

Assessment of the effectiveness of the macroprudential measures implemented in the context of the Covid-19 pandemic

Lucas Avezum
Vítor Oliveira
Diogo Serra

Banco de Portugal's 2021 Online Conference on Financial Stability

11 October 2021



**BANCO DE
PORTUGAL**
EUROSYSTEM

The views expressed in this presentation are those of the
authors and do not necessarily reflect the
views of Banco de Portugal

1. Introduction

- Against the background of a sudden and marked deterioration of the international economic and financial outlook triggered by the Covid-19 pandemic, the macroprudential and microprudential authorities have been tasked to contribute to the public policy responses that aim to support the private non-financial sector, ensuring that the balance between preserving financial stability and sustaining economic activity is maintained.
- Two main measures taken by the various bodies were the temporary flexibility in complying with part of the capital requirements, with a view to encouraging institutions to make use of their capital buffers, and the reduction in the level of some macroprudential buffers.
- The principle of building up capital (and liquidity) buffers to deal with risk materialisation underlies regulatory changes in the wake of the previous international financial crisis, with the purpose of preventing procyclical behaviour of the financial system during troubled times, which could exacerbate the effects of an adverse shock.

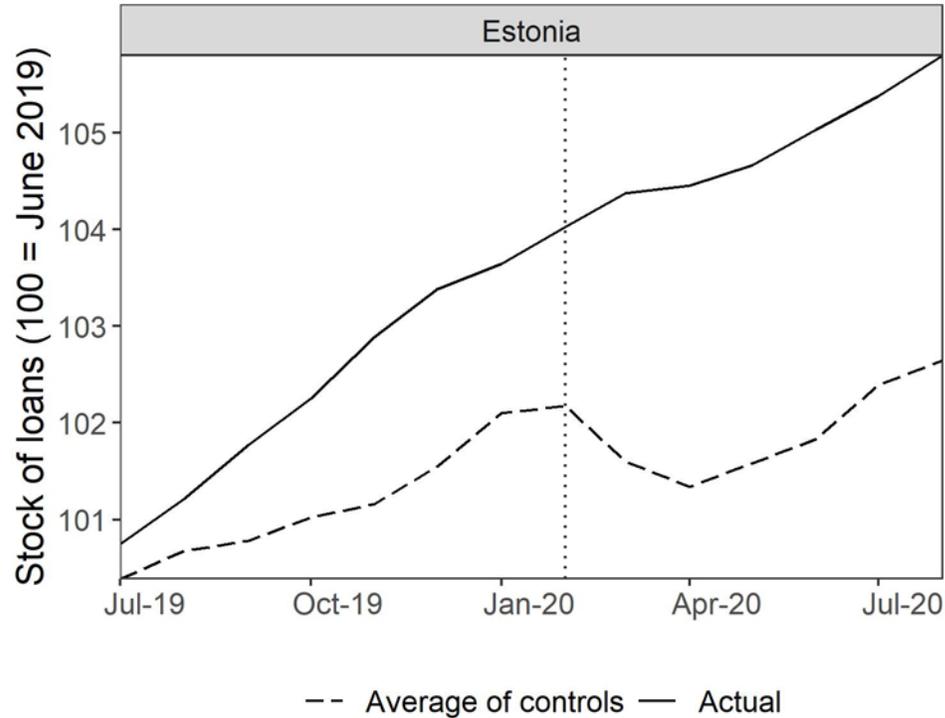


1. Introduction

- We contribute to a growing empirical literature on the effect of macroprudential capital buffers during the downturn of the business cycle by assessing the impact of the macroprudential measures implemented in the context of the Covid-19 pandemic, at the European level.
- ❖ We find evidence that macroprudential buffers releases contributed, on average, to mitigate the procyclicality of credit to households. Compared to countries that did not release buffers, credit growth to households was one percentage point higher on average in countries where there was a buffer release.
- ❖ Our results suggest that the release of capital buffers contributed, first, to mitigate the impact that the containment measures and the uncertainty underlying the development of the crisis had on households' investment decisions, and, second, to provide finance to loans to households for business purposes. However, the effect on consumption was muted.
- ❖ In addition, for aggregate household lending, we find that the effect for both the release of the CCyB and that of the SyRB was positive. However, the results suggest that for credit associated to small businesses purposes, only the release of the CCyB had an effect.



