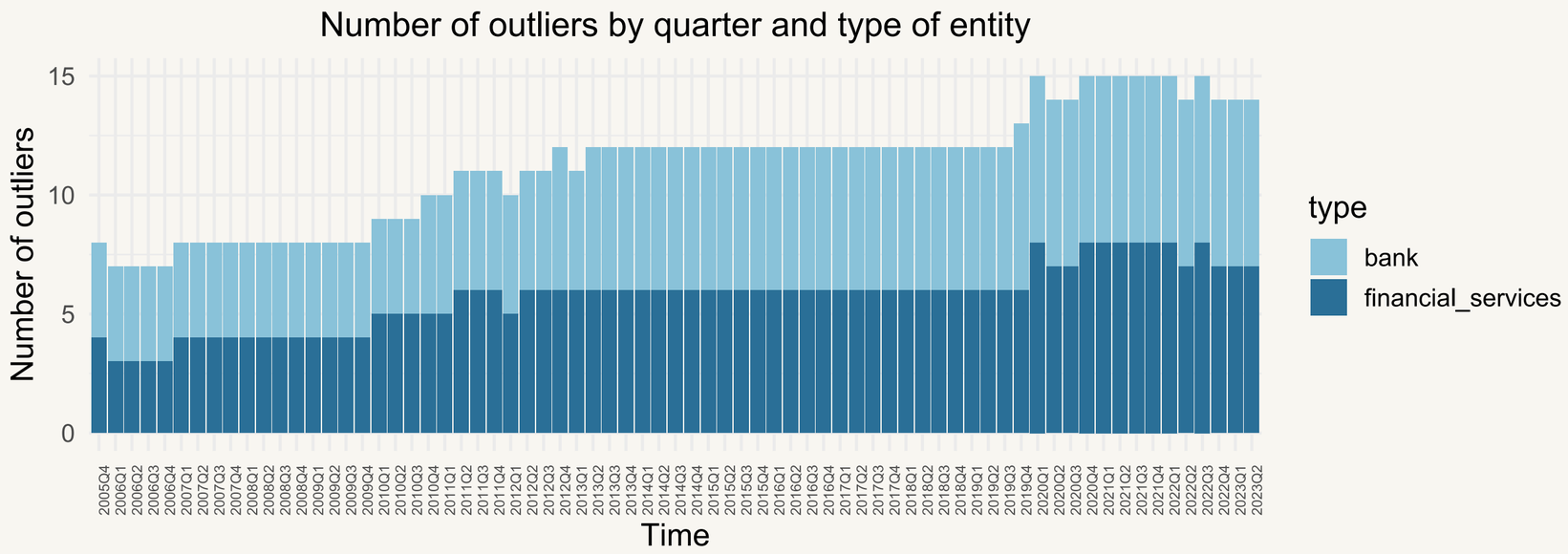
CYCLICAL BEHAVIOR OF FINANCIAL INSTITUTIONS

The US case

TABLE OF CONTENTS

DATA INSPECTION

PREPROCESSING



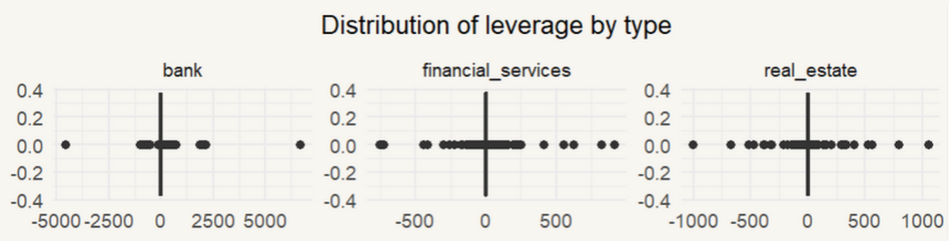
Windsorization of outliers:

