229
Loans/Assets	53.6	14.0	677	55.6	14.8	304	2.0	2.028
Deposits/Assets	44.3	17.8	677	47.1	18.0	304	2.9	2.349
Cash/Assets	5.8	3.5	677	6.0	3.5	304	0.3	1.079
Liquid Assets/Assets	16.9	8.9	677	17.0	8.7	304	0.1	0.142
Reserves/(Required reserves)	254.7	206.2	677	217.6	127.4	304	-37.1	-2.899
Bank president turnover (%)	7.9	15.5	637	7.7	15.0	290	-0.2	-0.157
Bank cashier turnover (%)	7.9	15.4	637	8.2	17.5	290	0.3	0.244
Officers are related (%)	7.3	23.8	676	6.0	20.5	304	-1.3	-0.816
Age	12.6	8.4	677	12.5	8.3	304	-0.1	-0.173

3.3 Figures 2 and 3

The original Figures 2 and 3 can be fully reproduced, resulting in an identical plot (see Figures 3.3.1 and 3.3.2, respectively). It is worth noting that the original figures include towns with populations ranging from 4,000 to 8,000 inhabitants, which is contrary to the approach taken by the authors in the previous descriptive tables. Consequently, we replicated the figures by limiting it to towns with populations between 5,000 and 7,000 inhabitants.

When a linear fit is applied, as depicted in the left panels of both Figure 3.3.1 and Figure 3.3.2, we overall observe similar shape and cutoff points, although there are slight variations in the intercepts and slopes, which are flatter after the cutoff point compared to the original figures. Conversely, when employing a quadratic fit (right panels of Figure 3.3.1 and Figure 3.3.2), noticeable differences emerge. In our robustness check, both Figures 2 and 3 display a clear inverted U-shape before the cutoff point and a U-shape after it. Moreover, the jumps near the cutoff point are reversed compared to those present in the original figures. According to our robustness check, when we replicate the two figures using evenly-spaced bins (Figures 3.3.2 (C) and 3.3.2 (D)), as the author did, we notice the same patterns that we discovered in our Figures 3.3.2 (A) and 3.3.2 (B).

Figure 3.3.1: Producing Figure 2 including towns within 5,000-7,000 population

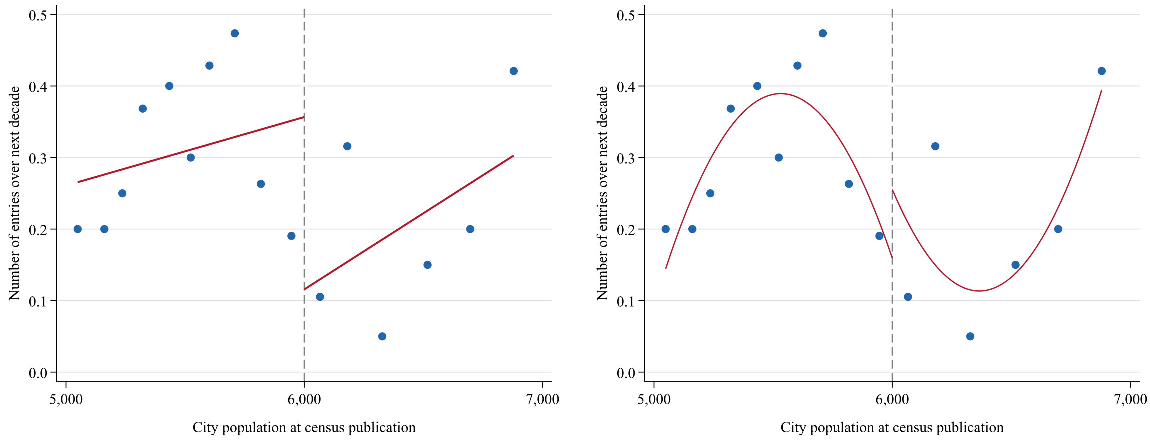
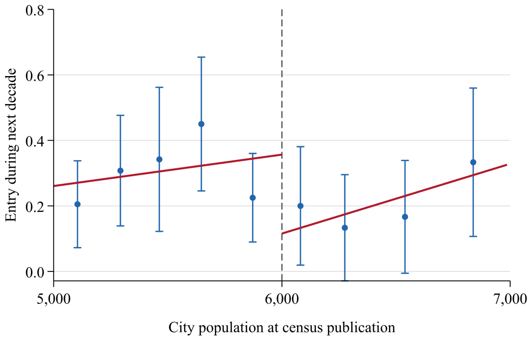
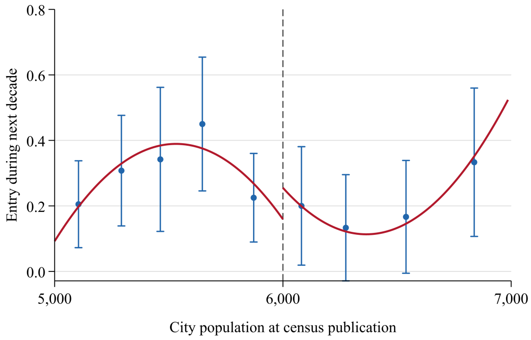


Figure 2 (A) Figure 2 (B)

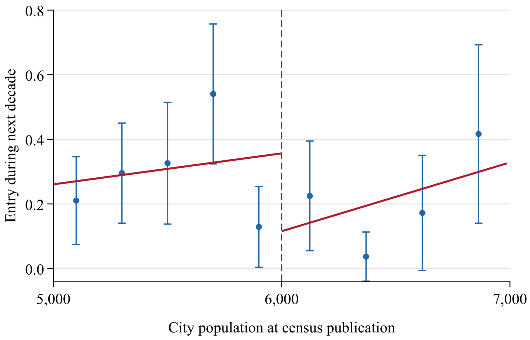
Figure 3.3.2: Producing Figure 3 including towns within 5,000-7,000 population



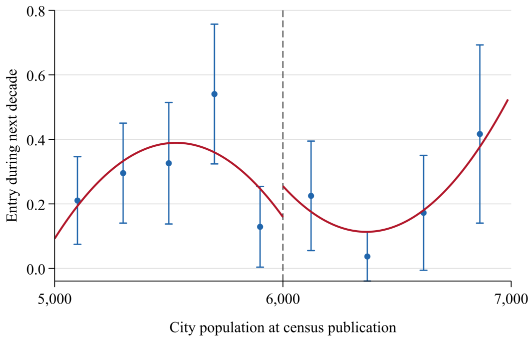
(A) First-order polynomial; quantile-spaced



(B) Second-order polynomial; quantile-spaced



(C) First-order polynomial; evenly-spaced



(D) Second-order polynomial; evenly-spaced

3.4 Table 3

The original Table 3 is fully replicable and reported as Table 3.4.1.

Table 3.4.1: Reproducing the original Table 3

Dependent Variable	Number of new national bank entrants						State bank entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conventional	-0.264***	-0.225***	-0.214***	-0.233***	-0.223**	-0.231***	-0.179	-0.199
	[0.002]	[0.004]	[0.005]	[0.006]	[0.013]	[0.008]	[0.386]	[0.368]
Bias-corrected	-0.275***	-0.239***	-0.229***	-0.252***	-0.220**	-0.235***	-0.258	-0.278
	[0.001]	[0.002]	[0.003]	[0.003]	[0.014]	[0.007]	[0.211]	[0.208]
Robust	-0.275***	-0.239***	-0.229***	-0.252***	-0.220**	-0.235**	-0.258	-0.278
	[0.004]	[0.008]	[0.010]	[0.010]	[0.026]	[0.016]	[0.279]	[0.265]
BW Type	MSE Two	MSE Two	MSE Two	MSE Common	MSE Two	MSE Two	MSE Two	MSE Common
Kernel Type	Uniform	Epanechnikov	Triangular	Epanechnikov	Uniform	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	2	3	3	2	2
Mean dep. var.	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029	621	621
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686	1,041	1,041
Observations	2,844	2,844	2,844	2,844	2,844	2,844	2,090	2,090
Obs. left of cutoff	2,548	2,548	2,548	2,548	2,548	2,548	1,866	1,866
Obs. right of cutoff	296	296	296	296	296	296	224	224
Left main bandwidth (h)	1,975	2,542	2,688	2,132	2,809	3,156	1,270	1,142
Right main bandwidth (h)	2,010	2,628	2,822	2,132	8,274	9,766	1,435	1,142
Effective obs. (left)	441	648	707	493	773	991	237	218
Effective obs. (right)	191	218	225	200	287	288	158	134

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

The estimations reported in Table 3.4.1 were recalculated according to multiple robustness checks as follows:

1 Turning off automatic mass points correction. As we can see in Table 3.4.2, minimal changes in the estimates are detected, with only rare and slight changes in the size and level of significance.

2 Adding the following control variables: "manufacturing" and "agricultural value growth". According to Table 3.4.3, drastic changes in the estimates are detected, manifesting in the loss of significance for most estimates, and weakening effects of the still significant estimates. This is mainly due to the drastic reduction of the number of effective observations on the left of the cutoff point after adding the controls, which resulted in a significant change in the left bandwidth.

3 Contemporaneously implementing (1) and (2). As shown in Table 3.4.4, dramatic changes in estimates and the number of effective observations on the left are detected. The results suggest that contrary to just turning off the mass points correction (Robustness check (1)), adding controls (as we did in Robustness check (2)) has a major impact on the estimates. The level of significance in column (4) decreases,

though the size and standard error of the coefficients do not change drastically. Most of the coefficients in column (5) lose significance, except for the bias-corrected estimate, whose significance dropped to 10% level. All coefficients in columns (6), (7), and (8) are no longer significant. Both left and right bandwidths significantly shrink, determining a similar large drop in the number of effective observations on both sides of the cutoff.

4 Excluding the town "Fredericksburg" from the data sample. The table remains unchanged, because Fredericksburg's population size is outside the interval of 5,000-7,000 inhabitants, but within the interval of 4,000-8,000 inhabitants.