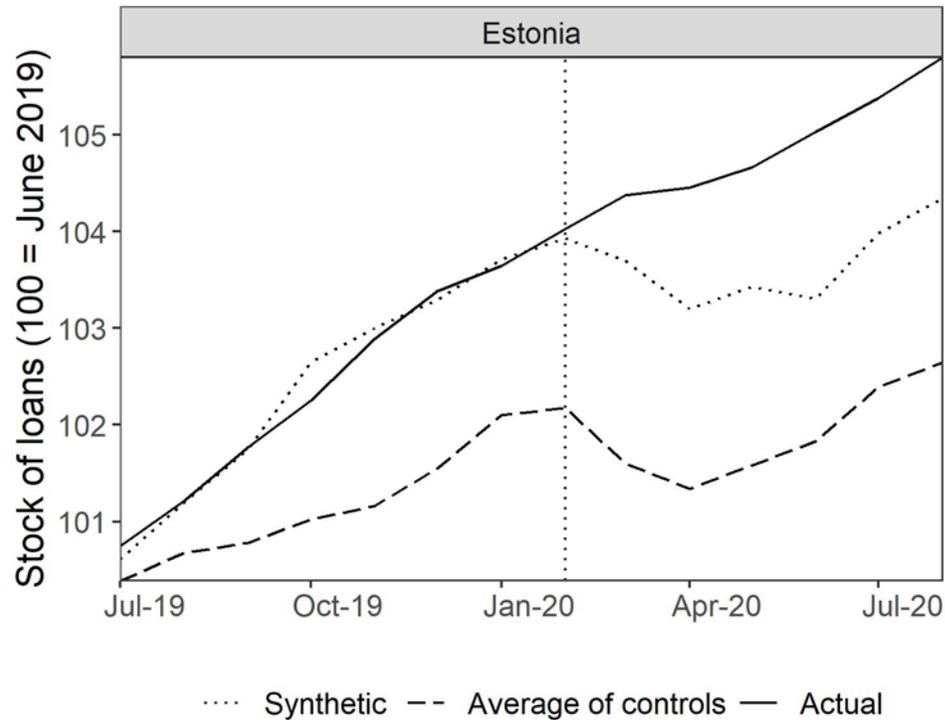
2. Methodology



- Naïve approach to estimate the treatment effect of buffer release: compare the evolution of credit growth of treated unit to the average evolution of control countries.
- This estimate is not suitable: trends diverge before the release of buffers.



2. Methodology



- This study follows the synthetic control method (SCM) developed by Abadie and Gardeazabal (2003) and extended in Abadie, Diamond, and Hainmueller (2010).
- The SCM constructs a “synthetic” treated country as a convex combination of countries whose macroprudential authorities have not decided to release the capital buffers
- Weights of control countries are defined by how closely they resembled the treated country in terms of credit growth predictors.



3. Data

- The analysis was carried out for loans granted to households to minimize the confounding effects of State-guaranteed-loans, as the latter have widely supported NFCs ([Annex 1](#)).
- The analysis was carried for EU countries. Nonetheless, some countries were excluded from the analysis taking into account:
 - (a) data quality (missing observations).
 - (b) the exclusion of countries that largely used other policies addressed to the financial sector in the context of the Covid-19 pandemic. ([Annex 2](#))
 - (c) the exclusion of countries where the containment measures were the most and the least severe. ([Annex 3](#))



3. Data

- Treated countries: countries whose macroprudential authorities announced the release of capital buffers:
 - Denmark, Estonia, Lithuania, the Netherlands, Poland, Slovakia, and Sweden.
- Remaining countries are control units:
 - Austria, Belgium, Germany, Greece, Latvia, Luxembourg, and Slovenia.
- For the purpose of the present study, the policy intervention was assumed to occur in March 2020, taking into account the ECB press release on 12 March 2020 (*ECB Banking Supervision provides temporary capital and operational relief in reaction to coronavirus*).
- The post-treatment period goes from March 2020 to August 2020.
- The pre-treatment period goes from July 2019 to February 2020.



