

# UP Paper

February 19, 2024

**Keywords:**

**JEL Codes:**

## **1 Introduction**

## **2 Literature Review**

Alexakis et al. (2023)

## **3 Data and Methodology**

Table 1: Descriptive Statistics

Series	Median	SD	Min	Max	IQR	Obs
Lending growth						
Three month change in log commercial mortgages to corporates and households	1.16	1.08	-1.43	3.81	1.67	153
Three month change in log household unsecured lending	1.43	2.49	-10.40	10.08	1.78	153
Three month change in log leasing and installments to corporates	1.32	1.48	-1.69	6.82	2.04	153
Three month change in log leasing and installments to households	1.15	1.29	-2.56	4.63	1.54	153
Three month change in log non-financial corporate unsecured lending	1.54	2.85	-9.17	8.04	3.58	153
Three month change in log residential mortgages to households	0.77	0.59	-0.78	2.33	0.73	153
Three month change in log total leasing and installments	1.30	1.12	-1.53	3.58	1.37	153
Three month change in log total mortgage lending	1.01	0.52	-0.11	1.96	0.65	153
Three month change in log total unsecured lending	1.55	2.20	-5.57	7.36	2.68	153
Lending rates						
Commercial mortgages to corporates and households rate	8.06	1.05	6.16	9.99	1.55	156
Household unsecured lending rate	14.17	2.63	4.78	15.67	2.19	156
Leasing and installements to corporate rate	9.40	0.84	7.05	10.46	1.38	156
Leasing and installments to households rate	10.63	0.96	8.85	11.91	2.06	156
Non financial corporate unsecured lending rate	7.26	0.75	6.02	8.48	1.28	156
Residential mortgages to household rate	8.64	1.24	6.78	10.28	2.27	156
Total leasing and installments rate	10.26	0.91	8.29	11.44	1.75	156
Total mortgages lending rate	8.40	1.17	6.59	10.19	1.99	156
Total unsecured lending rate	9.58	1.04	6.30	10.74	1.46	156
Macroprudential regulation narrative indices						
Draft Index	0	0.25	0	1	0	156
Implementation Index	0	0.27	0	1	0	156
Competition regulation narrative indices						
All credit entry entry index	0	0.29	0	1	0	156
All credit entry exit index	0	0.14	0	1	0	156
All entry index	0	0.40	0	1	0	156
All exit index	0	0.32	0	1	0	156
Commercial mortgages entry	0	0.11	0	1	0	156
Commercial mortgages exit	0	0.11	0	1	0	156
Corporate credit entry index	0	0.19	0	1	0	156
Corporate credit exit index	0	0.11	0	1	0	156
Corporate entry index	0	0.31	0	1	0	156
Corporate exit index	0	0.22	0	1	0	156
Corporate leasing entry index	0	0.08	0	1	0	156
Entry mortgages households index	0	0.08	0	1	0	156
Exit mortgages households index	0	0.11	0	1	0	156
Finance regulation index	0	0.29	0	1	0	156
Financial inclusion index	0	0.08	0	1	0	156
Household credit entry index	0	0.22	0	1	0	156
Household credit exit index	0	0.08	0	1	0	156
Household entry index	0	0.30	0	1	0	156
Household exit index	0	0.22	0	1	0	156
Household leasing entry index	0	0.08	0	1	0	156
Household leasing exit index	0	0.14	0	1	0	156
Other competition index	0	0.18	0	1	0	156
Controls						
Consumer confidence index	-8	10	-33	26	10	154
Repo rate	6	1	4	7	2	154
SAVIT40 index	18	4	13	38	5	154

## **4 Results**

### **4.1 Macroprudential regulation**

Table 2: Macroprudential regulations and lending volumes (3-months) results

	Total			Corporates			Households		
	Unsecured	Secured	Mortgages	Unsecured	Secured	Mortgages	Unsecured	Secured	Mortgages
Draft model									
Draft index	0.62	2.23**	-0.19***	0.41	0.89**	-0.41**	1.00**	3.11**	-0.16
Implementation model									
Implementation index	1.82***	0.51	-0.62**	2.33***	1.24*	-1.44**	0.62	-0.09	-0.27**
Num.Obs.	580	580	580	580	580	580	580	580	580
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01									

