# Introduction

# Literature Review

Alexakis et al. ([2023](#ref-alexakis2023animal))

# Data and Methodology

# Results

## Macroprudential regulation and lending

|  | total\_unsecured\_lending\_rate | total\_leasing\_and\_installments\_rate | total\_mortgages\_lending\_rate | non\_financial\_corporate\_unsecured\_lending\_rate | leasing\_and\_installements\_to\_corporate\_rate | commercial\_mortgages\_to\_corporates\_and\_households\_rate | household\_unsecured\_lending\_rate | leasing\_and\_installments\_to\_households\_rate | residential\_mortgages\_to\_household\_rate |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| draft | 0.82\*\*\* | -0.04 | -0.05 | 0.68\*\*\* | -0.12 | 0.11 | 1.01\*\*\* | 0.00 | -0.12 |
|  | (0.16) | (0.28) | (0.42) | (0.12) | (0.27) | (0.42) | (0.30) | (0.29) | (0.45) |
| factor(banks)Absa Bank | 9.24\*\*\* | 10.35\*\*\* | 8.24\*\*\* | 7.00\*\*\* | 10.00\*\*\* | 5.70\*\*\* | 13.64\*\*\* | 10.51\*\*\* | 9.06\*\*\* |
|  | (0.28) | (0.53) | (0.27) | (0.28) | (0.56) | (0.38) | (0.49) | (0.52) | (0.35) |
| factor(banks)FNB | 8.87\*\*\* | 10.83\*\*\* | 9.30\*\*\* | 7.34\*\*\* | 10.16\*\*\* | 9.21\*\*\* | 12.41\*\*\* | 11.08\*\*\* | 9.32\*\*\* |
|  | (0.85) | (0.32) | (0.38) | (0.78) | (0.36) | (0.37) | (0.75) | (0.30) | (0.40) |
| factor(banks)Nedbank | 8.44\*\*\* | 11.38\*\*\* | 9.60\*\*\* | 7.12\*\*\* | 10.10\*\*\* | 9.56\*\*\* | 12.60\*\*\* | 11.69\*\*\* | 9.65\*\*\* |
|  | (0.70) | (0.22) | (0.61) | (0.52) | (0.37) | (0.65) | (1.17) | (0.22) | (0.57) |
| factor(banks)Standard Bank | 9.25\*\*\* | 10.93\*\*\* | 9.45\*\*\* | 7.14\*\*\* | 10.18\*\*\* | 9.21\*\*\* | 13.77\*\*\* | 11.81\*\*\* | 9.51\*\*\* |
|  | (1.13) | (0.32) | (0.36) | (1.11) | (0.40) | (0.47) | (0.80) | (0.27) | (0.36) |
| factor(month)2 | -0.24\*\*\* | -0.03 | -0.08\*\* | -0.21\*\* | -0.02 | -0.07+ | -0.25\*\* | -0.06+ | -0.07+ |
|  | (0.06) | (0.04) | (0.03) | (0.08) | (0.05) | (0.04) | (0.08) | (0.04) | (0.04) |
| factor(month)3 | -0.15\*\* | -0.07\* | -0.12\* | -0.06 | -0.07+ | -0.12\* | -0.23\* | -0.09\* | -0.12\* |