4. Results: The effect of buffer release on loans to households

	Denmark	Estonia	Lithuania	Netherlands	Poland	Slovakia	Sweden
Austria	0.02	0.01	0.00	0.51	0.00	0.02	0.00
Belgium	0.00	0.06	0.42	0.12	0.00	0.35	0.00
Germany	0.58	0.00	0.00	0.03	0.01	0.01	0.78
Greece	0.16	0.00	0.00	0.15	0.08	0.00	0.03
Latvia	0.10	0.03	0.01	0.16	0.10	0.02	0.18
Luxembourg	0.04	0.22	0.00	0.02	0.00	0.15	0.00
Slovenia	0.10	0.67	0.56	0.02	0.81	0.46	0.00
RMSPE	0.08	0.16	0.25	0.15	0.52	0.33	1.00
ATT (p.p.)	0.45	1.29	1.82	0.34	3.23	1.25	1.89

- The impact of macroprudential buffer release was heterogeneous across countries.
- Model performance also varies considerably across treated countries.



2. Average treatment effect

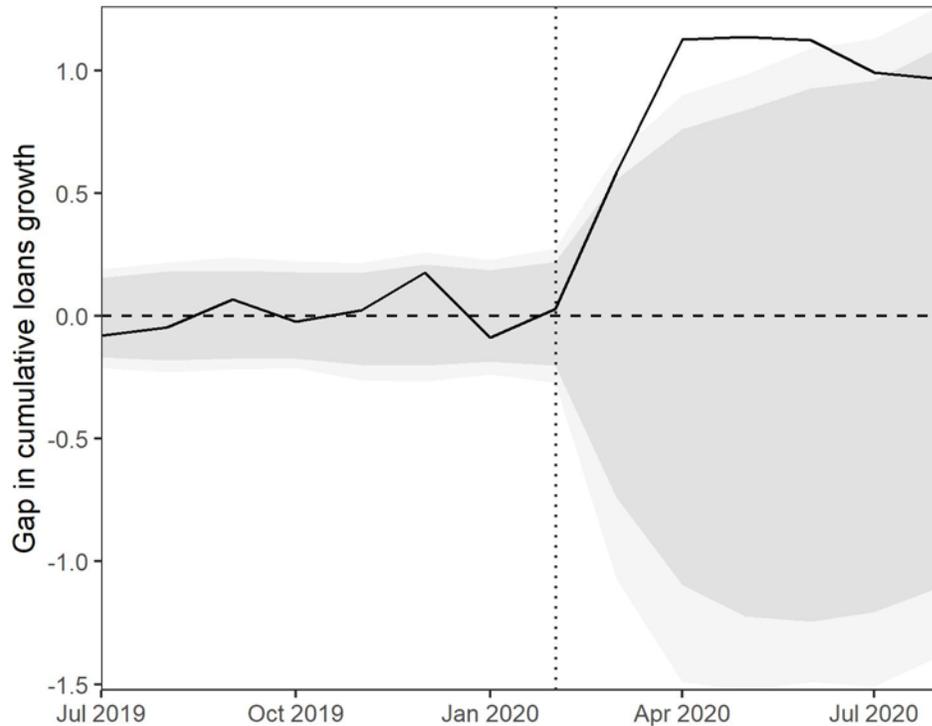
- We aggregated the results to obtain an average treatment effect (ATE).
- We follow Acemoglu et al. (2016) and Berger et al. (2020) and calculate the ATE for each month as the average of the treatment effects weighted by the inverse of the pre-treatment root mean squared predicted error:

$$ATE = \sum_i \frac{TE_i}{RMSPE_i} / \sum_i \frac{1}{RMSPE_i}$$

- We obtain confidence intervals by bootstrapping the distribution of placebos.