Table 3.4.2: Table 3 – Robustness check (1): Turning off automatic mass points correction

Dependent Variable	Number of new national bank entrants						State bank entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conventional	-0.232***	-0.226***	-0.215***	-0.232***	-0.216**	-0.230***	-0.179	-0.199
	[0.005]	[0.004]	[0.005]	[0.007]	[0.015]	[0.008]	[0.386]	[0.368]
Bias-corrected	-0.242***	-0.239***	-0.230***	-0.250***	-0.213**	-0.234***	-0.258	-0.278
	[0.004]	[0.002]	[0.003]	[0.004]	[0.017]	[0.007]	[0.211]	[0.208]
Robust	-0.242**	-0.239***	-0.230***	-0.250**	-0.213**	-0.234**	-0.258	-0.278
	[0.011]	[0.008]	[0.010]	[0.011]	[0.031]	[0.016]	[0.279]	[0.265]
BW Type	MSE Two	MSE Two	MSE Two	MSE Common	MSE Two	MSE Two	MSE Two	MSE Common
Kernel Type	Uniform	Epanechnikov	Triangular	Epanechnikov	Uniform	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	2	3	3	2	2
Mean dep. var.	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029	621	621
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686	1,041	1,041
Observations	2,844	2,844	2,844	2,844	2,844	2,844	2,090	2,090
Obs. left of cutoff	2,548	2,548	2,548	2,548	2,548	2,548	1,866	1,866
Obs. right of cutoff	296	296	296	296	296	296	224	224
Left main bandwidth (h)	2,086	2,514	2,681	2,097	2,837	3,184	1,270	1,142
Right main bandwidth (h)	2,243	2,579	2,780	2,097	8,568	9,701	1,435	1,142
Effective obs. (left)	475	636	704	481	787	1,003	237	218
Effective obs. (right)	202	216	224	199	288	288	158	134

Notes: p-values reported in square brackets.

Table 3.4.3: Table 3 – Robustness check (2): Adding controls

Dependent Variable	Number of new national bank entrants						State bank entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conventional	-0.130	-0.175*	-0.173*	-0.194**	-0.180	-0.171*	-0.035	-0.026
	[0.273]	[0.083]	[0.076]	[0.037]	[0.122]	[0.096]	[0.831]	[0.879]
Bias-corrected	-0.158	-0.171*	-0.167*	-0.208**	-0.187	-0.171*	-0.091	-0.087
	[0.181]	[0.091]	[0.088]	[0.025]	[0.108]	[0.096]	[0.583]	[0.619]
Robust	-0.158	-0.171	-0.167	-0.208*	-0.187	-0.171	-0.091	-0.087
	[0.237]	[0.142]	[0.137]	[0.051]	[0.115]	[0.120]	[0.638]	[0.665]
BW Type	MSE Two	MSE Two	MSE Two	MSE Common	MSE Two	MSE Two	MSE Two	MSE Common
Kernel Type	Uniform	Epanechnikov	Triangular	Epanechnikov	Uniform	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	2	3	3	2	2
Mean dep. var.	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029	621	621
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686	1,041	1,041
Observations	2,806	2,806	2,806	2,806	2,806	2,806	2,078	2,078
Obs. left of cutoff	2,511	2,511	2,511	2,511	2,511	2,511	1,854	1,854
Obs. right of cutoff	295	295	295	295	295	295	224	224
Left main bandwidth (h)	756	998	1,128	1,695	1,401	2,111	1,199	1,179
Right main bandwidth (h)	1,592	2,254	2,504	1,695	5,735	6,910	1,457	1,179
Effective obs. (left)	142	192	209	352	270	480	223	219
Effective obs. (right)	172	204	215	176	278	281	158	134

Notes: p-values reported in square brackets.

Table 3.4.4: Table 3 – Robustness check (3): Turning off automatic mass points correction and adding controls

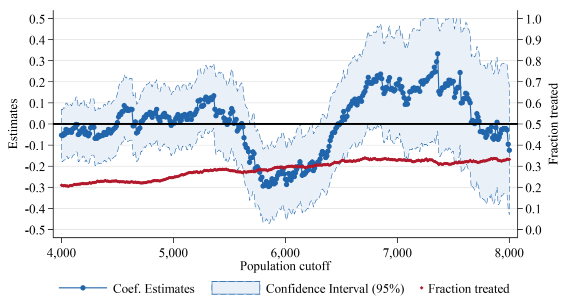
Dependent Variable	Number of new national bank entrants						State bank entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conventional	-0.158	-0.171*	-0.167*	-0.193**	-0.185	-0.169	-0.035	-0.026
	[0.156]	[0.092]	[0.088]	[0.039]	[0.110]	[0.101]	[0.831]	[0.879]
Bias-corrected	-0.167	-0.168*	-0.159	-0.207**	-0.192*	-0.170	-0.091	-0.087
	[0.134]	[0.098]	[0.106]	[0.028]	[0.096]	[0.101]	[0.583]	[0.619]
Robust	-0.167	-0.168	-0.159	-0.207*	-0.192	-0.170	-0.091	-0.087
	[0.193]	[0.151]	[0.159]	[0.053]	[0.104]	[0.124]	[0.638]	[0.665]
BW Type	MSE Two	MSE Two	MSE Two	MSE Common	MSE Two	MSE Two	MSE Two	MSE Common
Kernel Type	Uniform	Epanechnikov	Triangular	Epanechnikov	Uniform	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	2	3	3	2	2
Mean dep. var.	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029	621	621
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686	1,041	1,041
Observations	2,806	2,806	2,806	2,806	2,806	2,806	2,078	2,078
Obs. left of cutoff	2,511	2,511	2,511	2,511	2,511	2,511	1,854	1,854
Obs. right of cutoff	295	295	295	295	295	295	224	224
Left main bandwidth (h)	760	983	1,090	1,628	1,366	2,074	1,199	1,179
Right main bandwidth (h)	1,987	2,185	2,469	1,628	6,455	6,808	1,457	1,179
Effective obs. (left)	144	187	204	336	259	465	223	219
Effective obs. (right)	189	201	214	173	280	281	158	134

Notes: p-values reported in square brackets.

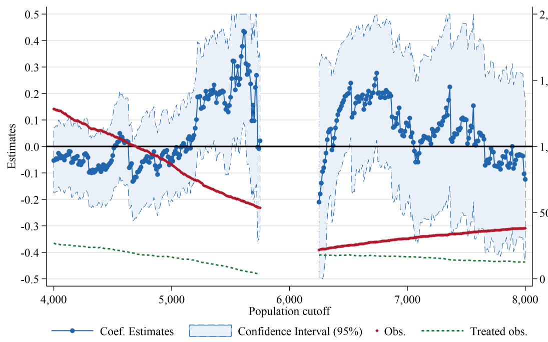
3.5 Figure 4

The original Figure 4 is fully replicable and reported as Figure 3.5.1. There is no additional value to generate it with the smaller population interval (5,000-7,000 inhabitants), as it would simply turn out to be a trim of the original figure, which is plotted in a very clear manner.

Figure 3.5.1: Reproducing the original Figure 4



(A) original



(B) original

3.6 Figure 5

The original Figure 5 is fully replicable, but this time we report Panels (A) and (B) separately from Panels (C) and (D) in order to have a close comparison with our robustness check. In other words, the replicated figures are shown Figure 3.6.1's first and third rows, respectively. Just for comparison reasons, we put them next to our replicated quadratic figures. Firstly, we replicated the figures with the original 4,000 to 8,000 bandwidth, as one can see in Figure 3.6.1. Secondly, we also modified the bandwidth to include towns with 5,000 to 7,000 population only and plotting quadratic fit, as shown in Figure 3.6.2.

According to the quadratic fits in Figure 3.6.1, we noticed that there is a larger jump at the cut-off point in panels (A), (B), and (C); the fit before the cutoff points are mildly convex in panels (A), (B), and (C), whereas after the cutoff points are concave, and, in panels (A) and (C), they really look like reverse U-shapes. In panel (D), both the fit before and after the cut-off point are mildly concave.

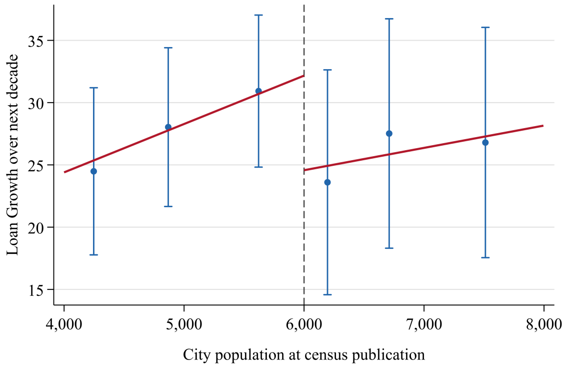
Figure 3.6.2 shows the linear and quadratic fits, when towns with 5,000 and 7,000 population only are included. This means that this time we replicated the new linear fit, in addition to the quadratic ones.

Looking at Panel A, we do not notice sizeable changes in the linear fit, except for a steeper slope of the linear fit after the cutoff, but when the quadratic fit is considered, the shapes are the opposite ones with respect to those found in Figure 3.6.2, as we now have a concave fit before the cutoff, and a convex one after it. A similar pattern can be found in the fits in panel B.

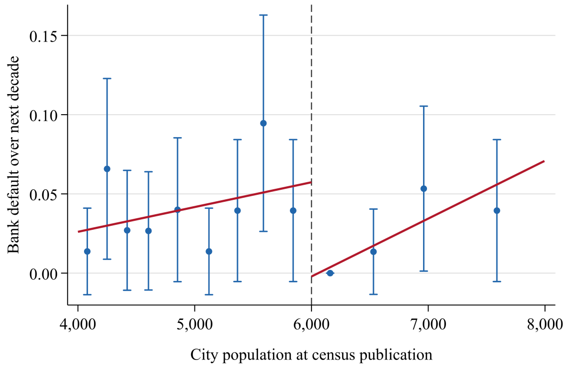
Moving to Panels C, we observe that what was found in the quadratic fit in panel C of Figure 3.6.1 is reinforced in Figure 3.6.2, with the fits before and after the cutoff point appearing to take a U-shape and a reversed U-shape, respectively. On the contrary, the linear trend we found here is very similar to the original one in the paper.

Concerning Panels D, the linear fits are very similar to the original linear fits reported in the published paper. The quadratic fits, along with being reinforced further on the left of the cutoff only, show a change in the cutoff jump, where we now see that the quadratic trend after the cutoff starts above the level of where the quadratic trend before the cutoff ends, being the opposite of what we see in Figure 3.6.1.