|  | (0.05) | (0.03) | (0.05) | (0.05) | (0.04) | (0.05) | (0.11) | (0.04) | (0.05) |
| factor(month)4 | -0.39\*\*\* | -0.16\* | -0.22\*\* | -0.26\*\*\* | -0.10 | -0.19\* | -0.56\*\*\* | -0.21\* | -0.22\*\* |
|  | (0.08) | (0.08) | (0.07) | (0.06) | (0.07) | (0.08) | (0.16) | (0.09) | (0.08) |
| factor(month)5 | -0.36\*\*\* | -0.20\*\* | -0.27\*\* | -0.24\*\*\* | -0.18\* | -0.27\* | -0.53\*\* | -0.20\* | -0.27\*\* |
|  | (0.09) | (0.08) | (0.09) | (0.07) | (0.08) | (0.11) | (0.20) | (0.08) | (0.10) |
| factor(month)6 | -0.31\*\*\* | -0.23\*\* | -0.26\*\*\* | -0.20\*\* | -0.27\* | -0.18+ | -0.49\* | -0.20\*\* | -0.29\*\*\* |
|  | (0.08) | (0.08) | (0.07) | (0.07) | (0.12) | (0.09) | (0.20) | (0.07) | (0.08) |
| factor(month)7 | -0.28\*\* | -0.18\* | -0.11 | -0.15\* | -0.22\* | -0.22\* | -0.50\* | -0.16\* | -0.09 |
|  | (0.10) | (0.08) | (0.10) | (0.07) | (0.11) | (0.11) | (0.20) | (0.08) | (0.11) |
| factor(month)8 | -0.30\*\* | -0.20\* | -0.20+ | -0.17\* | -0.23+ | -0.21+ | -0.46+ | -0.18+ | -0.20+ |
|  | (0.09) | (0.10) | (0.11) | (0.07) | (0.13) | (0.12) | (0.24) | (0.09) | (0.11) |
| factor(month)9 | -0.38\*\*\* | -0.22\* | -0.26\*\* | -0.27\*\* | -0.26\* | -0.29\* | -0.56\* | -0.19\* | -0.26\*\* |
|  | (0.10) | (0.09) | (0.09) | (0.09) | (0.12) | (0.11) | (0.22) | (0.08) | (0.09) |
| factor(month)10 | -0.33\*\*\* | -0.22\* | -0.24\* | -0.24\*\*\* | -0.27\* | -0.26\* | -0.46\* | -0.19+ | -0.23\* |
|  | (0.08) | (0.10) | (0.11) | (0.07) | (0.12) | (0.13) | (0.22) | (0.10) | (0.12) |
| factor(month)11 | -0.41\*\* | -0.18\* | -0.20\* | -0.26\*\* | -0.23+ | -0.14 | -0.67\* | -0.16\* | -0.20\* |
|  | (0.13) | (0.09) | (0.09) | (0.10) | (0.13) | (0.11) | (0.28) | (0.08) | (0.10) |
| factor(month)12 | -0.36\*\* | -0.63\* | -1.09\*\*\* | -0.22\* | -0.61\* | -1.11\*\*\* | -0.77\*\* | -0.67\* | -1.05\*\*\* |
|  | (0.12) | (0.28) | (0.30) | (0.09) | (0.30) | (0.30) | (0.25) | (0.30) | (0.31) |
| Num.Obs. | 816 | 816 | 816 | 816 | 816 | 816 | 816 | 816 | 816 |
| + p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001 | | | | | | | | | |