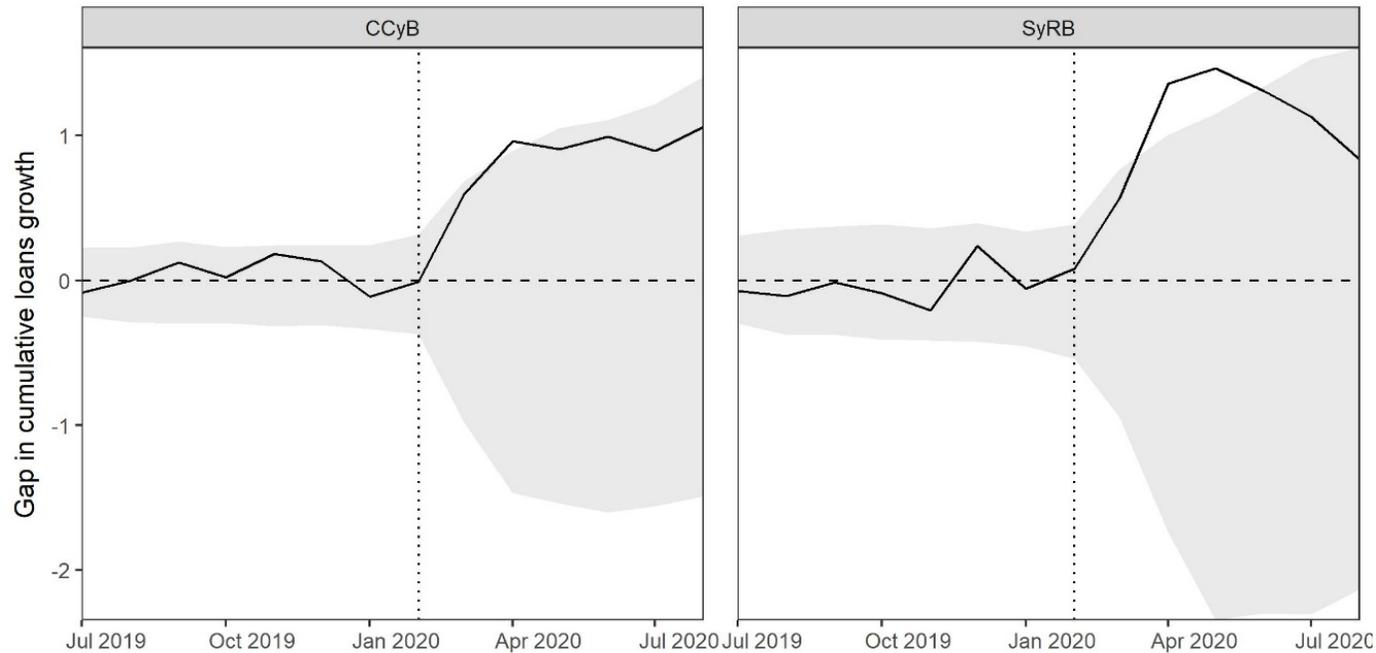
4.1. Average treatment effect



- The average treatment effect is the average treatment effect weighted by the inverse of the pre-treatment root mean squared predicted error
- On average, between March and August 2020, credit to households grew 0.99 percentage points more in countries where capital buffers were released compared to the counterfactual with no release.
- The effect is statistical significant at the 5% level, for the months of April, May, June, and at the 10% for the months of March and July.