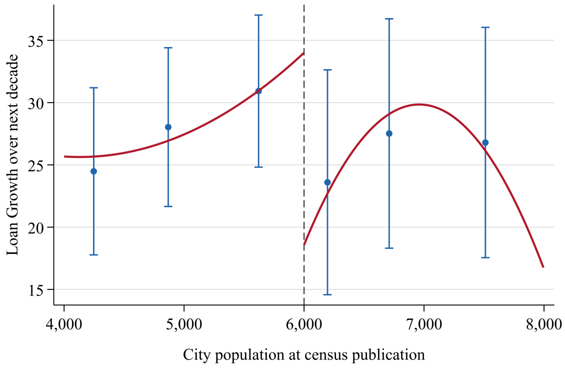
Figure 3.6.1: Figure 5 – comparing the linear trend with the quadratic one by keeping the original population cutoffs 4,000-8,000 inhabitants



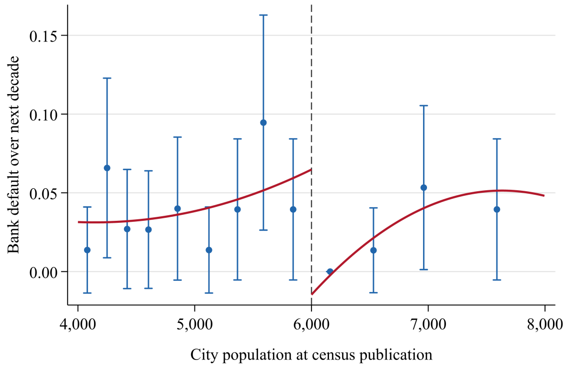
(A) original



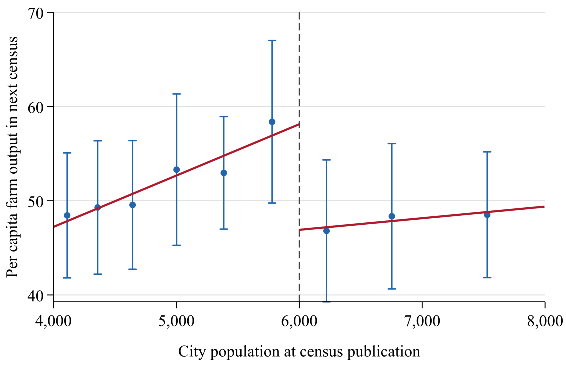
(B) original



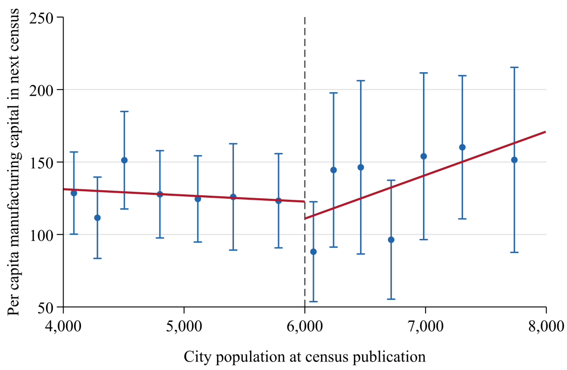
(A) quadratic



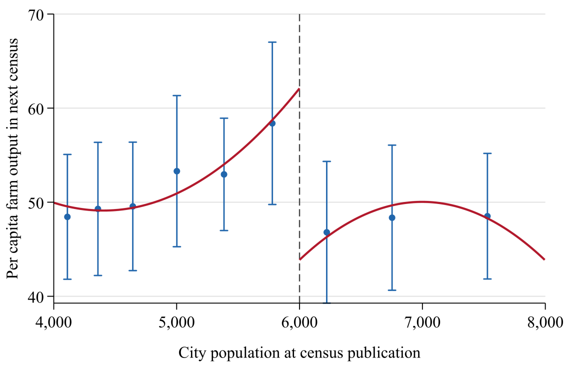
(B) quadratic



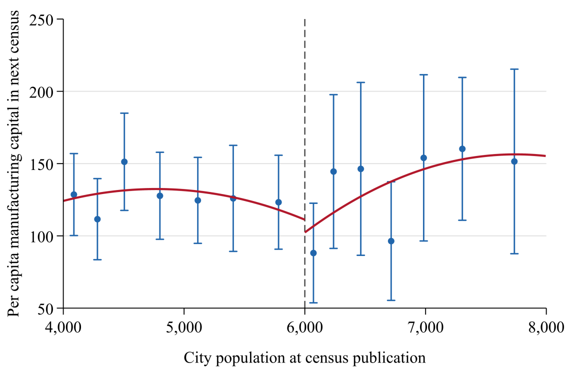
(C) original



(D) original

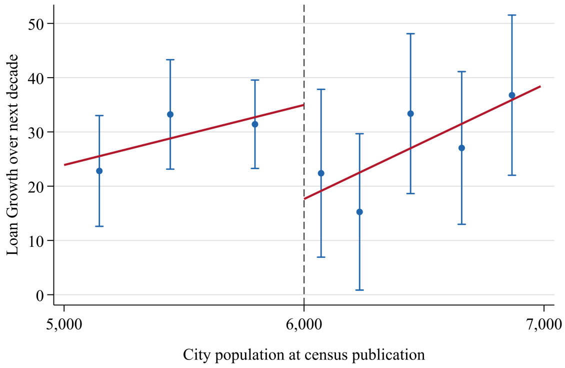


(C) quadratic

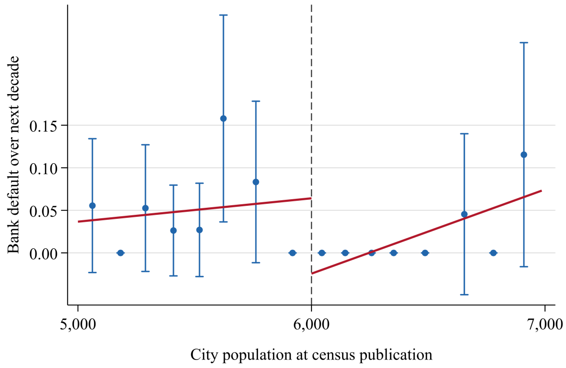


(D) quadratic

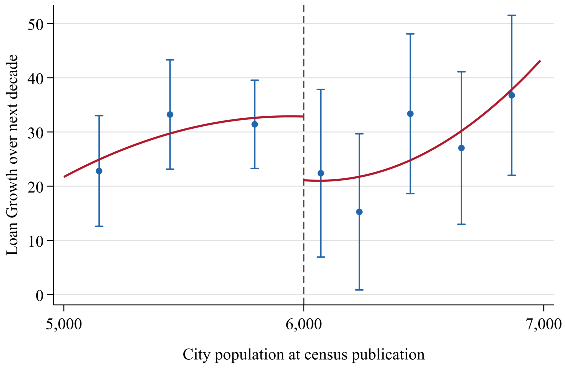
Figure 3.6.2: Figure 5 – comparing the linear trend with the quadratic one and redefining population cutoffs to 5,000-7,000 inhabitants



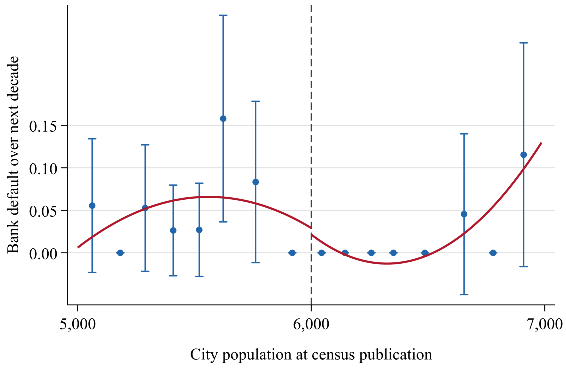
(A)



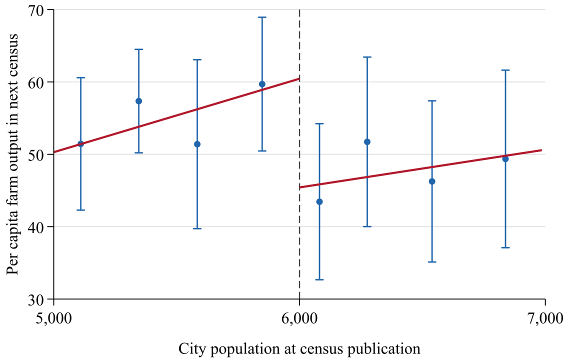
(B)



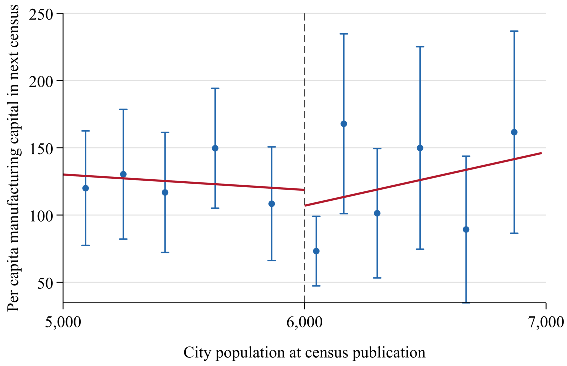
(A) quadratic



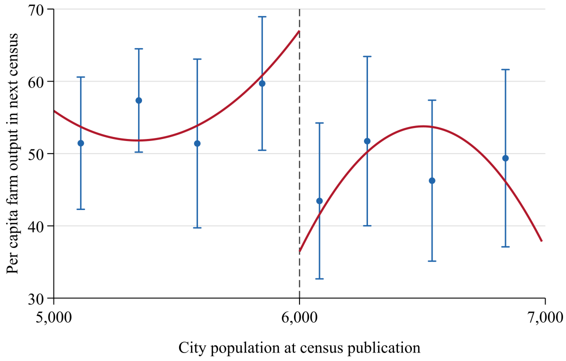
(B) quadratic



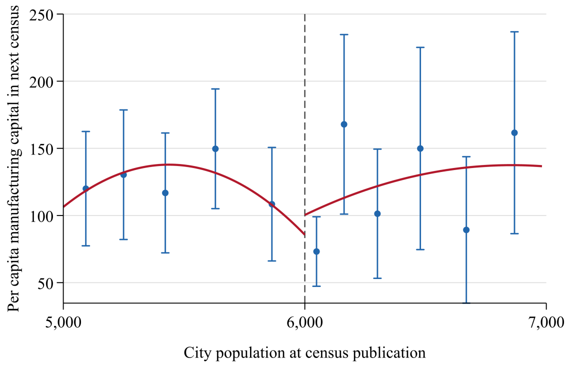
(C)



(D)



(C) quadratic



(D) quadratic

3.7 Table 4

The original Table 4 is fully replicable and reported as Table 3.7.1.

