TUTORIAL 5

EMPIRICAL BANKING AND FINANCE

Matriculation numbers: 3391610

3290592
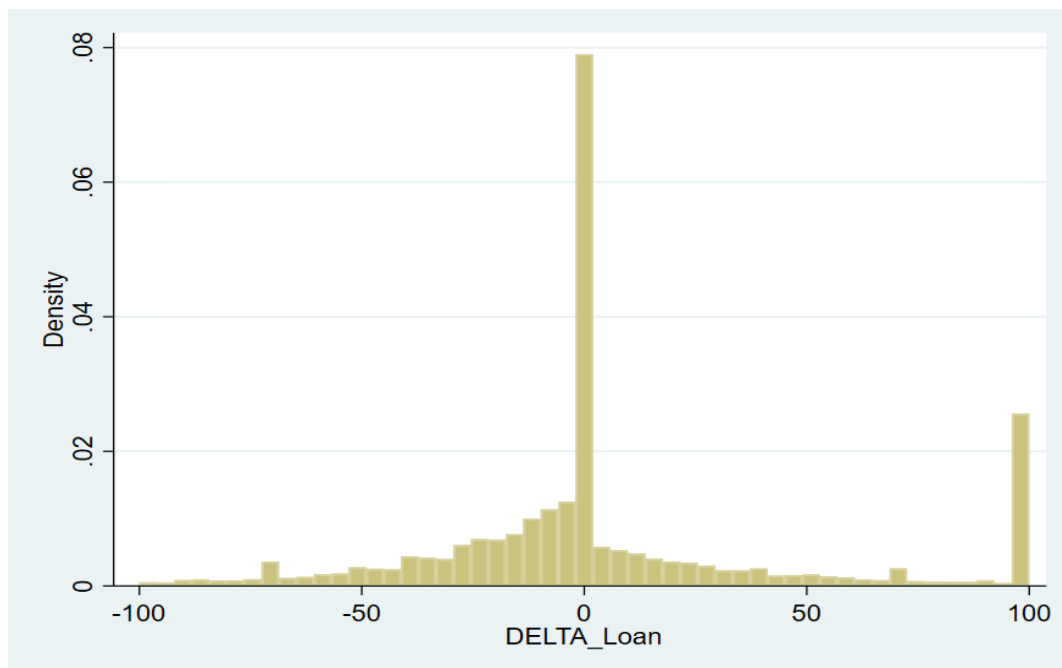
2.3 QUESTIONS

1. EMPIRICAL STRATEGY & EXPLORING THE DATASET

a) On page 139 [Giannetti and Simonov, 2013] write that the Japanese banking crisis is ideal to study the effects of bank bail-outs because in the first round of recapitalizations almost all banks received the same amount of capital: 100 bio yen. Explain why this is an ideal setting. What would be the problem if each bank had received an individual amount depending on the bank-specific amount of losses/non-performing loans?

If the government gave different recapitalization perhaps depending on the financial health of the banks, then **allocation of treatment** (recapitalization) would **depend on** the variable (financial health), that is **correlated** with the **outcome variable** (loan supply). Then certainly, we will have omitted variable (financial health) bias. Secondly, even if the government gave different amount not based on financial status, but for some other reason, that will create stigma effect in the firms. Firms would think that the banks that got higher recapitalization has worse performance, so that may affect demand side for credit, which might get reflected in **the variation** in the **outcome variable**, making the coefficient biased.

b) Create a histogram of deltaLoan. Provide an explanation of the two spikes in the graph.

According to the histogram, high density for the change in the loan that firms received from banks during the sample period (1998-2003) is observed for the value of 0 and 100%. This can be explained by different effects of recapitalization depending on initial capital injection and banks' ex post ability to meet capital requirements. Basically, although some banks increased their loans from recapitalization (thus we can observe 100% positive change in bank lending), there were some banks who only evergreen their loans, so that is why we can observe 0% change in bank lending.

c) The data are at the firm-bank-year level. Compute how many banks the average firm is borrowing from. Why is it important to have firms borrowing from several banks? How does this help to give the results below a causal interpretation?

We found that on average one firm borrows from **48.4** banks. It is important to have firms borrowing from several banks. If each firm borrows only from one bank, then everything is going to be captured by firm fixed effects. However, if we have one firms borrowing from several banks, then even if we take out firm fixed effects, there would be some variation. It is because now we can see how different banks change their lending behavior for the same firm.