4.1.1 Average treatment effect: CCyB vs SyRB

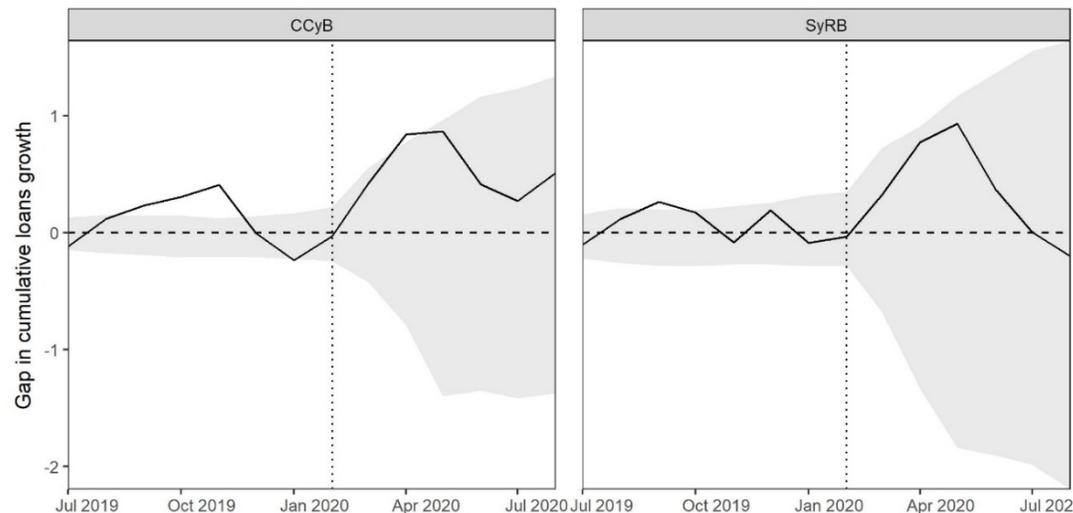
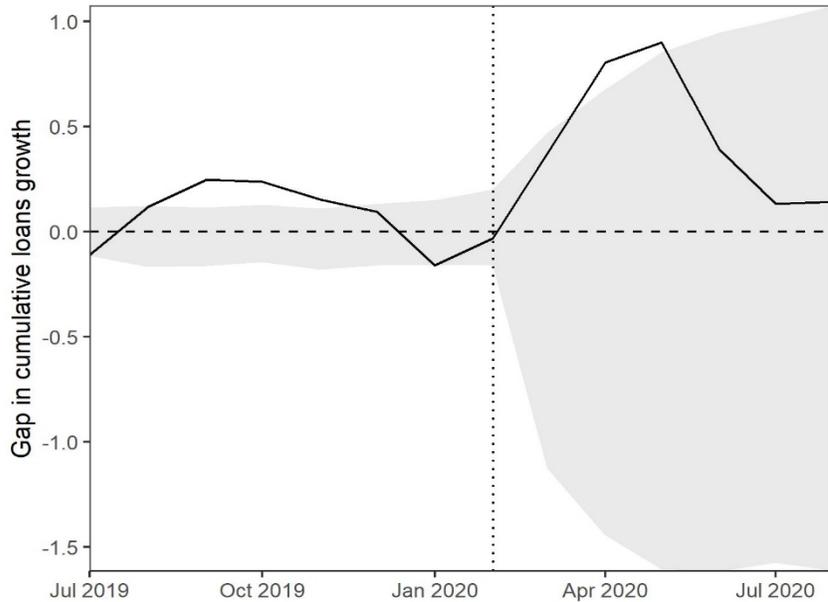


- Countries with CCyB release: Denmark, Lithuania, Sweden, and Slovakia.
- Countries with SyRB release: Estonia, Netherlands, and Poland.

- On average, between March and August 2020, credit to households grew 0.90 and 1.11 percentage points more in countries where, respectively, cyclical and structural buffers were released compared to the counterfactuals without capital release.