Table 3: Macroprudential regulation and lending rates

	Total			Corporates			Households		
	Unsecured	Secured	Mortgage	Unsecured	Secured	Mortgage	Unsecured	Secured	Mortgage
Draft model									
Draft index	0.38***	-0.39***	-0.50***	0.31***	-0.45***	-0.20	0.39**	-0.36***	-0.60***
Implementation model									
Implementation index	2.59***	-0.51***	-0.61**	2.30**	-0.73***	-0.77**	3.04***	-0.41***	-0.58**
Num.Obs.	580	580	580	580	580	580	580	580	580
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01									

## 4.2 Competition regulation

Table 4: Entry and exit effect on unsecured lending

	Rate	Volume
Corporates model		
All credit entry index	0.65**	0.21
All credit exit index	0.88**	-1.18***
Covid-19 dummy	-0.43*	-0.11
Households model		
All credit entry index	1.14***	-0.30***
All credit exit index	1.47***	-0.62***
Covid-19 dummy	-1.32***	-0.54***
Num.Obs.	768	768
Bank Fixed Effects	Yes	Yes
Monthly Fixed Effects	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01		

Table 5: Entry and exit effect on mortgages

	Rate	Volume
Corporates model		
Commercial mortgages entry index	-0.34**	-0.23**
Commercial mortgages exit index	-0.19	-0.11
Covid-19 dummy	-1.47**	-0.13
Households model		
Household mortgages entry index	-0.43***	-0.18***
Household mortgages exit index	0.06	-0.02
Covid-19 dummy	-1.93***	0.22**
Num.Obs.	768	768
Bank Fixed Effects	Yes	Yes
Monthly Fixed Effects	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01		



Table 6: Entry and exit effect on leasing and installments

	Rate	Volume
Corporates model		
Corporate leasing entry index	0.27	0.00
Covid-19 dummy	-1.75***	0.18**
Households model		
Household leasing entry index	-0.09	-0.26***
Household leasing exit index	-0.47***	0.62**
Covid-19 dummy	-1.55***	-0.18
Num.Obs.	768	768
Bank Fixed Effects	Yes	Yes
Monthly Fixed Effects	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01		

Table 7: Miscellaneous competition results

	Total					
	Unsecured Rate	Secured Rate	Mortgage Rate	Unsecured Lending	Secured Lending	Mortgage Lending
Financial inclusion model						
Financial inclusion index	-0.30***	0.21	-0.63***	2.16***	-1.94	-0.19
Covid-19 dummy	-0.66**	-1.57***	-1.84***	-0.28**	-0.01	0.09
Other competition developments model						
Other competition index	1.28***	-0.58***	-0.76***	1.05***	0.11	0.09*
Covid-19 dummy	-0.64**	-1.58***	-1.87***	-0.20	-0.06	0.09
Micro-regulations model						
Finance regulation index	0.99***	-0.18*	-0.31*	-0.36**	-0.10	-0.02
Covid-19 dummy	-0.62**	-1.58***	-1.87***	-0.24*	-0.06	0.09
Num.Obs.	768	768	768	768	768	768
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01						

## 5 Conclusion

## 6 References

Alexakis, C., Chantziaras, A., Economou, F., Eleftheriou, K., and Grose, C. (2023). Animal behavior in capital markets: Herding formation dynamics, trading volume, and the role of covid-19 pandemic. *The North American Journal of Economics and Finance*, 67:101946.

## A Appendix

### A.1 Data sources

Table A1: Data Sources

	Description	Availability	Source
Macroprudential narrative index		Public data	Own analysis
Competition narrative index		Public data	Own analysis
BA900	Banking sector balance sheet data at a bank level	Public data	South African Reserve Bank
		Aggregated data is public.	South African Reserve
BA930	Banking sector lending rates at a bank level	Bank specific data is private	Bank
		Aggregated data is public.	South African Reserve
Controls	Banking sector performance data at a bank level	Bank specific data is private	Prudential Authority