**?(caption)**

|  | total\_unsecured\_lending\_rate | total\_leasing\_and\_installments\_rate | total\_mortgages\_lending\_rate | non\_financial\_corporate\_unsecured\_lending\_rate | leasing\_and\_installements\_to\_corporate\_rate | commercial\_mortgages\_to\_corporates\_and\_households\_rate | household\_unsecured\_lending\_rate | leasing\_and\_installments\_to\_households\_rate | residential\_mortgages\_to\_household\_rate |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| implementation | 2.31\*\*\* | 0.25 | 0.29 | 1.96\*\* | 0.16 | 0.03 | 2.94\*\*\* | 0.31 | 0.34 |
|  | (0.56) | (0.31) | (0.39) | (0.70) | (0.36) | (0.44) | (0.40) | (0.30) | (0.39) |
| factor(banks)Absa Bank | 7.74\*\*\* | 10.19\*\*\* | 8.06\*\*\* | 5.73\*\*\* | 9.89\*\*\* | 5.68\*\*\* | 11.74\*\*\* | 10.31\*\*\* | 8.84\*\*\* |
|  | (0.48) | (0.64) | (0.36) | (0.54) | (0.69) | (0.41) | (0.56) | (0.62) | (0.42) |
| factor(banks)FNB | 7.37\*\*\* | 10.67\*\*\* | 9.12\*\*\* | 6.07\*\*\* | 10.05\*\*\* | 9.19\*\*\* | 10.51\*\*\* | 10.88\*\*\* | 9.10\*\*\* |
|  | (1.11) | (0.33) | (0.39) | (1.11) | (0.34) | (0.44) | (0.83) | (0.32) | (0.40) |
| factor(banks)Nedbank | 6.94\*\*\* | 11.22\*\*\* | 9.42\*\*\* | 5.85\*\*\* | 9.99\*\*\* | 9.54\*\*\* | 10.70\*\*\* | 11.49\*\*\* | 9.44\*\*\* |
|  | (0.80) | (0.31) | (0.77) | (0.66) | (0.51) | (0.82) | (1.25) | (0.31) | (0.72) |
| factor(banks)Standard Bank | 7.75\*\*\* | 10.76\*\*\* | 9.26\*\*\* | 5.87\*\*\* | 10.07\*\*\* | 9.19\*\*\* | 11.87\*\*\* | 11.61\*\*\* | 9.30\*\*\* |
|  | (1.35) | (0.30) | (0.42) | (1.44) | (0.38) | (0.55) | (0.82) | (0.26) | (0.40) |
| factor(month)2 | 1.31\*\*\* | 0.13 | 0.10 | 1.11\*\* | 0.08 | -0.04 | 1.72\*\*\* | 0.14 | 0.14 |
|  | (0.34) | (0.18) | (0.26) | (0.39) | (0.21) | (0.28) | (0.31) | (0.18) | (0.25) |
| factor(month)3 | 1.35\*\*\* | 0.09 | 0.06 | 1.21\*\* | 0.04 | -0.10 | 1.67\*\*\* | 0.11 | 0.09 |
|  | (0.36) | (0.19) | (0.25) | (0.41) | (0.22) | (0.26) | (0.37) | (0.18) | (0.25) |
| factor(month)4 | 1.01\*\* | -0.02 | -0.06 | 0.93\* | -0.01 | -0.16 | 1.22\*\* | -0.03 | -0.04 |
|  | (0.32) | (0.13) | (0.19) | (0.37) | (0.17) | (0.21) | (0.39) | (0.12) | (0.18) |
| factor(month)5 | 1.19\*\*\* | -0.04 | -0.09 | 1.07\*\* | -0.08 | -0.24 | 1.44\*\*\* | 0.01 | -0.06 |
|  | (0.34) | (0.17) | (0.20) | (0.40) | (0.20) | (0.23) | (0.39) | (0.16) | (0.21) |
| factor(month)6 | 1.18\*\*\* | -0.07 | -0.08 | 1.07\*\* | -0.17 | -0.16 | 1.41\*\*\* | 0.01 | -0.07 |
|  | (0.32) | (0.16) | (0.20) | (0.39) | (0.18) | (0.21) | (0.39) | (0.16) | (0.20) |
| factor(month)7 | 1.12\*\*\* | -0.04 | 0.05 | 1.04\*\* | -0.13 | -0.20 | 1.28\*\*\* | 0.02 | 0.10 |
|  | (0.26) | (0.16) | (0.17) | (0.35) | (0.18) | (0.21) | (0.30) | (0.16) | (0.16) |
| factor(month)8 | 1.30\*\*\* | -0.04 | -0.03 | 1.18\*\* | -0.14 | -0.18 | 1.57\*\*\* | 0.02 | 0.00 |
|  | (0.32) | (0.19) | (0.21) | (0.39) | (0.21) | (0.22) | (0.38) | (0.19) | (0.22) |
| factor(month)9 | 1.12\*\*\* | -0.05 | -0.08 | 1.00\*\* | -0.15 | -0.27 | 1.34\*\*\* | 0.01 | -0.04 |
|  | (0.29) | (0.17) | (0.20) | (0.36) | (0.20) | (0.24) | (0.37) | (0.17) | (0.20) |
| factor(month)10 | 1.27\*\*\* | -0.07 | -0.06 | 1.10\*\* | -0.18 | -0.23 | 1.56\*\*\* | 0.01 | -0.03 |
|  | (0.31) | (0.20) | (0.21) | (0.40) | (0.22) | (0.23) | (0.37) | (0.19) | (0.22) |
| factor(month)11 | 1.09\*\*\* | -0.02 | -0.01 | 1.01\*\* | -0.13 | -0.12 | 1.24\*\* | 0.04 | 0.02 |
|  | (0.25) | (0.21) | (0.21) | (0.34) | (0.23) | (0.22) | (0.39) | (0.20) | (0.22) |
| factor(month)12 | 1.24\*\* | -0.48+ | -0.91\*\* | 1.14\* | -0.52 | -1.07\*\*\* | 1.26\*\*\* | -0.47+ | -0.85\*\* |
|  | (0.40) | (0.27) | (0.28) | (0.46) | (0.33) | (0.28) | (0.35) | (0.28) | (0.29) |
| Num.Obs. | 816 | 816 | 816 | 816 | 816 | 816 | 816 | 816 | 816 |
| + p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001 | | | | | | | | | |