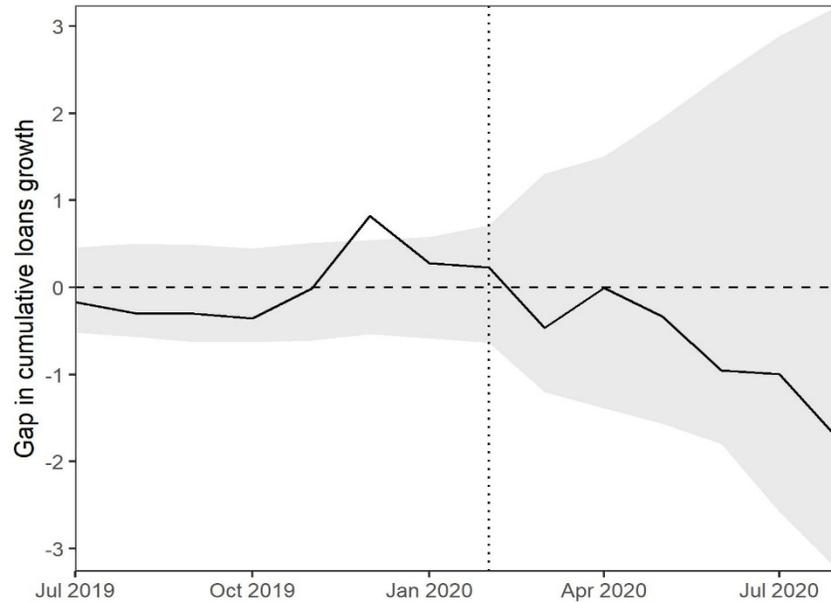
4.1.2 Average treatment effect: credit for house purchase



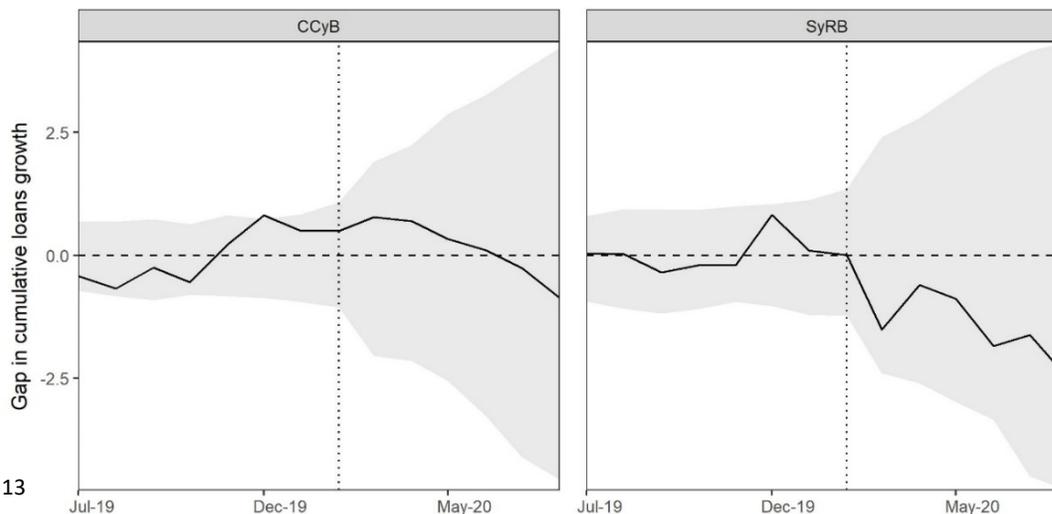
- On average, between March and August 2020, lending for house purchase grew 0.46 percentage points more in countries where capital buffers were released compared to the counterfactual with no release.
- The effects is statistical significant at the 10% level only in April and May.
- The effect is stronger and more persistent among the countries where the CCyB was released, but marginally significant different from zero.