## A.2 Aggregation scheme

Table A2: Aggregation schema

BA 900 Categories	Item	Sector	Aggregation
	Number		Key
Installment sales	141	Financial corporate sector	-
	142	Non financial corporate sector	g
	143	Household sector	h
	144	Other	-
Leasing transactions	146	Financial corporate sector	-
	147	Non financial corporate sector	g
	148	Household sector	h
	149	Other	-
Farm mortgages	152	Non financial corporate sector	d
	153	Household sector	d
	154	Other	-
Residential mortgages	156	Non financial corporate sector	e
	157	Household sector	-
	158	Other	-
Commercial and other mortgages	160	Public financial corporates	-
	161	Public non-financial corporates	-
	162	Private financial corporate	d
	163	Private non-financial corporates	d
	164	Household sector	-
	165	Other	-
	166	Other	-
Credit cards	167	Financial corporate sector	a
	168	Non financial corporate sector	b
	169	Household sector	-
	170	Other	-
Overdrafts	171	Public sector (includes public corporations and local government)	-
	172	Public non-financial corporates	-
	173	Private financial corporate	-
	174	Private non-financial corporates	a
	175	Household sector	-
	176	Other Household sector	-
	177	Non-profit organisations serving households	b
Factoring debtors	187	Non-profit organisations serving households	-
Other loans and advances	189	Financial corporate sector	-
	190	Non financial corporate sector	a
	191	Unincorporated business enterprises	-
	192	Other Household sector	b
	193	Non-profit organisations serving households	-

The following aggregation scheme which results in nine categories was followed based on

Table A2:

- a. Non-financial corporate unsecured lending: Items  $168 + 183 + 190$
- b. Household unsecured lending: Items  $169 + 185 + 192$
- c. Total unsecured lending: Non-financial corporate unsecured lending + Household unsecured lending
- d. Commercial mortgages to corporates and households: Items  $152 + 153 + 156 + 163 + 164$
- e. Residential mortgages to household: Item 157
- f. Total mortgage lending: Commercial mortgages to corporates and households + Residential mortgages to household
- g. Leasing and instalments to corporates: Items  $142 + 147$
- h. Leasing and instalments to households: Items  $143 + 148$
- i. Total leasing and instalments: Leasing and instalments to corporates + Leasing and instalments to households

### A.3 Bank lending rates weighting scheme

The loans quantities from the BA900s are then linked to the lending rate data from the BA930s using table to create nine lending rate categories the schema on Table A3. The weights for each category are then calculated by dividing the total value of the loans in each category by the total value of all loans in the BA900s. The weights are then used to calculate the weighted average lending rate for each month. The weighted average lending rate is calculated by multiplying the lending rate for each category by the weight for that category and then summing the results.

Table A3: Weighting schema

Sector	BA 930 Categories	Item Number	Weighting Key
Corporate sector	Overdraft rate	48	a and c
	Instalment sale agreements flexible rate	49	g and i
	Instalment sale fixed rate	50	-
	Leasing transactions flexible rate	51	g and i
	Leasing transactions fixed rate	52	-
	Mortgage advances flexible rate	53	d and f
	Mortgage advances fixed rate	54	-
	Credit card rate	55	a and c
	Other	56	a and c
Household sector	Overdraft rate	58	b and c
	Instalment sale agreements flexible rate	59	h and i
	Instalment sale fixed rate	60	-
	Leasing transactions flexible rate	61	h and i
	Leasing transactions fixed rate	62	-
	Mortgage advances flexible rate	63	e and f
	Mortgage advances fixed rate	64	-
	Credit card rate	65	b and c
	Other	66	b and c

The nine categories, therefore, are as follows:

- Non-financial corporate unsecured lending: Weighted average of items 55 + 48 + 56
- Household unsecured lending: Weighted average of items 65 + 58 + 66
- Total unsecured lending: Weighted average of items 55 + 48 + 56 + 65 + 58 + 66
- Commercial mortgages to corporates and households: Weighted average of items 53
- Residential mortgages to household: Item 63
- Total mortgage lending: Weighted average of items 53 + 63



- g. Leasing and instalments to corporates: Weighted average of items 49 + 51
- h. Leasing and instalments to households: Weighted average of items 59 + 61
- i. Total leasing and instalments: Weighted average of items 49 + 51 + 59 + 61