Table 3.7.1: Reproducing the original Table 4

Dependent Variable	Δ Loans						
Sample	All cities					No new entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-11.813*	-12.250**	-11.698*	-13.759**	-13.933**	-16.516**	-13.657**
	[0.054]	[0.046]	[0.070]	[0.033]	[0.036]	[0.030]	[0.050]
Bias-corrected	-14.248**	-14.618**	-13.656**	-15.517**	-14.073**	-18.334**	-14.838**
	[0.020]	[0.017]	[0.034]	[0.016]	[0.034]	[0.016]	[0.033]
Robust	-14.248**	-14.618**	-13.656*	-15.517**	-14.073*	-18.334**	-14.838*
	[0.036]	[0.032]	[0.059]	[0.029]	[0.051]	[0.039]	[0.061]
BW Type	MSE Two	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Triangular	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	3	3	2	2
Mean dep. var.	26.87	26.87	26.87	26.87	26.87	23.63	23.63
Num. counties	1,029	1,029	1,029	1,029	1,029	791	791
Num. cities	1,673	1,673	1,673	1,673	1,673	1,288	1,288
Num. banks	2,358	2,358	2,358	2,358	2,358	1,725	1,725
Observations	3,077	3,077	3,077	3,077	3,077	2,473	2,473
Obs. left of cutoff	2,641	2,641	2,641	2,641	2,641	2,182	2,182
Obs. right of cutoff	436	436	436	436	436	291	291
Left main bandwidth (h)	2,052	2,171	2,352	2,733	5,337	1,792	2,269
Right main bandwidth (h)	2,972	3,151	2,352	10,109	5,337	1,607	2,269
Effective obs. (left)	593	651	729	893	2,562	381	539
Effective obs. (right)	320	327	295	423	392	191	214

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

The original Table 4 was recalculated according to the following robustness checks:

1 Identical model specification, but without winsorizing the data.

In Table 3.7.2 we notice that the coefficients have become larger in absolute value (more negative) with similar significance levels. The non-winsorization of the sample data affected the left bandwidth, which has become smaller, leading to a decrease in the number of effective observations on the left of the cutoff.

2 Identical model specification, but trimming the 1% and 99% tails.

This robustness check has a heavier impact on the distribution of the data because we are eliminating part of the data, so we were expecting ex ante to witness some changes in the estimation. In effect, in Table 3.7.3 the estimated coefficients not only become smaller in absolute value, but almost all of them turn out to be non-significant. In contrast to robustness check (1), this time the left bandwidth becomes larger, leading to a larger number of effective observations on the left of the cutoff with the exception of column (3).

3 Adding lagged dependent variable as a control variable.

In this robustness check (Table 3.7.4), we kept the winsorised sample data, as the authors of the paper did, but we added a control variable: the lag of the dependent variable. Interestingly, while this time the coefficients become larger in absolute terms, the significance levels are almost completely lost, except for columns 1, 6, and 7. We notice that when we add lagged dependent variable as a control variable, the right bandwidth sizeably changes (between 40% to 70%, depending on the column). The left bandwidth is affected as well, although not as much as the right one. Consequently, not only the number of observations were affected on the right of the cutoff, but also those on its left, making it more difficult to understand what is the leading factor affecting the estimated coefficients and standard errors. It is also worth noting that the inclusion of the mentioned control variable in this model specification significantly reduces the sample: such a large drop in the sample size can naturally affect point estimates and statistical significance.

Table 3.7.2: Table 4 – Robustness check (1): No winsorizing data

Dependent Variable	Δ Loans						
Sample	All cities					No new entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-13.927**	-14.053**	-13.364*	-14.870**	-15.540**	-18.376**	-15.170**
	[0.031]	[0.029]	[0.051]	[0.028]	[0.028]	[0.021]	[0.036]
Bias-corrected	-16.592**	-16.613**	-15.580**	-16.580**	-14.959**	-20.359**	-16.383**
	[0.010]	[0.010]	[0.023]	[0.014]	[0.034]	[0.011]	[0.024]
Robust	-16.592**	-16.613**	-15.580**	-16.580**	-14.959*	-20.359**	-16.383**
	[0.021]	[0.021]	[0.041]	[0.026]	[0.052]	[0.028]	[0.049]
BW Type	MSE Two	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Triangular	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	3	3	2	2
Mean dep. var.	27.23	27.23	27.23	27.23	27.23	24.04	24.04
Num. counties	1,029	1,029	1,029	1,029	1,029	791	791
Num. cities	1,673	1,673	1,673	1,673	1,673	1,288	1,288
Num. banks	2,358	2,358	2,358	2,358	2,358	1,725	1,725
Observations	3,077	3,077	3,077	3,077	3,077	2,473	2,473
Obs. left of cutoff	2,641	2,641	2,641	2,641	2,641	2,182	2,182
Obs. right of cutoff	436	436	436	436	436	291	291
Left main bandwidth (h)	1,814	1,982	2,299	2,671	5,220	1,615	2,251
Right main bandwidth (h)	2,976	3,147	2,299	10,096	5,220	1,599	2,251
Effective obs. (left)	504	566	702	863	2,513	335	534
Effective obs. (right)	320	327	290	423	389	191	211

Notes: p-values reported in square brackets.

Table 3.7.3: Table 4 – Robustness check (2): Trimming 1% and 99% tails

Dependent Variable	Δ Loans						
Sample	All cities					No new entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-6.517	-7.137	-6.892	-8.277	-9.191	-10.008	-8.054
	[0.231]	[0.184]	[0.217]	[0.153]	[0.116]	[0.114]	[0.174]
Bias-corrected	-7.235	-7.888	-7.825	-9.638*	-9.068	-10.897*	-8.014
	[0.183]	[0.142]	[0.161]	[0.096]	[0.121]	[0.086]	[0.177]
Robust	-7.235	-7.888	-7.825	-9.638	-9.068	-10.897	-8.014
	[0.234]	[0.188]	[0.215]	[0.128]	[0.154]	[0.135]	[0.236]
BW Type	MSE Two	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Triangular	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	3	3	2	2
Mean dep. var.	26.64	26.64	26.64	26.64	26.64	23.44	23.44
Num. counties	1,029	1,029	1,029	1,029	1,029	791	791
Num. cities	1,673	1,673	1,673	1,673	1,673	1,288	1,288
Num. banks	2,358	2,358	2,358	2,358	2,358	1,725	1,725
Observations	3,005	3,005	3,005	3,005	3,005	2,419	2,419
Obs. left of cutoff	2,580	2,580	2,580	2,580	2,580	2,133	2,133
Obs. right of cutoff	425	425	425	425	425	286	286
Left main bandwidth (h)	2,449	2,599	2,387	2,822	5,040	2,010	2,169
Right main bandwidth (h)	2,742	2,869	2,387	9,219	5,040	1,464	2,169
Effective obs. (left)	744	812	721	928	2,380	451	497
Effective obs. (right)	303	311	288	410	380	181	207

Notes: p-values reported in square brackets.

Table 3.7.4: Table 4 – Robustness check (3): Adding the lag of the dependent variable as a control variable

Dependent Variable	Δ Loans						
Sample	All cities					No new entrants	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-15.265	-14.691	-11.572	-16.433	-16.246	-23.915**	-22.599**
	[0.131]	[0.139]	[0.268]	[0.149]	[0.153]	[0.025]	[0.043]
Bias-corrected	-19.898**	-18.689*	-14.396	-18.180	-17.672	-28.948***	-25.968**
	[0.049]	[0.060]	[0.168]	[0.110]	[0.120]	[0.007]	[0.020]
Robust	-19.898*	-18.689	-14.396	-18.180	-17.672	-28.948**	-25.968**
	[0.086]	[0.103]	[0.225]	[0.146]	[0.156]	[0.018]	[0.041]
BW Type	MSE Two	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Triangular	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	2	2	1	1
Order Bias (q)	2	2	2	3	3	2	2
Mean dep. var.	27.23	27.23	27.23	27.23	27.23	24.04	24.04
Num. counties	1,029	1,029	1,029	1,029	1,029	791	791
Num. cities	1,673	1,673	1,673	1,673	1,673	1,288	1,288
Num. banks	2,358	2,358	2,358	2,358	2,358	1,725	1,725
Observations	1,145	1,145	1,145	1,145	1,145	972	972
Obs. left of cutoff	979	979	979	979	979	852	852
Obs. right of cutoff	166	166	166	166	166	120	120
Left main bandwidth (h)	2,007	2,091	1,344	2,798	2,747	1,947	1,239
Right main bandwidth (h)	1,211	1,454	1,344	2,725	2,747	1,199	1,239
Effective obs. (left)	261	270	133	407	390	201	103
Effective obs. (right)	96	104	99	129	129	74	75

Notes: p-values reported in square brackets.

3.8 Table 5

The original Table 5 is fully replicable and reported as Table 3.8.1.

Table 3.8.1: Reproducing the original Table 5

Dependent Variable	Δ Capital Paid In	Δ Equity	Δ Deposits	Δ Cash	Δ Reserves	Δ Assets
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-5.203	-5.672	-10.742*	-1.218	-5.121	-8.897
	[0.195]	[0.184]	[0.096]	[0.899]	[0.599]	[0.116]
Bias-corrected	-7.254*	-7.565*	-12.612*	-2.202	-9.136	-10.382*
	[0.071]	[0.077]	[0.051]	[0.818]	[0.349]	[0.066]
Robust	-7.254	-7.565	-12.612*	-2.202	-9.136	-10.382
	[0.107]	[0.114]	[0.087]	[0.843]	[0.411]	[0.109]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	-1.32	4.70	50.87	20.57	38.73	27.74
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,358	2,358	2,358	2,358	2,358	2,358
Observations	3,077	3,077	3,075	3,077	3,077	3,077
Obs. left of cutoff	2,641	2,641	2,639	2,641	2,641	2,641
Obs. right of cutoff	436	436	436	436	436	436
Left main bandwidth (h)	1,408	1,300	2,547	2,046	1,875	1,456
Right main bandwidth (h)	2,800	3,156	3,044	3,301	3,276	2,863
Effective obs. (left)	352	313	805	592	526	362
Effective obs. (right)	313	327	324	333	333	318

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

The original Table 5 was recalculated according to the following robustness checks:

1 Identical model specification, but without winsorizing the data.

Focusing on the coefficients shown in Table 3.8.2, there are no sizeable changes, except for some estimates in column (2). In particular, its "robust coefficient" is now significant at 10% level of confidence, and the bias-corrected coefficient changes from −7.57 in the original results to −8.99. This is driven by the changes that occurred in the bandwidths, especially in the left one, which led to some variation in the number of effective observations on the left of the cutoff point.