2. THE IMPACT OF BANK-BAILOUTS ON LENDING: BINARY TREATMENT

a) Run a regression with deltaLoan on the LHS and recap1,recap2,recap3 as well as firm, bank and year fixed effects on the RHS. Use standard errors clustered at the firm-level.

```
Number of clusters (firmid)   =      2,579          Root MSE         =     39.7488

                                  (Std. Err. adjusted for 2,579 clusters in firmid)
```

deltaLoan	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
recap1	.1107332	.6964802	0.16	0.874	-1.254984	1.47645
recap2	1.904665	.7290643	2.61	0.009	.4750535	3.334276
recap3	-19.78098	1.937361	-10.21	0.000	-23.57992	-15.98204
_cons	5.827072	.0304081	191.63	0.000	5.767445	5.886699

```
Absorbed degrees of freedom:
```

Absorbed FE	Categories	- Redundant	= Num. Coefs	
firmid	2579	2579	0	*
bankid	219	0	219	
year	7	1	6	

b) Run the same regression as above and add privateRecap as a control variable on the RHS.

```
Number of clusters (firmid)   =      2,579          Root MSE        =     39.6080

                               (Std. Err. adjusted for 2,579 clusters in firmid)

                              Robust
   deltaLoan       Coef.    Std. Err.      t     P>|t|     [95% Conf. Interval]

      recap1     1.570093    .6908748     2.27   0.023     .2153673    2.924819
      recap2     7.266163    .7318863     9.93   0.000     5.831019    8.701308
      recap3    -23.34292    1.939579   -12.04   0.000    -27.14621   -19.53963
 privateRecap   -12.80411    .3826788   -33.46   0.000    -13.5545    -12.05372
       _cons     7.199126    .0570941   126.09   0.000     7.087171    7.311081

Absorbed degrees of freedom:

  Absorbed FE   Categories   - Redundant   = Num. Coefs

       firmid      2579          2579            0      *
       bankid       219             0          219
         year         7             1            6
```

c) Give a precise interpretation of the coefficient on recap1 found in question b). What is the economic size of this coefficient?

On average, first-round recapitalization increased the loan by 1.6 percentage point, holding next-round recapitalizations constant and accounting for time-invariant firm and bank fixed effects and time-variant common shocks. In order to find economic size of the coefficient, we divide the coefficient (1.6) by standard deviation of the outcome variable (42.5), which is equal to 0.038 or 3.8 percent. That means on average, a first-round recapitalized bank increases lending by 3.8% of the standard deviation of change in lending.

d) Compare the coefficient of recap1 between question a) and b). Using summary statistics only provide a possible explanation for why the two coefficients are so different.

The coefficient of recap 1 in part (a) is much lower than that of part (b).

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    Variable |       Obs        Mean    Std. Dev.       Min         Max

      firmid |   151,697    7545.529    12979.52          1       91581
      bankid |         0
        year |   151,697    2000.658     1.98268       1998        2004
   deltaLoan |   151,697    5.836464    42.48554  -99.98261         100
   loanShare |   151,697    .0806852    .1242542          0           1

      recap1 |   151,697    .0312069    .1738772          0           1
      recap2 |   151,697    .0221099    .1470414          0           1
      recap3 |   151,697    .0024457    .0493933          0           1
privateRecap |   151,697    .1192707    .3241078          0           1
  bidderBank |   151,697    .1295609    .3358208          0           1