## A.4 Aggregated bank lending

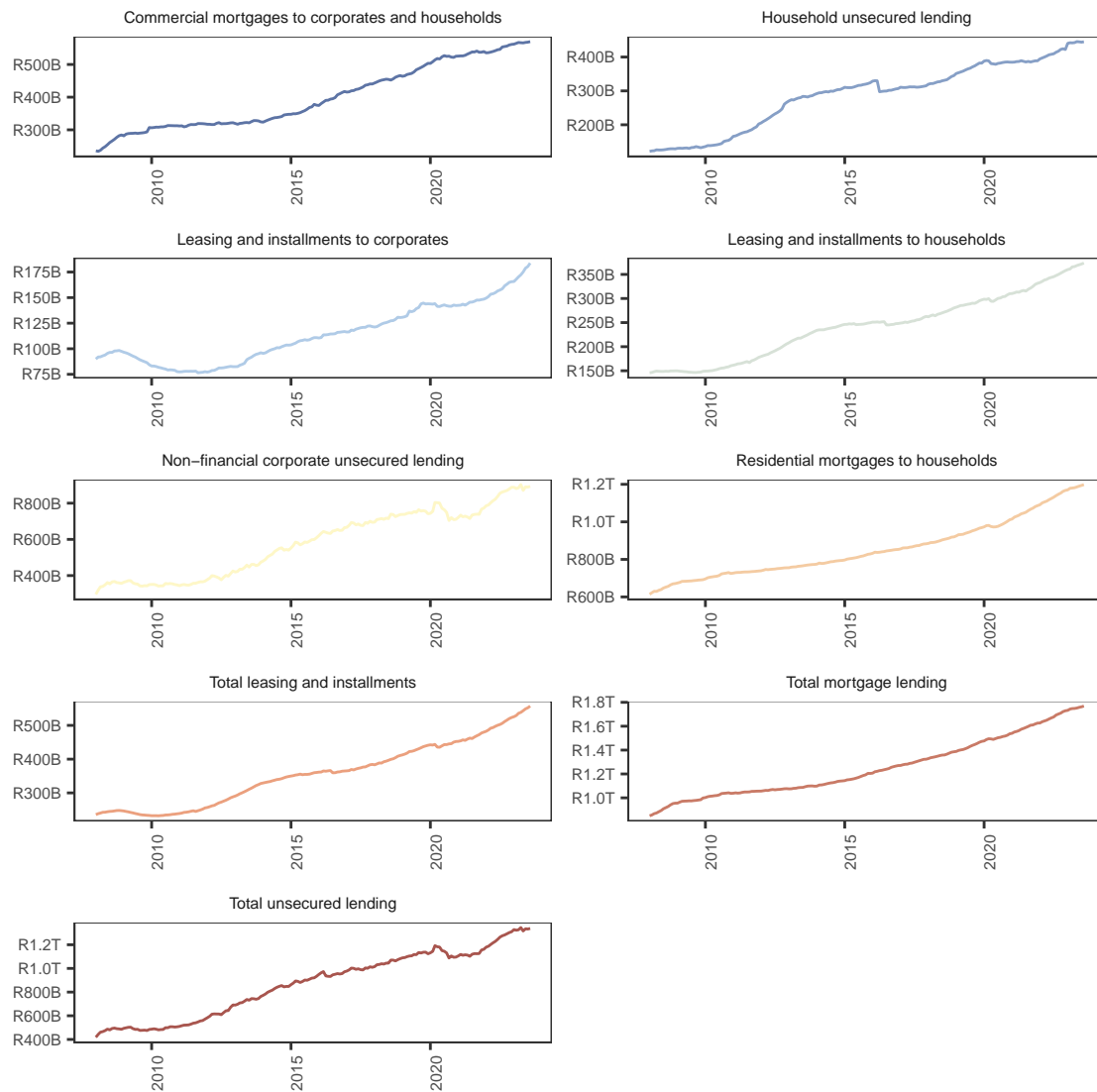


Figure A1: Total aggregated bank lending

## A.5 Weighted lending rates (aggregated)

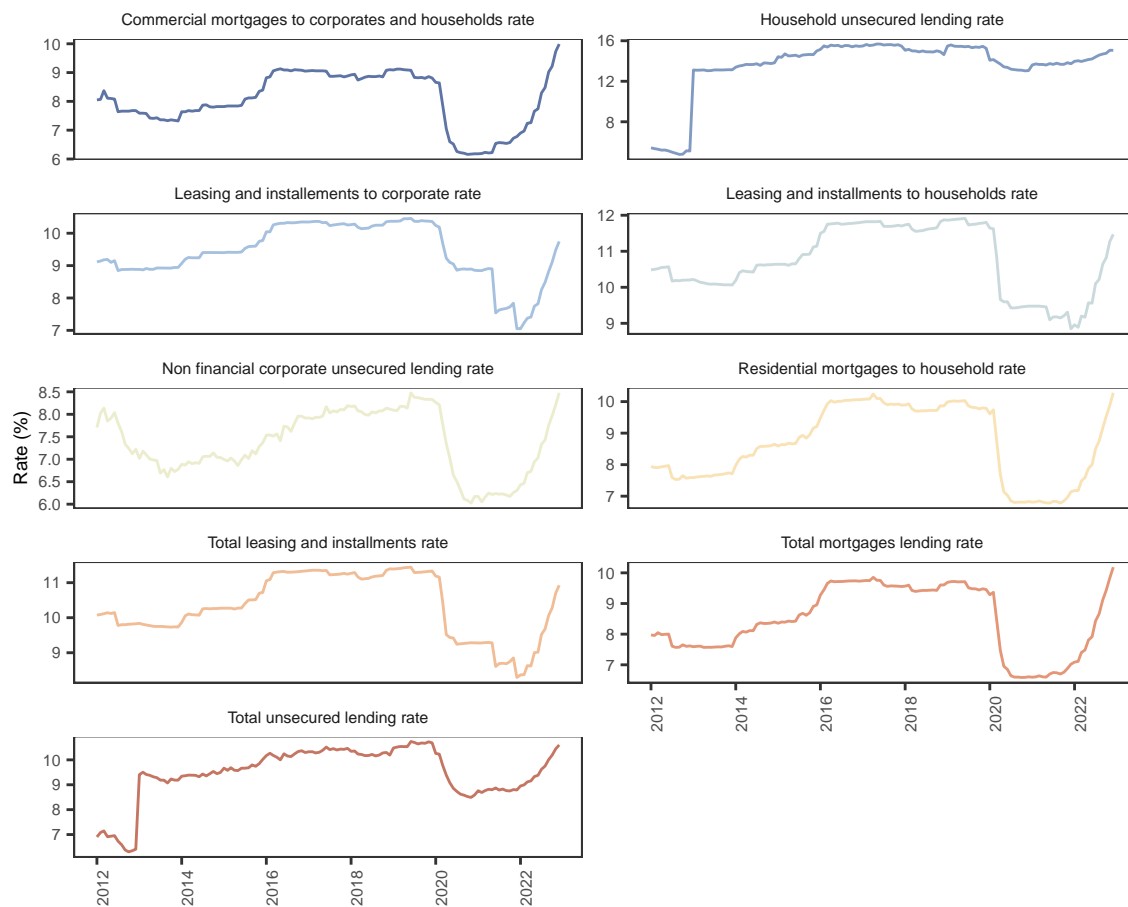


Figure A2: Weighted lending rates

## A.6 Description of narrative events

Table A4: Description of the narrative indexes

Index	Description
Macroprudential	The macroprudential narrative index
Competition	The competition narrative index