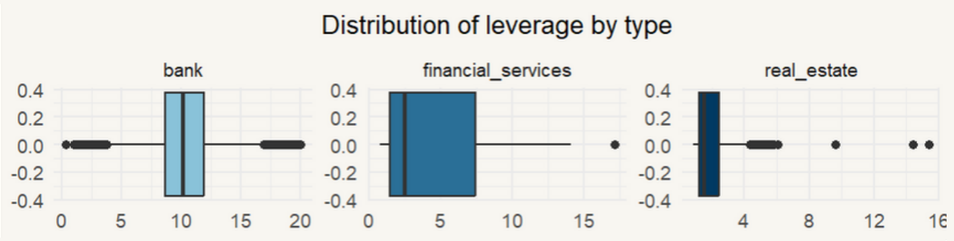
- Z-score
- 4 MAD from the median

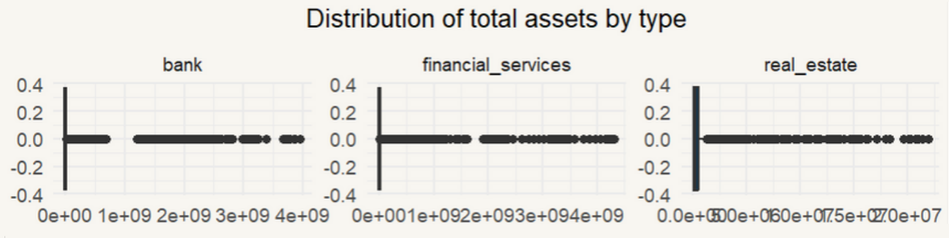
Missing values:

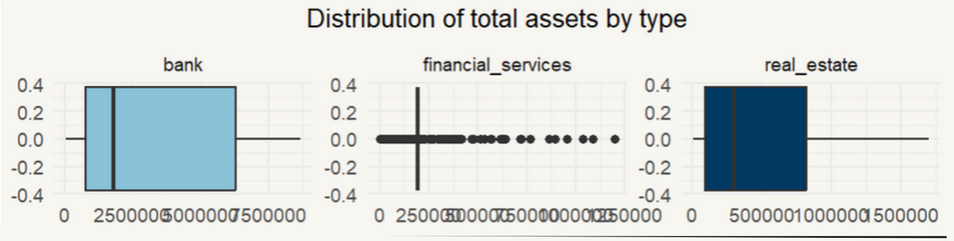
- Remove firms > 30% NA
- Imputation with KNN for cross-section variation
- Imputation with natural spline for time variation