2 Identical model specification, but trimming 1% and 99% tails.

The estimated coefficients in column (1) of Table 3.8.3 increase in absolute value (become more negative), while those in columns (4), (5), and (6) become smaller in absolute value (less negative). Significance levels of the estimates change, in columns (1) and (2), the bias-corrected coefficients lost significance, while the estimates in column (3) gain higher significance level. Both left and right bandwidths increase for columns (1), (2), and (3), while they decrease for columns (4), (5), and (6), affecting in the same direction the number of effective observations on both left and right of the cutoff.

3 Adding lagged dependent variable as a control variable.

While estimated coefficients in columns (1), (2), (3) and (6) of Table 3.8.4 lost significance, coefficients in column (4) became significantly positive, with the estimates being 28.20, 32.94, and 32.94, significant on 10%, 5%, and 5% levels, respectively. The bandwidths and the effective observations on both sides change dramatically, with the left (right) bandwidth increasing (decreasing) sizeably. The number of observations on the left of the cutoff varies depending on the considered column, while those on the right of the cutoff always exhibit a drastic decrease. It is important to highlight that incorporating the mentioned control variable in this model specification leads to a substantial reduction in the sample size. This significant reduction in the sample size can potentially impact point estimates and statistical significance.

Table 3.8.2: Table 5 – Robustness check (1): No winsorizing data

Dependent Variable	Δ Capital Paid In	Δ Equity	Δ Deposits	Δ Cash	Δ Reserves	Δ Assets
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-5.455	-6.898	-10.745	-0.630	-4.307	-9.069
	[0.195]	[0.133]	[0.104]	[0.948]	[0.663]	[0.117]
Bias-corrected	-7.582*	-8.988*	-12.455*	-1.688	-7.988	-10.523*
	[0.072]	[0.050]	[0.059]	[0.861]	[0.419]	[0.069]
Robust	-7.582	-8.988*	-12.455*	-1.688	-7.988	-10.523
	[0.108]	[0.080]	[0.099]	[0.880]	[0.479]	[0.113]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	-1.43	4.79	51.08	20.80	38.72	27.88
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,358	2,358	2,358	2,358	2,358	2,358
Observations	3,077	3,077	3,075	3,077	3,077	3,077
Obs. left of cutoff	2,641	2,641	2,639	2,641	2,641	2,641
Obs. right of cutoff	436	436	436	436	436	436
Left main bandwidth (h)	1,473	1,343	2,507	2,105	2,000	1,459
Right main bandwidth (h)	2,640	2,914	3,020	3,378	3,407	2,784
Effective obs. (left)	366	332	786	618	584	362
Effective obs. (right)	305	319	322	335	335	311

Notes: p-values reported in square brackets.

Table 3.8.3: Table 5 – Robustness check (2): Trimming 1% and 99% tails

Dependent Variable	Δ Capital Paid In	Δ Equity	Δ Deposits	Δ Cash	Δ Reserves	Δ Assets
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-3.383	-2.459	-10.841*	-2.130	-2.473	-8.385
	[0.336]	[0.510]	[0.086]	[0.825]	[0.802]	[0.127]
Bias-corrected	-5.144	-3.957	-13.144**	-1.655	-4.204	-9.911*
	[0.144]	[0.289]	[0.038]	[0.864]	[0.669]	[0.071]
Robust	-5.144	-3.957	-13.144*	-1.655	-4.204	-9.911
	[0.196]	[0.349]	[0.067]	[0.882]	[0.714]	[0.113]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	-1.35	4.64	50.33	20.68	38.56	27.56
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,358	2,358	2,358	2,358	2,358	2,358
Observations	3,031	3,011	3,014	3,014	3,007	3,011
Obs. left of cutoff	2,606	2,590	2,583	2,588	2,577	2,587
Obs. right of cutoff	425	421	431	426	430	424
Left main bandwidth (h)	1,510	1,469	2,207	1,656	1,565	1,401
Right main bandwidth (h)	3,062	3,589	3,165	3,028	3,170	3,209
Effective obs. (left)	386	355	649	435	396	339
Effective obs. (right)	320	334	325	318	323	321

Notes: p-values reported in square brackets.

Table 3.8.4: Table 5 – Robustness check (3): Adding the lag of the dependent variable as a control variable

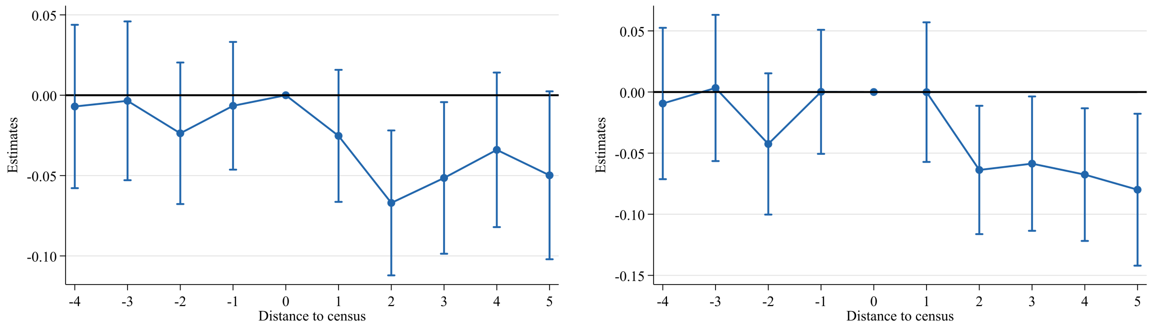
Dependent Variable	Δ Capital Paid In	Δ Equity	Δ Deposits	Δ Cash	Δ Reserves	Δ Assets
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-2.977	-0.193	-0.115	28.200*	11.901	-7.807
	[0.591]	[0.974]	[0.990]	[0.052]	[0.421]	[0.305]
Bias-corrected	-4.390	-1.443	-0.695	32.937**	9.358	-9.877
	[0.428]	[0.805]	[0.936]	[0.023]	[0.527]	[0.194]
Robust	-4.390	-1.443	-0.695	32.937**	9.358	-9.877
	[0.517]	[0.829]	[0.947]	[0.046]	[0.586]	[0.258]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	-1.43	4.79	51.08	20.80	38.72	27.88
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,358	2,358	2,358	2,358	2,358	2,358
Observations	1,145	1,145	1,144	1,145	1,145	1,145
Obs. left of cutoff	979	979	978	979	979	979
Obs. right of cutoff	166	166	166	166	166	166
Left main bandwidth (h)	2,810	2,037	2,470	1,142	1,962	1,992
Right main bandwidth (h)	1,083	1,259	1,898	1,306	1,834	1,899
Effective obs. (left)	407	262	335	118	245	252
Effective obs. (right)	90	97	118	97	117	118

Notes: p-values reported in square brackets.

3.9 Figure 6

The original Figure 6 is fully replicable and reported as Figure 3.9.1. Nonetheless, this time we are not in the position of proposing meaningful robustness checks.

Figure 3.9.1: Reproducing the original Figure 6



(A) original (B) original

3.10 Table 6

The original Table 6 is fully replicable, the replicated table is shown as Table 3.10.1.

Table 3.10.1: Reproducing the original Table 6

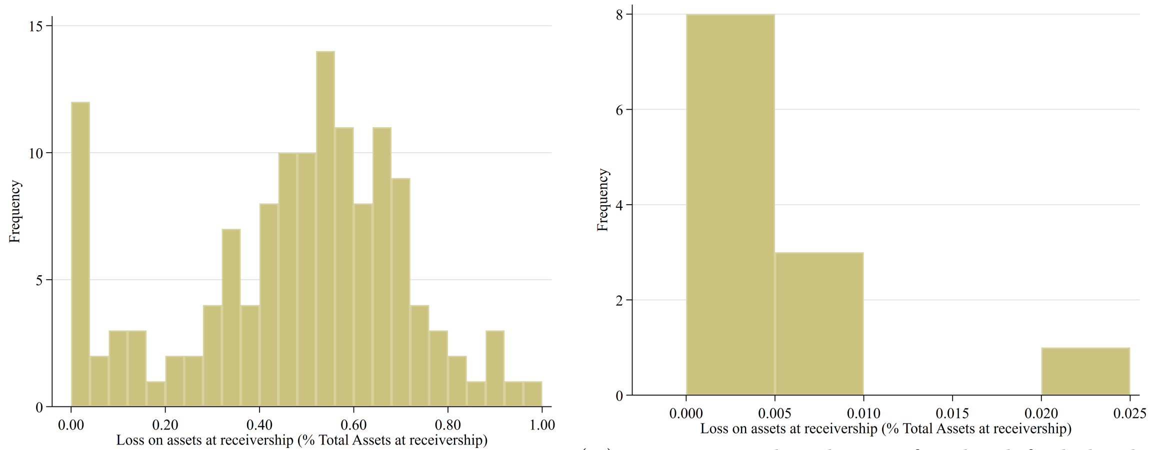
Dependent Variable	Default		Loss Ratio	
	(1)	(2)	(3)	(4)
Conventional	-0.073***	-0.081***	-0.035***	-0.037***
	[0.000]	[0.001]	[0.002]	[0.003]
Bias-corrected	-0.080***	-0.088***	-0.039***	-0.041***
	[0.000]	[0.000]	[0.000]	[0.001]
Robust	-0.080***	-0.088***	-0.039***	-0.041***
	[0.001]	[0.001]	[0.003]	[0.002]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1
Order Bias (q)	2	2	2	2
Mean dep. var.	0.04	0.04	0.02	0.02
Num. counties	1,029	1,029	1,029	1,029
Num. cities	1,673	1,673	1,673	1,673
Num. banks	2,358	2,358	2,358	2,358
Observations	3,650	3,650	3,645	3,645
Obs. left of cutoff	3,125	3,125	3,123	3,123
Obs. right of cutoff	525	525	522	522
Left main bandwidth (h)	2,406	1,818	2,399	1,840
Right main bandwidth (h)	1,550	1,818	1,615	1,840
Effective obs. (left)	858	590	854	597
Effective obs. (right)	267	286	275	286

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

We investigate the distribution of the *Loss Ratio* dependent variable of specifications

(3) and (4) from Table 3.10.1. As Figure 3.10.1 shows, there is no major concern relating to outliers.