## A.7 Macroprudential narrative indexes

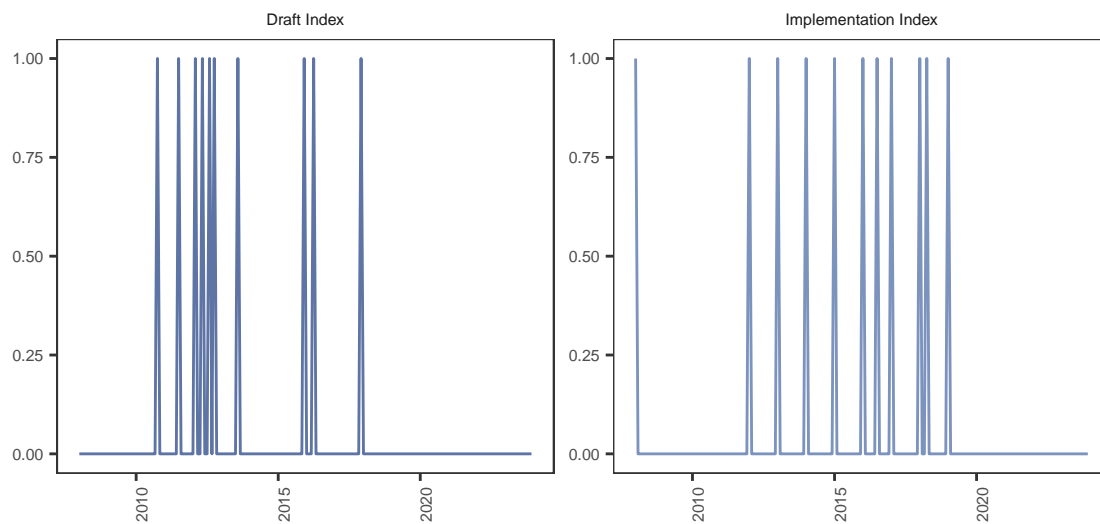


Figure A3: Macroprudential narrative indexes

## A.8 Competition narrative indexes

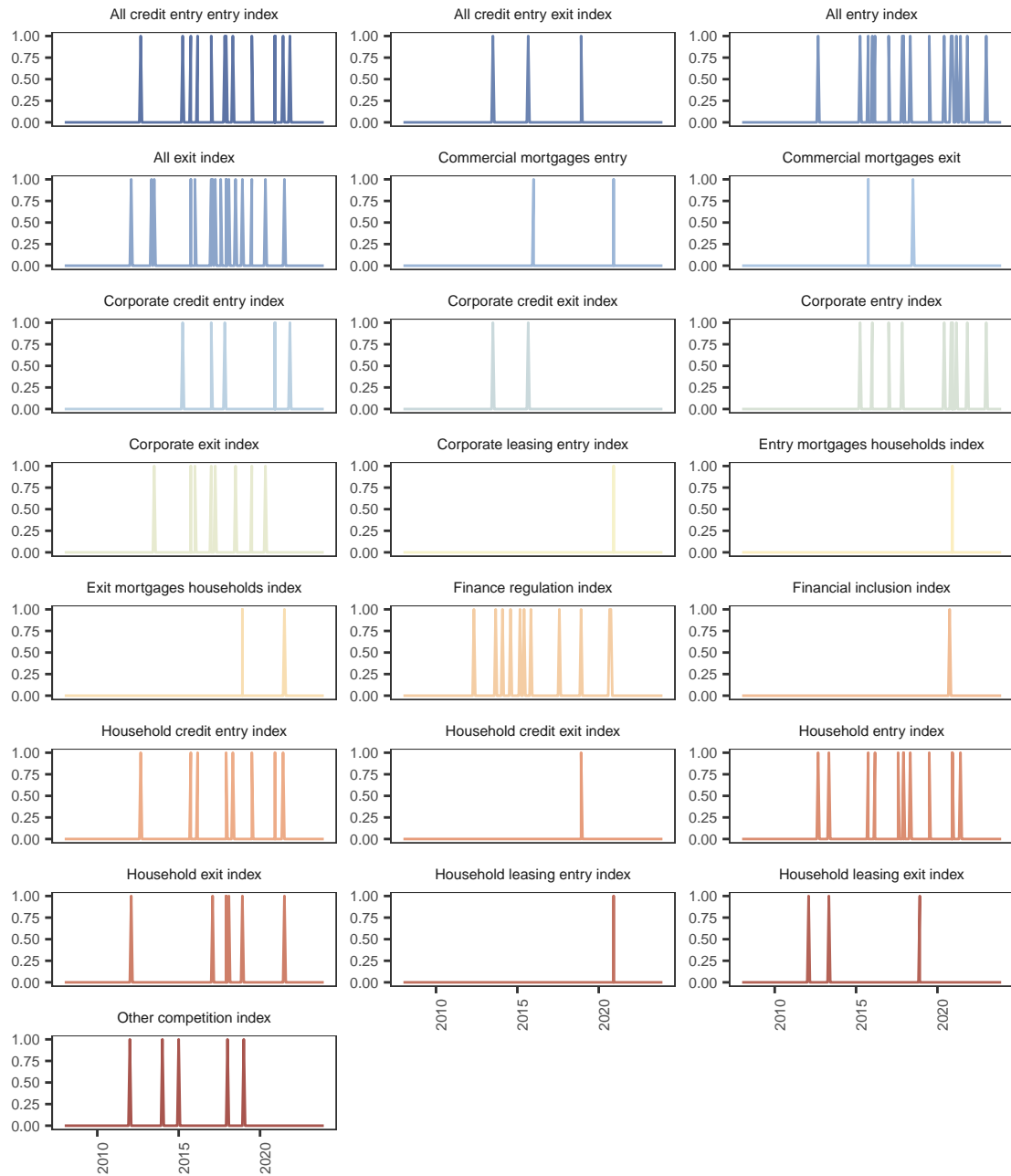


Figure A4: Competition narrative indexes

## A.9 Modelling variables description

Table A5: Variables description

Name	Type	Description	Sample	Frequency
Macroprudential	Index	The macroprudential narrative index	All banks	Quarterly
Competition	Index	The competition narrative index	All banks	Quarterly

## **A.10 Macropudential results with controls**



Table A6: Macroprudential regulations and lending volumes (3-months) with controls results

	Total			Corporates			Households		
	Unsecured	Secured	Mortgages	Unsecured	Secured	Mortgages	Unsecured	Secured	Mortgages
Draft model									
Draft index	0.64	2.28**	-0.19**	0.42	0.89**	-0.38	1.03**	3.18*	-0.15
Return on assets	104.98	-413.87	-86.66	149.74	250.40**	-210.20	-61.27	-786.53	-33.17
Total capital adequacy ratio	23.32	27.84	3.52	18.53	14.14	20.13	35.24	36.15	0.10
Implementation model									
Implementation index	1.52***	1.19	-0.49**	1.98***	0.69	-1.18**	0.55	1.29	-0.21*
Return on assets	87.24	-425.50	-80.94	126.16	243.17**	-196.31	-66.63	-798.14	-30.83
Total capital adequacy ratio	21.36	25.32	4.14	16.20	12.92	21.59	34.09	33.05	0.40
Num.Obs.	580	580	580	580	580	580	580	580	580
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01									

Table A7: Macroprudential regulation and lending rates with controls

	Total			Corporations			Households		