  targetBank |   151,697    .0090641    .0947735          0           1
```

According to the summary statistics above, the mean value for privateRecap is higher than that of recap 1 variable. That means the number of banks that are being privately recapitalized is much higher than the banks who are recapitalized by the government. Also, standard deviation of private recapitalization variable is almost two times higher than that of recap 1 variable. These 2 differences might account for different coefficients, but we do not know the exact mechanism.

e) What might be problematic about including privateRecap as a control variable? Please provide a basic check (not a regression) that could confirm/alleviate the concerns about including privateRecap as a control variable.

We think that it can be a bad control if privateRecap happened after the government recapitalization (first round). In other words, privateRecap can itself be an outcome variable of government recapitalization. As a basic check, we could see that among the banks which were not exposed to first round recapitalization, mean value of the private recap is **0.11**. However, among the banks which were exposed to first round recapitalization, mean value of private recap is **0.37**. This may hint that actually investors decided to give capital for banks after government has done it. In that case, privateRecap would be a bad control.

3. THE IMPACT OF BANK-BAILOUTS ON LENDING: CONTINUOUS TREATMENT

a) Replicate column (1) of Table 3, Panel A in the paper.

deltaLoan	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Recap1_int	49.1633	3.230098	15.22	0.000	42.83238	55.49423
Recap2_int	58.18863	3.884955	14.98	0.000	50.57419	65.80306
Recap3_int	-2.482975	8.146779	-0.30	0.761	-18.4505	13.48455
Private_int	-12.36177	2.434079	-5.08	0.000	-17.13252	-7.591024
loanShare	-94.58143	1.108501	-85.32	0.000	-96.75407	-92.40879
bidderBank~t	8.188071	2.122553	3.86	0.000	4.02791	12.34823
targetBank~t	-1.76121	7.360909	-0.24	0.811	-16.18844	12.66602
_cons	13.01728	.1268769	102.60	0.000	12.7686	13.26595

b) Why are the authors interacting the recapitalization dummies with loanShare?

Authors add interaction terms in order to see heterogeneous effect of the treatment. Basically, they want to see whether the effect of recapitalization on the lending changes with the firm's relationship level with the bank (proxied by loan's share that firm receives from the bank).

c) What is the marginal impact of recap1 on deltaLoan for a firm with a loanShare of 10% and holding all other dummy variables at zero?

4.9

d) Replicate column (3) of Table 3, Panel A in the paper.

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deltaLoan	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
recap1_int	52.40619	3.258021	16.09	0.000	46.02053	58.79185
recap2_int	62.84704	3.927952	16.00	0.000	55.14833	70.54576
recap3_int	1.20508	8.577942	0.14	0.888	-15.60753	18.01769
privateRec~t	-11.52456	2.416898	-4.77	0.000	-16.26163	-6.787482
loanShare	-90.34873	1.181131	-76.49	0.000	-92.66373	-88.03374
bidder_int	18.31985	2.161832	8.47	0.000	14.0827	22.557
target_int	7.000262	7.237715	0.97	0.333	-7.185524	21.18605
_cons	11.98972	.1187076	101.00	0.000	11.75706	12.22239

e) Compare the coefficient of recap1 of question a) and d). What do you conclude?

Compared to the part (a) coefficient of recap 1 increased. The reason can be that in this estimation we included **time-variant** firm fixed effects (by using interaction of firmid with year), so this might increase precision of the result.

4. BIG PICTURE

a) Describe one additional potentially beneficial effect of bail-outs on the economy that cannot be measured with the type of regressions above?

Considering that financial system is integrated, bailouts decrease the systemic risk in the economy. It might be case that for some banks bailout did not increase the supply of lending, but overall bank bailouts during the crisis avoid the cost to spread the other sectors (like real sector) in the economy. In addition, bailouts decrease the panic among agents in the economy during the crisis, which is important to get out of the crisis.

```stata
*** Question1
by firmid bankid , sort: gen nvals = _n == 1
by firmid : replace nvals = sum(nvals)
by firmid : replace nvals = nvals[_N]
contract nvals
*** Question 2
reghdfe deltaLoan recap1 recap2 recap3 , absorb( firmid bankid year ) cluster (firmid)
reghdfe deltaLoan recap1 recap2 recap3 privateRecap , absorb( firmid bankid year ) cluster(firmid)
sum
keep if recap1==0
sum
keep if recap1==1
sum
*** Question 3
gen recap1_int= recap1* loanShare
gen recap2_int= recap2* loanShare
gen recap3_int= recap3* loanShare
gen privateRecap_int= privateRecap* loanShare
gen bidder_int= bidderBank* loanShare
gen target_int= targetBank* loanShare
reghdfe deltaLoan recap1_int recap2_int recap3_int privateRecap_int loanShare bidder_int target_int, absorb( firmid year bankid)
gen firmid_int_year= firmid* year
reghdfe deltaLoan recap1_int recap2_int recap3_int privateRecap_int loanShare bidder_int target_int, absorb( firmid_int_year bankid)
```