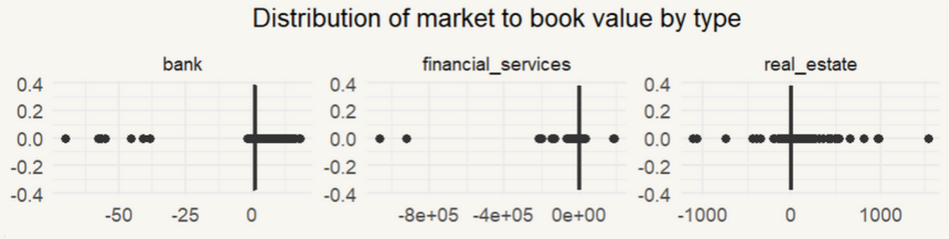
PREPROCESSING

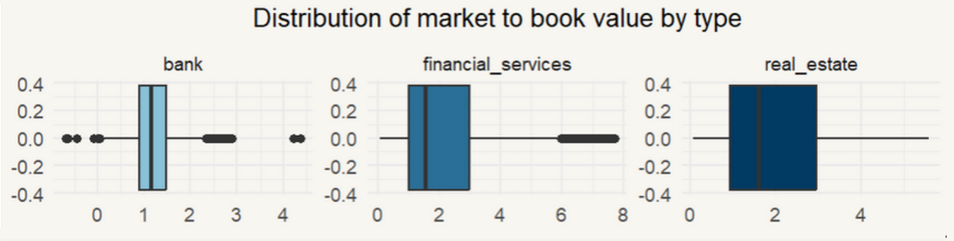


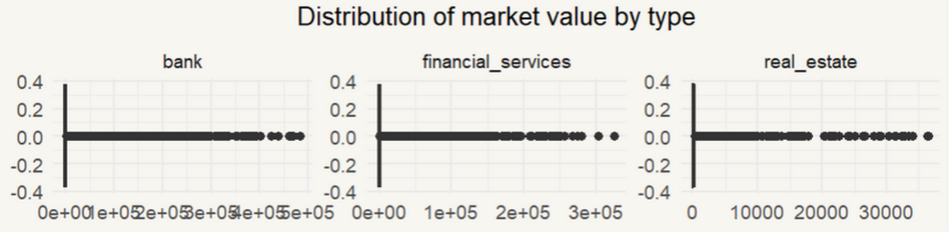


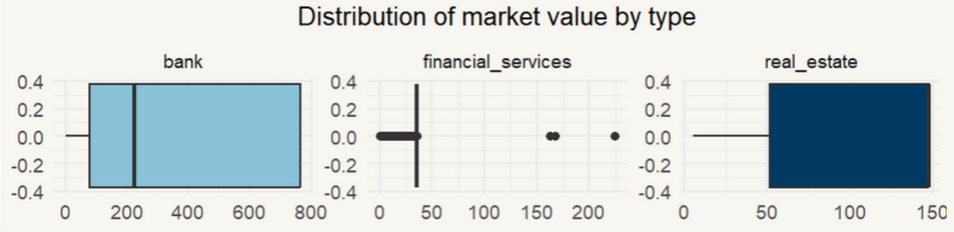


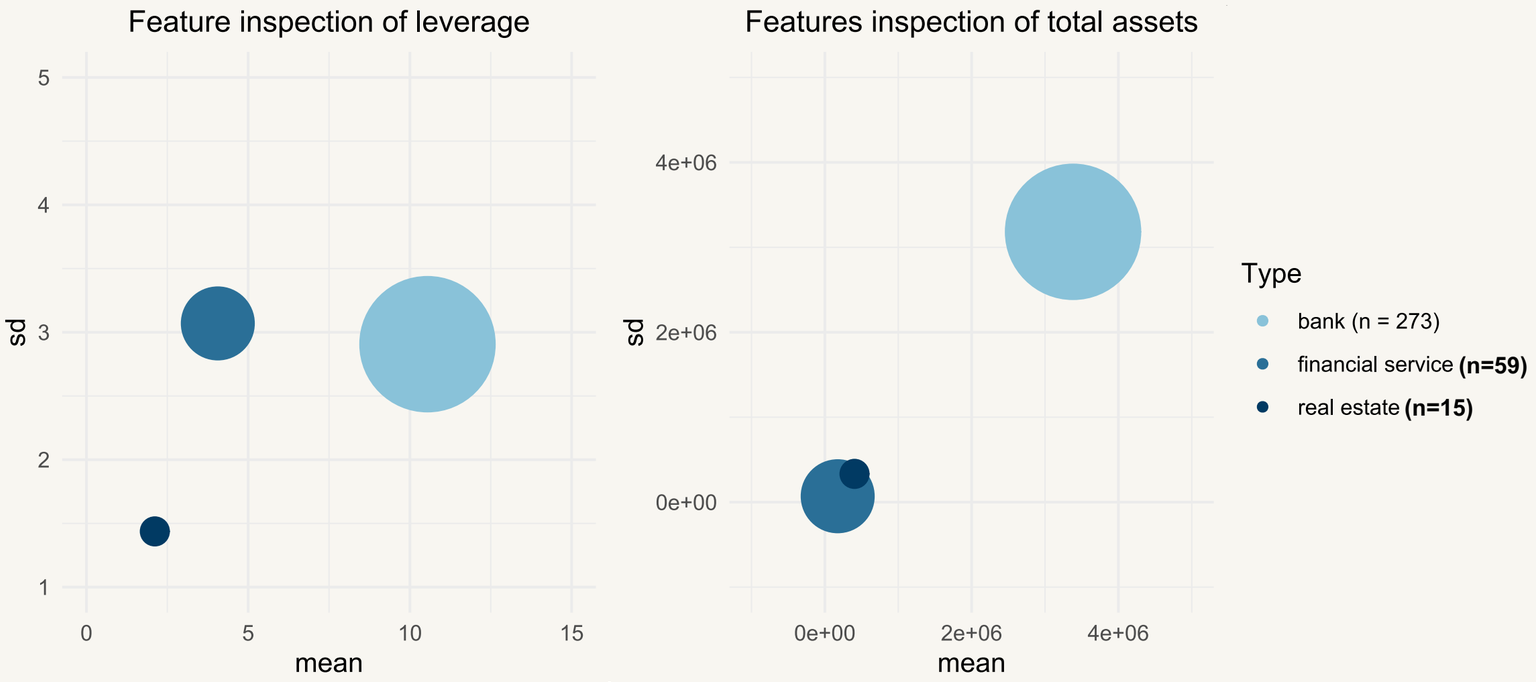