	Unsecured	Secured	Mortgage	Unsecured	Secured	Mortgage	Unsecured	Secured	Mortgage
Draft model									
Draft index	0.41*	-0.38***	-0.47***	0.36	-0.44***	-0.18	0.39**	-0.35***	-0.57***
Return on assets	584.54***	-79.07*	-121.05	515.32***	-107.26	-112.38	601.51***	-64.31**	-128.11
Total capital adequacy ratio	71.38**	5.00	17.84	83.98**	2.97	11.83	39.13**	5.72	20.87
Implementation model									
Implementation index	1.05***	-0.40***	-0.49***	0.80	-0.56***	-0.64***	1.67***	-0.33**	-0.47***
Return on assets	572.34***	-74.68**	-115.69	506.04***	-101.03	-104.79	581.66***	-60.70**	-123.16
Total capital adequacy ratio	70.05**	5.63	18.61	82.93**	3.81	12.61	37.14**	6.27	21.67
Num.Obs.	580	580	580	580	580	580	580	580	580
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01									

## A.11 Competition results with controls

Table A8: Entry and exit effect on unsecured lending with controls

	Rate	Volume
Corporation estimates		
All credit entry index	-0.03	0.27
All credit exit index	-0.13**	-1.68***
Covid-19 dummy	0.31	0.09
Repo rate	0.58**	-0.33*
Consumer confidence index	0.01***	0.03***
Return on assets	62.83	214.51***
SAVIT40 index	0.00	0.09***
Households estimates		
All credit entry index	0.05	-0.29***
All credit exit index	-0.16**	-0.34*
Covid-19 dummy	-1.69**	-1.37***
Repo rate	0.57***	-0.27**
Consumer confidence index	0.00	0.01**
Return on assets	-52.93	-59.41
SAVIT40 index	-0.01	0.03***
Num.Obs.	604	604
Bank Fixed Effects	Yes	Yes
Monthly Fixed Effects	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01		