Figure 3.10.1: *Loss Ratio* histograms



(A) *Loss Ratio* distribution for the default banks

(B) *Loss Ratio* distribution for the default banks and *Loss Ratio* < 0.05

3.11 Table 7

The original Table 7 is fully replicable and reported as Table 3.11.1.

Table 3.11.1: Reproducing the original Table 7

Dependent Variable	OREO	Rediscounts	Equity / Assets	Equity / Loans	Deposits / Assets	Cash / Loans	Reserves / Required Reserves
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-0.080**	0.001	2.708	9.599*	-4.630	-0.236	17.513
	[0.040]	[0.960]	[0.133]	[0.081]	[0.117]	[0.844]	[0.228]
Bias-corrected	-0.079**	-0.009	3.418*	11.598**	-5.834**	-0.528	21.719
	[0.043]	[0.767]	[0.058]	[0.035]	[0.048]	[0.660]	[0.135]
Robust	-0.079*	-0.009	3.418*	11.598*	-5.834*	-0.528	21.719
	[0.089]	[0.794]	[0.096]	[0.057]	[0.088]	[0.702]	[0.179]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2	2
Mean dep. var.	0.07	0.06	28.95	58.52	52.61	10.62	215.96
Num. counties	992	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,589	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,200	2,358	2,358	2,358	2,358	2,358	2,358
Observations	2,476	3,077	3,077	3,077	3,077	3,077	3,072
Obs. left of cutoff	2,122	2,641	2,641	2,641	2,641	2,641	2,636
Obs. right of cutoff	354	436	436	436	436	436	436
Left main bandwidth (h)	1,808	2,310	2,164	2,271	1,837	2,305	2,416
Right main bandwidth (h)	3,145	3,375	3,752	3,440	3,616	3,985	4,138
Effective obs. (left)	385	711	649	691	512	707	754
Effective obs. (right)	269	335	344	335	343	348	357

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

The original Table 7 was recalculated according to the following robustness checks:

1 Identical model specification, but without winsorizing the data.

A sizeable change can be detected in column (4) of Table 3.11.2: this is due to an increase in both left and right bandwidths that led to the increase of effective observations on both sides (with a larger impact on those on the left of the cutoff). All coefficients keep the same significance level but display dramatic differences in the size and standard error of the estimated coefficients with respect to those of the original table.

Estimates in columns (1) and (2) remain identical to the original results. Columns (3) and (5) exhibit slight changes in terms of the size and standard errors of the estimated coefficients. The right bandwidth of column (6) substantially increases, nonetheless the estimated coefficients are virtually unchanged.

2 Identical model specification, but trimming 1% and 99% tails.

Compared to the original results, columns (1) and (2) of Table 3.11.3 surprisingly remain the same, suggesting that the change in the data sample and its distribution had no impact on their estimates. However, moving to column (3), the "conventional" coefficient is now significant at 10% level, and "bias-corrected" and "robust" coefficients are now significant at 5% level. The absolute value of the estimates in column (3) increases too. On the contrary, estimates in column (4) are now either insignificant or marginally significant. Column (5) gained significance compared to the original results, and the absolute value of the estimates increased, similar to what was seen in column (3).

For columns (3), (5), and (6), both bandwidths increased, while for column (4), right bandwidth increased, while the left bandwidth decreased. For column (7), left bandwidth decreased and right bandwidth increased. Changes in bandwidths in all columns result in correspondent changes in the number of effective observations on both sides of the cutoff point.

3 Adding lagged dependent variable as a control variable.

Estimates in column (1) of Table 3.11.4 remained almost identical, while columns (3), (4) and (5)'s coefficients lost significance and become smaller in absolute value to different extents. For columns (1), (2), and (3), both left and right bandwidths increased, leading to an increase in effective observations on both sides of the cutoff point. Left bandwidth decreased in columns (4), (5), (6), and very substantially for column (7). While the right bandwidth decreased for column (5), it increased for column (4), and substantially increased for columns (6) and (7). The changes in the number of effective observations in each column are positively correlated with the changes in their left and right bandwidths.

Table 3.11.2: Table 7 – Robustness check (1): No winsorizing

Dependent Variable	OREO	Rediscounts	$\frac{\text{Equity}}{\text{Assets}}$	$\frac{\text{Equity}}{\text{Loans}}$	$\frac{\text{Deposits}}{\text{Assets}}$	$\frac{\text{Cash}}{\text{Loans}}$	$\frac{\text{Reserves}}{\text{Required Reserves}}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-0.080**	0.001	2.757	12.236*	-4.506	-0.238	15.918
	[0.040]	[0.960]	[0.134]	[0.079]	[0.130]	[0.861]	[0.393]
Bias-corrected	-0.079**	-0.009	3.456*	14.871**	-5.687*	-0.391	22.728
	[0.043]	[0.767]	[0.060]	[0.033]	[0.056]	[0.774]	[0.223]
Robust	-0.079*	-0.009	3.456*	14.871*	-5.687*	-0.391	22.728
	[0.089]	[0.794]	[0.100]	[0.051]	[0.099]	[0.804]	[0.226]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2	2
Mean dep. var.	0.07	0.06	29.01	59.00	52.60	10.77	219.95
Num. counties	992	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,589	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,200	2,358	2,358	2,358	2,358	2,358	2,358
Observations	2,476	3,077	3,077	3,077	3,077	3,077	3,072
Obs. left of cutoff	2,122	2,641	2,641	2,641	2,641	2,641	2,636
Obs. right of cutoff	354	436	436	436	436	436	436
Left main bandwidth (h)	1,808	2,310	2,066	2,482	1,818	2,313	2,033
Right main bandwidth (h)	3,145	3,375	3,746	3,728	3,650	4,942	4,601
Effective obs. (left)	385	711	598	777	506	711	592
Effective obs. (right)	269	335	344	343	343	379	369

Notes: p-values reported in square brackets.

Table 3.11.3: Table 7 – Robustness check (2): Trimming 1% tails

Dependent Variable	OREO	Rediscounts	$\frac{\text{Equity}}{\text{Assets}}$	$\frac{\text{Equity}}{\text{Loans}}$	$\frac{\text{Deposits}}{\text{Assets}}$	$\frac{\text{Cash}}{\text{Loans}}$	$\frac{\text{Reserves}}{\text{Required Reserves}}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-0.080**	0.001	3.019*	6.547	-5.374*	-0.448	13.211
	[0.040]	[0.960]	[0.065]	[0.125]	[0.058]	[0.677]	[0.308]
Bias-corrected	-0.079**	-0.009	3.709**	8.013*	-6.632**	-0.792	15.612
	[0.043]	[0.767]	[0.024]	[0.060]	[0.019]	[0.461]	[0.228]
Robust	-0.079*	-0.009	3.709**	8.013	-6.632**	-0.792	15.612
	[0.089]	[0.794]	[0.046]	[0.106]	[0.041]	[0.530]	[0.305]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2	2
Mean dep. var.	0.07	0.06	28.77	58.07	52.74	10.49	213.18
Num. counties	992	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,589	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,200	2,358	2,358	2,358	2,358	2,358	2,358
Observations	2,476	3,077	3,006	3,023	3,003	3,011	3,024
Obs. left of cutoff	2,122	2,641	2,586	2,598	2,584	2,578	2,593
Obs. right of cutoff	354	436	420	425	419	433	431
Left main bandwidth (h)	1,808	2,310	2,096	2,200	2,037	1,700	2,020
Right main bandwidth (h)	3,145	3,375	3,618	3,133	3,420	3,810	3,985
Effective obs. (left)	385	711	595	645	576	445	586
Effective obs. (right)	269	335	332	318	320	343	343

Notes: p-values reported in square brackets.

Table 3.11.4: Table 7 – Robustness check (3): Adding the lag of the dependent variable as a control variable

Dependent Variable	OREO	Rediscounts	$\frac{Equity}{Assets}$	$\frac{Equity}{Loans}$	$\frac{Deposits}{Assets}$	$\frac{Cash}{Loans}$	$\frac{Reserves}{Required\ Reserves}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conventional	-0.080**	0.006	1.887	7.012	0.516	0.473	27.367
	[0.029]	[0.826]	[0.135]	[0.145]	[0.777]	[0.700]	[0.190]
Bias-corrected	-0.078**	-0.003	2.261*	8.562*	0.857	0.487	31.275
	[0.034]	[0.909]	[0.073]	[0.075]	[0.637]	[0.692]	[0.134]
Robust	-0.078*	-0.003	2.261	8.562	0.857	0.487	31.275
	[0.074]	[0.920]	[0.123]	[0.108]	[0.668]	[0.734]	[0.220]
BW Type	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two	MSE Two
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2	2
Mean dep. var.	0.07	0.06	29.01	59.00	52.60	10.77	219.95
Num. counties	992	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,589	1,673	1,673	1,673	1,673	1,673	1,673
Num. banks	2,200	2,358	2,358	2,358	2,358	2,358	2,358
Observations	2,476	3,077	3,077	3,077	3,077	3,077	3,067
Obs. left of cutoff	2,122	2,641	2,641	2,641	2,641	2,641	2,631
Obs. right of cutoff	354	436	436	436	436	436	436
Left main bandwidth (h)	2,093	2,351	2,330	2,258	1,139	2,180	1,109
Right main bandwidth (h)	3,175	3,527	3,778	4,343	3,406	4,096	4,650
Effective obs. (left)	477	728	720	687	286	652	273
Effective obs. (right)	269	341	344	367	335	355	374

Notes: p-values reported in square brackets.

3.12 Table 8

The original Table 8 is fully replicable and reported as Table 3.12.1.