**?(caption)**

## Competition regulation and lending

|  | non\_financial\_corporate\_unsecured\_lending\_rate |
| --- | --- |
| entry\_credit\_non\_fin\_dummy | 0.77\* |
|  | (0.30) |
| exit\_credit\_non\_fin\_dummy | 1.16\* |
|  | (0.45) |
| factor(banks)Absa Bank | 6.95\*\*\* |
|  | (0.32) |
| factor(banks)FNB | 7.30\*\*\* |
|  | (0.82) |
| factor(banks)Nedbank | 7.07\*\*\* |
|  | (0.55) |
| factor(banks)Standard Bank | 7.09\*\*\* |
|  | (1.19) |
| factor(month)2 | -0.12+ |
|  | (0.06) |
| factor(month)3 | -0.06 |
|  | (0.05) |
| factor(month)4 | -0.22\*\*\* |
|  | (0.06) |
| factor(month)5 | -0.20\*\* |
|  | (0.07) |
| factor(month)6 | -0.21\*\* |
|  | (0.08) |
| factor(month)7 | -0.19+ |
|  | (0.09) |
| factor(month)8 | -0.04 |
|  | (0.06) |
| factor(month)9 | -0.35\*\* |
|  | (0.12) |
| factor(month)10 | -0.16\* |
|  | (0.07) |
| factor(month)11 | -0.32\* |
|  | (0.13) |
| factor(month)12 | -0.22\* |
|  | (0.10) |
| Num.Obs. | 816 |
| + p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001 | |

**?(caption)**

|  | household\_unsecured\_lending\_rate |
| --- | --- |
| entry\_credit\_households\_dummy | 1.34\*\*\* |
|  | (0.31) |
| exit\_credit\_households\_dummy | 2.20\*\*\* |
|  | (0.56) |
| factor(banks)Absa Bank | 13.64\*\*\* |
|  | (0.52) |
| factor(banks)FNB | 12.41\*\*\* |
|  | (0.80) |
| factor(banks)Nedbank | 12.60\*\*\* |
|  | (1.19) |
| factor(banks)Standard Bank | 13.77\*\*\* |
|  | (0.79) |
| factor(month)2 | -0.18\*\* |
|  | (0.06) |
| factor(month)3 | -0.32\*\* |
|  | (0.11) |
| factor(month)4 | -0.49\*\* |
|  | (0.17) |
| factor(month)5 | -0.55\*\* |
|  | (0.18) |
| factor(month)6 | -0.58\*\* |
|  | (0.22) |
| factor(month)7 | -0.53\*\* |
|  | (0.18) |
| factor(month)8 | -0.34 |
|  | (0.22) |
| factor(month)9 | -0.65\* |
|  | (0.26) |
| factor(month)10 | -0.42\* |
|  | (0.20) |
| factor(month)11 | -0.67\* |
|  | (0.28) |
| factor(month)12 | -0.79\*\*\* |
|  | (0.23) |
| Num.Obs. | 816 |
| + p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001 | |