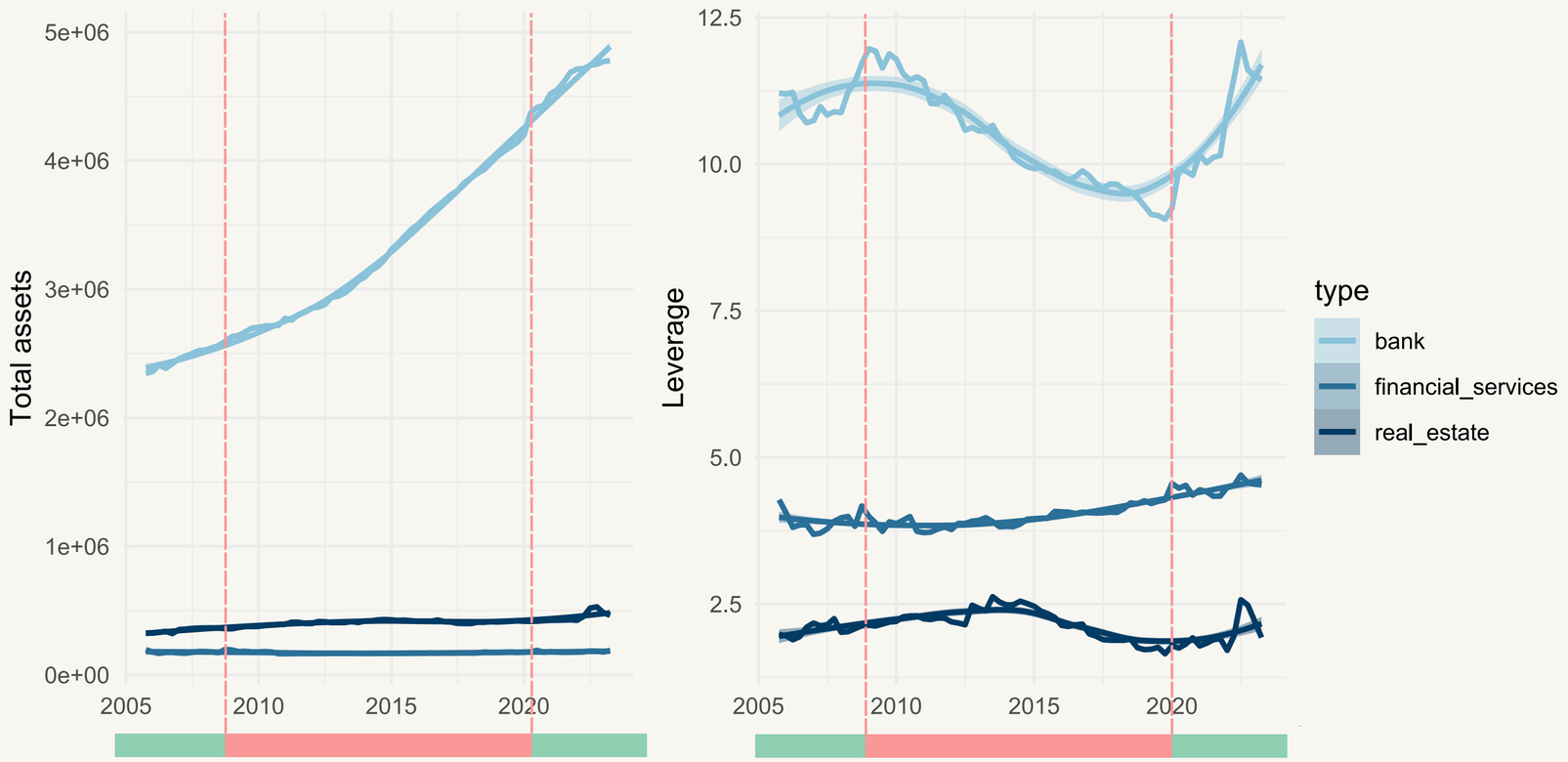






SUMMARY STATISTICS

- CBs are bigger and have higher leverage → lower solvency
- mean(lev) CB > 2*mean(lev) FS
  std(lev) CB = std(lev) FS
- Total assets: mean ↑ std ↑