Table 3.12.1: Reproducing the original Table 8

Dependent Variable	Farm Output		Farm Value		Number of Farms	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-8.721**	-9.937**	-39.136	-39.462	-10.636**	-11.023**
	[0.048]	[0.016]	[0.164]	[0.136]	[0.026]	[0.023]
Bias-corrected	-9.986**	-11.525***	-48.831*	-46.509*	-12.456***	-12.297**
	[0.023]	[0.005]	[0.082]	[0.079]	[0.009]	[0.011]
Robust	-9.986**	-11.525***	-48.831	-46.509	-12.456**	-12.297**
	[0.045]	[0.010]	[0.124]	[0.122]	[0.018]	[0.021]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	62.77	62.77	399.29	399.29	86.39	86.39
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686
Observations	2,801	2,801	2,801	2,801	2,801	2,801
Obs. left of cutoff	2,507	2,507	2,507	2,507	2,507	2,507
Obs. right of cutoff	294	294	294	294	294	294
Left main bandwidth (h)	1,409	1,770	1,564	2,125	1,544	1,856
Right main bandwidth (h)	3,036	1,770	3,209	2,125	2,693	1,856
Effective obs. (left)	274	374	314	488	312	401
Effective obs. (right)	231	178	234	200	221	181

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

Carlson et al. (2022) report the table using the non-winsorized data, which is contrary to their approach in all the preceding regression tables. Consequently, our initial robustness check involves replicating their table using winsorized data (Table 3.12.2). The coefficient estimated in columns (1), (2) and (3) become smaller but the statistical significance of the coefficients remains the same. The coefficients in column (4) not only decreased in their absolute value but also lost all the significance. Columns (5) and (6) exhibit changes in the size of the coefficients, but not in their significance and sign.

Table 3.12.2: Table 8 – Robustness check (1): Winsorizing 1% tails

Dependent Variable	Farm Output		Farm Value		Number of Farms	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-7.710*	-9.027**	-38.348	-36.366	-10.46**	-10.71**
	[0.064]	[0.020]	[0.162]	[0.164]	[0.028]	[0.026]
Bias-corrected	-8.798**	-10.516***	-47.999*	-42.975	-12.28***	-11.94**
	[0.035]	[0.007]	[0.080]	[0.100]	[0.010]	[0.013]
Robust	-8.798*	-10.516**	-47.999	-42.975	-12.28**	-11.94**
	[0.064]	[0.013]	[0.119]	[0.149]	[0.019]	[0.024]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	62.50	62.50	397.77	397.77	0.09	0.09
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686
Observations	2,801	2,801	2,801	2,801	2,801	2,801
Obs. left of cutoff	2,507	2,507	2,507	2,507	2,507	2,507
Obs. right of cutoff	294	294	294	294	294	294
Left main bandwidth (h)	1,408	1,746	1,654	2,146	1,560	1,860
Right main bandwidth (h)	2,970	1,746	3,199	2,146	2,694	1,860
Effective obs. (left)	274	366	341	499	313	404
Effective obs. (right)	229	178	233	200	221	181

Notes: p-values reported in square brackets.

The original Table 8 was also recalculated according to the following robustness checks:

1 Identical model specification, but trimming 1% and 99% tails.

In this case, we noticed a substantial change in the coefficient estimates (Table 3.12.3). Column (1)'s coefficients, which were highly significant in the original table, are now sizeably decreased in their absolute values and are no longer significant. Similarly, while the estimates in column (2) are still significant, they experience a decrease in their levels of significance, as well as their absolute values. On the contrary, the estimates in columns (3) and (4) do not exhibit drastic changes, except from the "bias-corrected" estimate in column (4), which lost its significance, in line with the findings of the table reproduced with winsorized data. Similarly to the same table, columns (5) and (6)'s coefficients are very small in size but still highly significant.

2 Adding the lag of the dependent variable as a control variable.

In Table 3.12.4 we notice that all the coefficients become larger in absolute terms (more negative than the original table) and maintain similar significance levels as the original estimates with a couple of exceptions: column (3)'s "bias-corrected" coefficient is not significant any longer, while column (4)'s "robust" coefficient has now become significant at 10% confidence level.

3 Excluding the town "Fredericksburg" from the data sample.

The table marginally changes, because excluding Fredericksburg's observations (2 observations) affects the calculation of both left and right bandwidth, which, in turn, modify the number of effective observations on the left and right of the cutoff, respectively.

Table 3.12.3: Table 8 – Robustness check (1): Trimming 1% tails

Dependent Variable	Farm Output		Farm Value		Number of Farms	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-4.977	-6.792*	-39.082	-36.599	-10.09**	-10.51**
	[0.199]	[0.063]	[0.156]	[0.161]	[0.031]	[0.028]
Bias-corrected	-5.609	-8.113**	-48.433*	-42.469	-11.78**	-11.76**
	[0.148]	[0.027]	[0.079]	[0.104]	[0.012]	[0.014]
Robust	-5.609	-8.113**	-48.433	-42.469	-11.78**	-11.76**
	[0.209]	[0.041]	[0.120]	[0.156]	[0.022]	[0.025]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	62.06	62.06	394.46	394.46	0.09	0.09
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686
Observations	2,721	2,721	2,720	2,720	2,724	2,724
Obs. left of cutoff	2,436	2,436	2,435	2,435	2,438	2,438
Obs. right of cutoff	285	285	285	285	286	286
Left main bandwidth (h)	1,412	1,734	1,650	2,201	1,612	1,820
Right main bandwidth (h)	3,037	1,734	3,360	2,201	2,948	1,820
Effective obs. (left)	267	354	333	505	326	382
Effective obs. (right)	224	171	231	195	222	175

Notes: p-values reported in square brackets.

Table 3.12.4: Table 8 – Robustness check (2): Adding the lag of the dependent variable as a control variable

Dependent Variable	Farm Output		Farm Value		Number of Farms	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-12.783**	-13.111**	-61.184	-57.863	-13.444**	-14.287**
	[0.031]	[0.016]	[0.136]	[0.129]	[0.018]	[0.018]
Bias-corrected	-14.007**	-15.293***	-66.169	-70.200*	-14.903***	-16.212***
	[0.018]	[0.005]	[0.107]	[0.066]	[0.009]	[0.007]
Robust	-14.007**	-15.293***	-66.169	-70.200*	-14.903**	-16.212**
	[0.034]	[0.009]	[0.150]	[0.090]	[0.017]	[0.013]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	62.77	62.77	399.29	399.29	86.39	86.39
Num. counties	1,029	1,029	1,029	1,029	1,029	1,029
Num. cities	1,686	1,686	1,686	1,686	1,686	1,686
Observations	2,841	2,841	2,841	2,841	2,841	2,841
Obs. left of cutoff	2,545	2,545	2,545	2,545	2,545	2,545
Obs. right of cutoff	296	296	296	296	296	296
Left main bandwidth (h)	1,251	1,819	1,367	2,106	1,475	1,947
Right main bandwidth (h)	3,767	1,819	3,795	2,106	3,892	1,947
Effective obs. (left)	232	392	261	480	287	423
Effective obs. (right)	244	180	244	199	246	188

Notes: p-values reported in square brackets.

Table 3.12.5: Table 8 – Robustness check (3): Excluding "Fredericksburg"

Dependent Variable	Farm Output		Farm Value		Number of Farms	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-8.604**	-9.860**	-39.136	-39.340	-10.681**	-10.852**
	[0.048]	[0.016]	[0.163]	[0.137]	[0.024]	[0.025]
Bias-corrected	-9.829**	-11.416***	-48.765*	-46.164*	-12.520***	-12.065**
	[0.024]	[0.005]	[0.082]	[0.081]	[0.008]	[0.012]
Robust	-9.829**	-11.416**	-48.765	-46.164	-12.520**	-12.065**
	[0.046]	[0.010]	[0.123]	[0.124]	[0.016]	[0.023]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	62.80	62.80	399.51	399.51	86.42	86.42
Num. counties	1,028	1,028	1,028	1,028	1,028	1,028
Num. cities	1,685	1,685	1,685	1,685	1,685	1,685
Observations	2,799	2,799	2,799	2,799	2,799	2,799
Obs. left of cutoff	2,505	2,505	2,505	2,505	2,505	2,505
Obs. right of cutoff	294	294	294	294	294	294
Left main bandwidth (h)	1,445	1,785	1,576	2,133	1,598	1,881
Right main bandwidth (h)	3,036	1,785	3,209	2,133	2,693	1,881
Effective obs. (left)	281	376	317	487	323	408
Effective obs. (right)	231	179	234	200	221	182

Notes: p-values reported in square brackets.

3.13 Table 9

The original Table 9 is fully replicable, except for a minor discrepancy for the "conventional" coefficient of column (1), and reported as Table 3.13.1.

Table 3.13.1: Reproducing the original Table 9

Dependent Variable	Manuf. Value		Manuf. Capital		Manuf. Establishments	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	4.822	-8.273	-23.075*	-26.202**	0.608	0.150
	[0.753]	[0.620]	[0.057]	[0.030]	[0.168]	[0.728]
Bias-corrected	7.174	-6.487	-24.018**	-28.896**	0.761*	0.163
	[0.640]	[0.698]	[0.048]	[0.017]	[0.084]	[0.704]
Robust	7.174	-6.487	-24.018*	-28.896**	0.761	0.163
	[0.677]	[0.735]	[0.081]	[0.034]	[0.120]	[0.741]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	123.28	123.28	99.45	99.45	6.60	6.60
Num. counties	992	992	992	992	992	992
Num. cities	1,598	1,598	1,598	1,598	1,598	1,598
Observations	2,260	2,260	2,260	2,260	2,261	2,261
Obs. left of cutoff	2,023	2,023	2,023	2,023	2,024	2,024
Obs. right of cutoff	237	237	237	237	237	237
Left main bandwidth (h)	1,324	2,312	1,761	2,116	1,137	2,173
Right main bandwidth (h)	3,903	2,312	3,015	2,116	3,764	2,173
Effective obs. (left)	186	437	283	373	160	392
Effective obs. (right)	198	166	185	159	196	161

Notes: while the original paper provides the reader with coefficients' standard errors, we report their p-values in square brackets.