**?(caption)**

# Conclusion

# References

Alexakis, Christos, Antonios Chantziaras, Fotini Economou, Konstantinos Eleftheriou, and Christos Grose. 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.

# Appendix

## Data sources (check)

|  | 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 |
| BA930 | Banking sector lending rates at a bank level | Aggregated data is public. Bank specific data is private | South African Reserve Bank |
| Controls | Banking sector performance data at a bank level | Aggregated data is public. Bank specific data is private | Prudential Authority |

**?(caption)**

## Aggregation scheme (check)

| BA 900 Categories | Item Number | Sector | Aggregation 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 | - |
| Credit cards | 167 | Financial corporate sector | a |
|  | 168 | Non financial corporate sector | b |
|  | 169 | Household sector | - |
|  | 170 | Other | - |
| Overdrafts | 178 | Public sector (includes public corporations and local government) | - |
|  | 181 | Financial corporate sector | - |
|  | 182 | Non financial corporate sector | - |
|  | 183 | Unincorporated business enterprises | a |
|  | 184 | Other Household sector | - |
|  | 185 | Non-profit organisations serving households | b |
| Factoring debtors | 187 |  | - |
| 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 | - |
|  |  |  |  |

**?(caption)**

The following aggregation scheme which results in nine categories was followed based on **?@tbl-scheme**:

1. Non-financial corporate unsecured lending: Items 168 + 183 + 190
2. Household unsecured lending: Items 169 + 185 + 192
3. Total unsecured lending: Non-financial corporate unsecured lending + Household unsecured lending
4. Commercial mortgages to corporates and households: Items 152 + 153 + 156 + 163 + 164
5. Residential mortgages to household: Item 157
6. Total mortgage lending: Commercial mortgages to corporates and households + Residential mortgages to household
7. Leasing and instalments to corporates: Items 142 + 147
8. Leasing and instalments to households: Items 143 + 148
9. Total leasing and instalments: Leasing and instalments to corporates + Leasing and instalments to households

## Bank lending rates weighting scheme (check)

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 **?@tbl-scheme\_1**. 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.

| 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 |

**?(caption)**

The nine categories, therefore, are as follows:

1. Non-financial corporate unsecured lending: Weighted average of items 55 + 48 + 56
2. Household unsecured lending: Weighted average of items 65 + 58 + 66
3. Total unsecured lending: Weighted average of items 55 + 48 + 56 + 65 + 58 + 66
4. Commercial mortgages to corporates and households: Weighted average of items 53
5. Residential mortgages to household: Item 63
6. Total mortgage lending: Weighted average of items 53 + 63
7. Leasing and instalments to corporates: Weighted average of items 49 + 51
8. Leasing and instalments to households: Weighted average of items 59 + 61
9. Total leasing and instalments: Weighted average of items 49 + 51 + 59 + 61

## Description of narrative events (check)

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

**?(caption)**

## Competition narrative indexes (check)

|  |
| --- |
| Figure 1: Competition narrative indexes |

## Macroprudential narrative indexes (check)

|  |
| --- |
| Figure 2: Macroprudential narrative indexes |

## Aggregated bank lending

|  |
| --- |
| Figure 3: Total aggregated bank lending |

## Weighted lending rates (aggregated)

|  |
| --- |
| Figure 4: Weighted lending rates |