Table A9: Entry and exit effect on mortgages with controls

	Rate	Volume
Corporation estimates		
Commercial mortgages entry index	0.02	-0.23***
Commercial mortgages exit index	-0.10	-0.13
Covid-19 dummy	0.61*	0.32**
Repo rate	0.01	0.00
Consumer confidence index	159.03	-49.45
Return on assets	0.00	0.00
SAVIT40 index	0.85*	0.35
Households estimates		
Household mortgages entry index	-0.04**	-0.17***
Houehold mortgages entry index	0.07	-0.04
Covid-19 dummy	1.25***	0.08
Repo rate	0.01***	0.00**
Consumer confidence index	-25.23**	2.09
Return on assets	-0.02***	-0.01***
SAVIT40 index	0.91***	0.48***
Num.Obs.	604	604
Bank Fixed Effects	Yes	Yes
Monthly Fixed Effects	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01		

Table A10: Entry and exit effect on leasing and installments with controls

	Rate	Volume
Corporation estimates		
Corporate leasing entry index	0.16	0.04
Covid-19 dummy	-0.75	-0.48***
Repo rate	0.79***	-0.22**
Consumer confidence index	0.00	0.00
Return on assets	-184.38	27.03
SAVIT40 index	0.01	0.00
Households estimates		
Household leasing entry index	0.04	-0.31***
Household leasing exit index	0.03	0.53***
Covid-19 dummy	-0.12	-0.40
Repo rate	0.78***	-0.25**
Consumer confidence index	0.00**	0.01**
Return on assets	-85.21	6.74
SAVIT40 index	-0.01	0.00
Num.Obs.	604	604
Bank Fixed Effects	Yes	Yes
Monthly Fixed Effects	Yes	Yes
* p < 0.1, ** p < 0.05, *** p < 0.01		

Table A11: Miscellaneous competition results with controls

	Total					
	Unsecured Rate	Secured Rate	Mortgage Rate	Unsecured Lending	Secured Lending	Mortgage Lending
Financial inclusion estimates						
Financial inclusion index	0.21*	0.33***	0.11***	2.61***	-0.34	-0.08
Covid-19 dummy	-0.41	-0.29	0.87***	-0.15	-0.44*	0.34*
Repo rate	0.45**	0.78***	1.08***	-0.28*	-0.23***	0.11**
Consumer confidence index	0.01*	0.00	0.01***	0.02***	0.01**	0.00
Return on assets	58.02	-118.63	29.13	147.08***	10.34	-7.19
SAVIT40 index	-0.01	0.00	-0.02***	0.04***	0.00	0.00
Other competition developments estimates						
Other competition index	0.05	-0.04	-0.01	0.57	-0.12	0.19***
Covid-19 dummy	-0.42	-0.30	0.87***	-0.20	-0.44*	0.35*
Repo rate	0.45*	0.78***	1.08***	-0.28**	-0.23***	0.12**
Consumer confidence index	0.00*	0.00	0.01***	0.02***	0.01**	0.00
Return on assets	57.07	-120.25	28.61	135.16***	11.86	-6.60
SAVIT40 index	-0.01	0.00	-0.02***	0.05***	0.00	-0.01
Micro-regulations estimates						
Finance regulation index	0.00	0.03	0.00	-0.58***	-0.14*	0.01
Covid-19 dummy	-0.42	-0.29	0.87***	-0.38	-0.47*	0.34*
Repo rate	0.45*	0.78***	1.08***	-0.31**	-0.23***	0.12**
Consumer confidence index	0.01*	0.00	0.01***	0.02***	0.01**	0.00
Return on assets	57.00	-120.10	28.60	132.57***	11.50	-6.77
SAVIT40 index	-0.01	0.00	-0.02***	0.06***	0.00	-0.01
Num.Obs.	604	604	604	604	604	604
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Monthly Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01