Similar to the original Table 8, the authors report the table using the non-winsorized data, which is contrary to their approach in all the preceding regression tables, and, as in Table 8, the town "Friederickburg" is added in the sample. In other words, when incorporating the non-winsorized data, it becomes essential to include "Friederickburg" in the sample. This adjustment rectifies the only coefficient estimate that differs, namely the ”conventional” coefficient in column (1). Consequently, our initial robustness check involves replicating their table using winsorized data (Table 3.13.2). The size of the coefficients in columns (1) to (4) decreases in absolute terms, but their significance levels do not change, except for column (3), which becomes either less significant or not significant at all (“robust” coefficient). On the contrary, columns (5) and (6)’s coefficients are virtually unchanged both in their size/sign and their significance.

Table 3.13.2: Table 9 – Robustness check (1): Winsorizing 1% and 99% tails

Dependent Variable	Manuf. Value		Manuf. Capital		Manuf. Establishments	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	4.181	-2.782	-17.381*	-22.950**	0.601	0.163
	[0.771]	[0.850]	[0.091]	[0.041]	[0.163]	[0.710]
Bias-corrected	7.064	-2.224	-18.923*	-25.963**	0.753*	0.171
	[0.624]	[0.880]	[0.068]	[0.021]	[0.081]	[0.693]
Robust	7.064	-2.224	-18.923	-25.963**	0.753	0.171
	[0.659]	[0.896]	[0.114]	[0.041]	[0.118]	[0.729]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	123.28	123.28	99.45	99.45	6.60	6.60
Num. counties	992	992	992	992	992	992
Num. cities	1,598	1,598	1,598	1,598	1,598	1,598
Observations	2,260	2,260	2,260	2,260	2,261	2,261
Obs. left of cutoff	2,023	2,023	2,023	2,023	2,024	2,024
Obs. right of cutoff	237	237	237	237	237	237
Left main bandwidth (h)	1,345	2,295	2,135	2,153	1,192	2,166
Right main bandwidth (h)	4,103	2,295	3,188	2,153	3,713	2,166
Effective obs. (left)	190	428	381	388	167	391
Effective obs. (right)	201	166	188	160	195	161

Notes: p-values reported in square brackets.

The original Table 9 was also recalculated according to the following robustness checks:

1 Identical model specification, but trimming 1% and 99% tails.

When implementing this robustness check (see Table 3.13.3), we find similar results to those mentioned in the previous paragraph.

2 Adding the lag of the dependent variable as a control variable.

This robustness check leads to interesting results (see Table 3.13.4). Particularly, the coefficients in columns (3) and (4) are not significant any longer, mainly because of the increase in their standard deviation. After a careful look at the table, one can notice that column (3)’s left and right bandwidths have sizeably increased, leading to the use of additional effective observations (especially on the left of the cutoff) in the estimation. Finally, column (5)’s bias-corrected coefficient is not statistically significant any longer.

3 Excluding the town "Fredericksburg" from the data sample.

The table marginally changes (see 3.13.5), because excluding Fredericksburg's observations (2 observations) affects the calculation of both left and right bandwidth, which, in turn, modify the number of effective observations on the left and right of the cutoff, respectively.

Table 3.13.3: Table 9 – Robustness check (2): Trimming 1% and 99% tails

Dependent Variable	Manuf. Value		Manuf. Capital		Manuf. Establishments	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	3.920	-4.112	-13.701	-20.650*	0.402	0.181
	[0.757]	[0.765]	[0.171]	[0.058]	[0.305]	[0.661]
Bias-corrected	5.393	-5.311	-16.170	-23.934**	0.521	0.170
	[0.670]	[0.700]	[0.107]	[0.028]	[0.183]	[0.678]
Robust	5.393	-5.311	-16.170	-23.934**	0.521	0.170
	[0.705]	[0.738]	[0.159]	[0.050]	[0.237]	[0.723]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	123.28	123.28	99.45	99.45	6.60	6.60
Num. counties	992	992	992	992	992	992
Num. cities	1,598	1,598	1,598	1,598	1,598	1,598
Observations	2,230	2,230	2,230	2,230	2,231	2,231
Obs. left of cutoff	1,999	1,999	1,999	1,999	2,000	2,000
Obs. right of cutoff	231	231	231	231	231	231
Left main bandwidth (h)	1,357	2,389	2,208	2,083	1,219	2,172
Right main bandwidth (h)	3,982	2,389	3,113	2,083	3,777	2,172
Effective obs. (left)	191	457	400	363	170	390
Effective obs. (right)	194	165	184	154	192	157

Notes: p-values reported in square brackets.

Table 3.13.4: Table 9 – Robustness check (3): Adding the lag of the dependent variable as a control variable

Dependent Variable	Manuf. Value		Manuf. Capital		Manuf. Establishments	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	-2.006	-8.170	-15.123	-24.688	0.354	0.103
	[0.915]	[0.662]	[0.402]	[0.157]	[0.421]	[0.816]
Bias-corrected	3.327	-4.759	-12.696	-25.947	0.526	0.125
	[0.860]	[0.799]	[0.482]	[0.137]	[0.232]	[0.778]
Robust	3.327	-4.759	-12.696	-25.947	0.526	0.125
	[0.874]	[0.821]	[0.534]	[0.183]	[0.282]	[0.806]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	123.28	123.28	99.45	99.45	6.60	6.60
Num. counties	992	992	992	992	992	992
Num. cities	1,598	1,598	1,598	1,598	1,598	1,598
Observations	2,265	2,265	2,265	2,265	2,272	2,272
Obs. left of cutoff	2,027	2,027	2,027	2,027	2,034	2,034
Obs. right of cutoff	238	238	238	238	238	238
Left main bandwidth (h)	1,644	2,321	1,917	2,128	1,528	2,124
Right main bandwidth (h)	3,846	2,321	3,530	2,128	3,874	2,124
Effective obs. (left)	257	437	320	378	231	378
Effective obs. (right)	198	167	195	160	199	159

Notes: p-values reported in square brackets.

Table 3.13.5: Table 9 – Robustness check (4): Excluding "Fredericksburg"

Dependent Variable	Manuf. Value		Manuf. Capital		Manuf. Establishments	
	(1)	(2)	(3)	(4)	(5)	(6)
Conventional	5.738	-8.555	-23.083*	-26.527**	0.587	0.146
	[0.709]	[0.608]	[0.058]	[0.028]	[0.180]	[0.734]
Bias-corrected	8.140	-6.797	-24.042**	-29.230**	0.731*	0.151
	[0.597]	[0.684]	[0.049]	[0.016]	[0.095]	[0.725]
Robust	8.140	-6.797	-24.042*	-29.230**	0.731	0.151
	[0.639]	[0.723]	[0.082]	[0.032]	[0.131]	[0.759]
BW Type	MSE Two	MSE Common	MSE Two	MSE Common	MSE Two	MSE Common
Kernel Type	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov	Epanechnikov
Order Loc. Poly. (p)	1	1	1	1	1	1
Order Bias (q)	2	2	2	2	2	2
Mean dep. var.	123.29	123.29	99.45	99.45	6.60	6.60
Num. counties	991	991	991	991	991	991
Num. cities	1,597	1,597	1,597	1,597	1,597	1,597
Observations	2,258	2,258	2,258	2,258	2,259	2,259
Obs. left of cutoff	2,021	2,021	2,021	2,021	2,022	2,022
Obs. right of cutoff	237	237	237	237	237	237
Left main bandwidth (h)	1,310	2,312	1,732	2,112	1,198	2,183
Right main bandwidth (h)	3,899	2,312	3,010	2,112	3,762	2,183
Effective obs. (left)	182	435	275	371	167	392
Effective obs. (right)	198	166	185	159	196	161

Notes: p-values reported in square brackets.

4 Conclusion

Carlson et al. (2022) investigate the impact of banking competition on economic growth and financial stability by examining the unique characteristics of the National Banking Era's capital regulation.

According to their findings, banks in markets facing higher entry barriers following a census publications experience a decline in banking competition and exhibit a more risk-adverse behaviour by reducing loan portfolio growth. In contrast, banks located in areas with lower entry barriers tend to expand their lending activities, fostering actual economic growth. Moreover, they also display a greater inclination toward risk-taking, which introduces potential threats to financial stability.

In our present investigation, we perform the reproducibility and replicability of Carlson et al. (2022)'s empirical results while evaluating the sensitivity of their findings to assess whether they are robust to certain decisions made by the original paper's authors.

The original study has indeed successfully been replicated, although with minor discrepancies noted in the magnitude of the estimated coefficients of Tables 8 and 9. These discrepancies are attributed to issues in the provided code, which impacted the replication of those tables.

Furthermore, we identify a few inconsistencies within Carlson et al. (2022)'s original analysis, particularly concerning the selection of data samples based on population ranges and the treatment of potential outliers. Our robustness checks aim at comprehensively addressing these inconsistencies by considering different city population ranges and adopting diverse techniques to manage potential outlier concerns.

Additionally, we conduct supplementary robustness checks by introducing the lag of the dependent variable as a control variable within the analysis as an attempt to control for omitted variables.

Our tests affirm the robustness of the paper's findings. The most substantial impacts on the results estimated by the authors are attributed to the inclusion of additional control variables. In some instances, the statistical significance of relevant coefficients diminishes, leading to potential shifts in the interpretation of the authors' findings. At the same time, it is important to emphasize that including additional variables significantly diminishes the effective sample size in some cases, as observed in both Tables 4 and 5. Additionally, RDD methodology relies on how the variables behave around the treatment cutoff, with less emphasis on control variables.

Moreover, the application of data trimming affects the results in certain cases, although we acknowledge that a more thorough evaluation of the appropriateness of trimming for outlier treatment is necessary.

Lastly, altering the population range induces reversals in the jumps near the cutoff, as compared to the original figures. If taken into account, this variation would partially influence some of the insights presented in the original paper.

Overall, reproducing and replicating this paper have been a rather valuable experience, as normally such a detailed and thorough analysis of authors' findings is not carried out. Even if Carlson et al. (2022) has been published in one of the main peer-reviewed journals, this type of checks are rarely performed, due to resources (firstly, time) constraints. Our findings reiterate the limits of many empirical results, and this task would be rather instructive for PhD students, who should be encouraged to replicate published papers, perhaps even as a first chapter of their PhD dissertation.

References

Carlson, M., Correia, S. and Luck, S.: 2022, The Effects of Banking Competition on Growth and Financial Stability: Evidence from the National Banking Era, *Journal of Political Economy* **130**(2), 462–520.