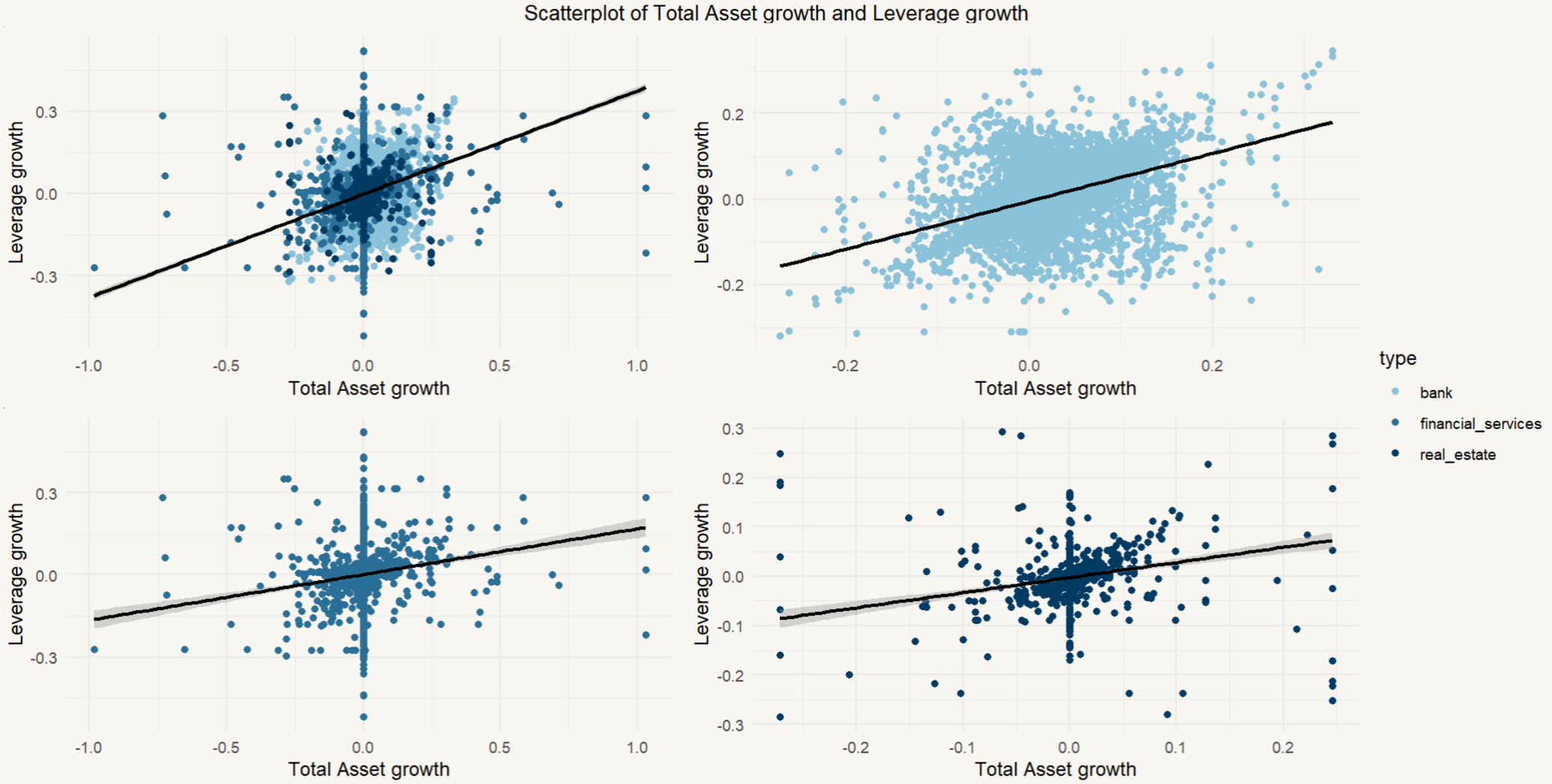


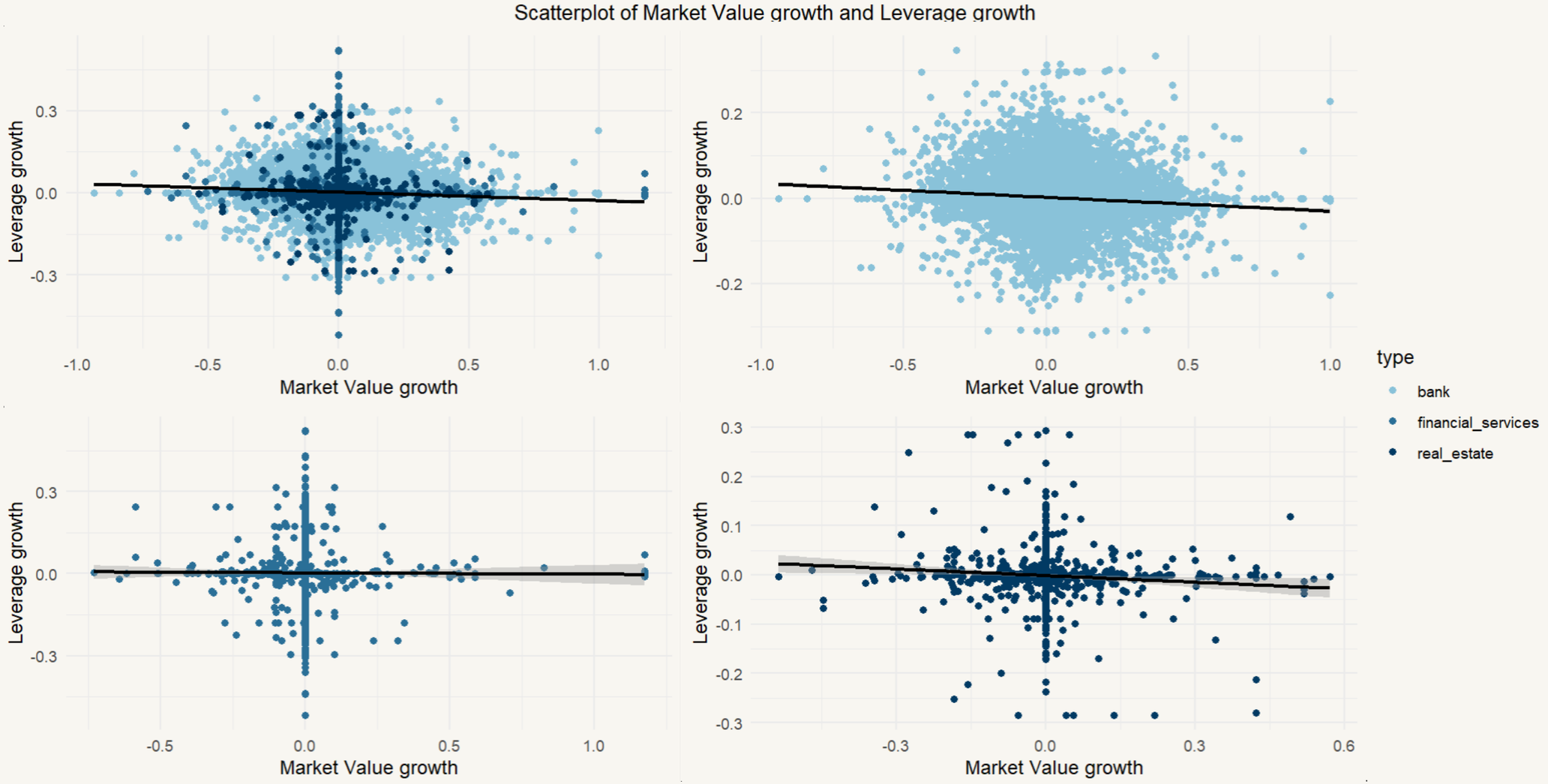
STYLIZED FACTS

FS e REF not relevant fluctuations

CB total assets (size) always increasing while leverage fluctuating:

- pro-cyclical before 2008 and after 2020
- counter-cyclical between 2008 and 2020
- pro-cyclical after 2020


Scatterplot of Total Asset growth and Leverage growth
Leverage growth
Total Asset growth
type
bank
financial_services
real_estate


Scatterplot of Market Value growth and Leverage growth
Leverage growth
Market Value growth
type
bank
financial_services
real_estate

LONG TIME PERIOD ANALYSIS

RESULTS

	Dependent variable:			
	$\Delta leverage_{i,t}$			
	(1)	(2)	(3)	(4)
$\Delta TotalAssets_{i,t}$	0.371***	0.370***		
	(0.076)	(0.076)		
$\Delta MarketValue_{i,t}$			-0.025***	-0.024***
			(0.004)	(0.004)
$(ln)Leverage_{i,t-1}$	-0.036***	-0.036***	-0.042***	-0.043***
	(0.005)	(0.005)	(0.005)	(0.005)
$MarketToBook_{i,t-1}$		0.002**		0.002***
		(0.001)		(0.001)
Entity FE	*YES*	*YES*	*YES*	*YES*
Time FE	*YES*	*YES*	*YES*	*YES*
Observations	24290	24290	24290	24290
R^2	0.123	0.123	0.036	0.037
Adjusted R^2	0.108	0.108	0.019	0.020
Note:			*p<0.1; **p<0.05; ***p<0.01	

ΔTotalAssetsi,t

- Statistically significant → **leverage procyclicality**

ΔMarketValuei,t

- Opposite sign w.r.t. ΔTotalAssetsi,t; if the market value of the entity increases, other things being equal, the leverage decreases by construction

(ln)Leveragei,t-1

- Statistically significantant
- Negative sign as expected

MarketToBooki,t-1

- Its inclusion doesn't affect the estimates

BY ENTITY AND SUBPERIOD

RESULTS

	Dependent variable:		
	$\Delta leverage_{i,t}$		
	(1)	(2)	(3)
$\Delta TotalAssets_{i,t}$	0.560***	0.368***	0.372***
	(0.034)	(0.048)	(0.047)
$\Delta TotalAssets*FSs_{i,t}$	-0.400***		
	(0.066)		
$\Delta TotalAssets*REs_{i,t}$	-0.278***		
	(0.056)		
$\Delta TotalAssets*GFC_{i,t}$		0.041	
		(0.068)	
$\Delta TotalAssets*MPE_{i,t}$		-0.070	
		(0.099)	
$\Delta TotalAssets*COV_{i,t}$		0.142	
		(0.098)	

	(1)	(2)	(3)
$\Delta TotalAssets*CBs*GFC_{i,t}$			0.282***
			(0.074)
$\Delta TotalAssets*CBs*MPE_{i,t}$			0.165***
			(0.058)
$\Delta TotalAssets*CBs*COV_{i,t}$			0.275***
			(0.076)
$\Delta TotalAssets*FSs*GFC_{i,t}$			-0.124***
			(0.047)
$\Delta TotalAssets*FSs*MPE_{i,t}$			-0.262***
			(0.097)
$\Delta TotalAssets*FSs*COV_{i,t}$			-0.178
			(0.199)
$\Delta TotalAssets*REs*GFC_{i,t}$			-0.419*
			(0.225)
$\Delta TotalAssets*REs*MPE_{i,t}$			-0.431
			(0.308)
$\Delta TotalAssets*REs*COV_{i,t}$			0.410**
			(0.178)

	(1)	(2)	(3)
GFC		0.006	0.005
		(0.005)	(0.005)
MPE		0.005	0.002
		(0.004)	(0.004)
COV		0.050***	0.050***
		(0.005)	(0.005)
$(ln)leverage_{i,t-1}$	0.002***	0.002**	0.002***
	(0.001)	(0.001)	(0.001)
$MarketToBook_{i,t-1}$	-0.035***	-0.036***	-0.036***
	(0.005)	(0.005)	(0.005)
Entity FE	*YES*	*YES*	*YES*
Time FE	*YES*	*YES*	*YES*
Observations	24290	24290	24290
R^2	0.148	0.177	0.198
Adjusted R^2	0.133	0.162	0.184
Note:		*p<0.1; **p<0.05; ***p<0.01	

BY ENTITY AND SUBPERIOD

RESULTS

Model (1) *by entity*

- Coefficient of TAs positive and statistically significant → **procyclicality of banks***
- Coefficients associated with the two interaction terms statistically significant, negative and smaller in absolute value w.r.t. the one of TAs → **pro-cyclicality in leverage characterizes financial institutions that are involved consistently in banking activity**

Model (2) *by subperiod*

- Coefficient of TA smaller w.r.t Model (1), still statistically significant
- Interaction terms → **no significant difference in procyclicality in the three subperiods we considered**

Model (3) *by entity and subperiods*

- **CBs always more procyclical than the baseline period** (especially during the GFC). All the coefficients statistically significant. **CBs have the most pronounced procyclicality behavior among all types of financial entities**
- FSs less procyclical, w.r.t. the baseline period, in the GFC and in the period of MPE. Coefficients statistically significant. No difference during the pandemic
- REFs register a weakly different behavior in procyclicality only in the MPE period.

Results are coeherent with what found in Model (1), and it is confirmed here for each subperiod as well.

**The baseline is the type "bank"*

CONCLUSIONS

- Strong empirical evidence of a procyclicality behavior for the entire time period
- CBs act more procyclically than FSs and REFs, as theory suggests
- Strong procyclicality of CBs suring the subperiods examined, and especially during the GFC