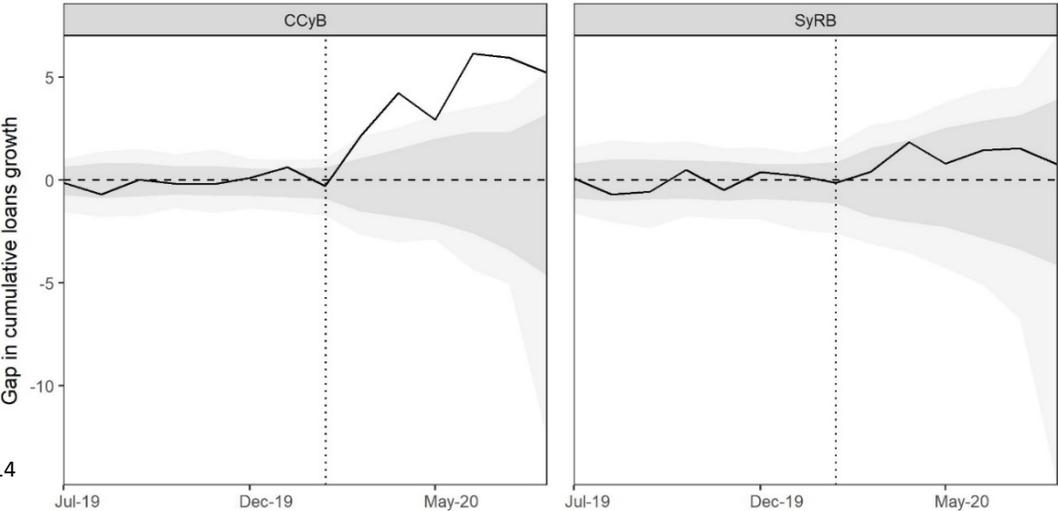
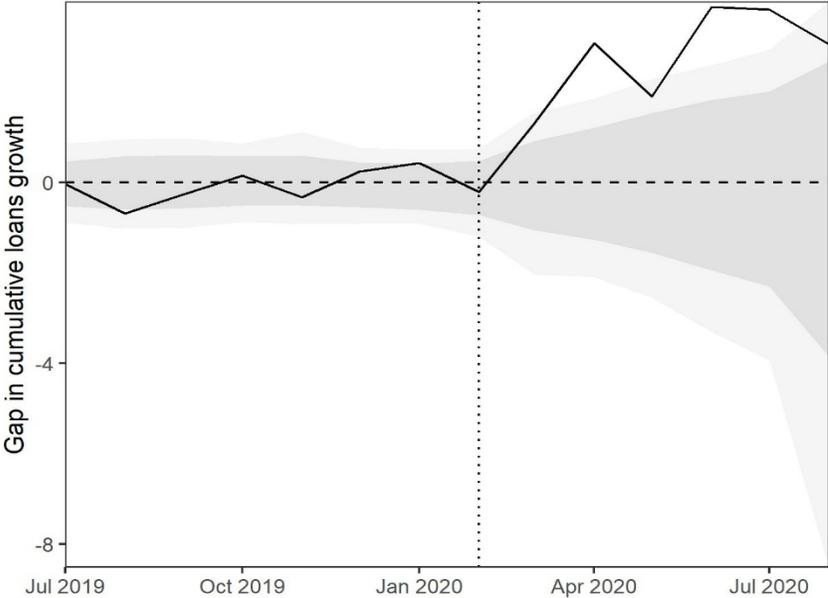
4.1.2 Average treatment effect: credit for consumption



- The macroprudential capital buffers release appears to have no effect on credit for consumption.
- The result is strongly driven by the countries where the SyRB was released, but still not statistically significant.



4.1.2 Average treatment effect: other lending



- On average, between March and August 2020, other lending grew 2.85 percentage points more in countries where capital buffers were released compared to the counterfactual with no release.
- The estimated confidence intervals suggest that the effect is statistical significant at the 10% for the entire post-treatment period and at 1% level in April, June, and July.
- The effect is only relevant among the countries where the CCyB was released. In these countries, the estimated impact on lending is 4.45 percentage points and statistically significant at the 1%.



5. Conclusion

This study shows that there is evidence that macroprudential buffers release contributed, on average, to mitigate the procyclicality of credit to households. Compared to countries that did not release buffers, credit growth to households was one percentage point higher in countries where there was a buffer release.

The impact of macroprudential buffer release was heterogeneous across the European countries analyzed in this study.

We find that the average treatment effect was positive for both the countries where the CCyB was released and for the countries where the SyRB was released. However, the results suggest that for credit associated to households' business purposes only the release of the CCyB had an effect.

Our results suggest that the release of capital buffers contributed, first, to mitigate the impact that the containment measures and the uncertainty with respect to the development of the crisis had on households' investment decisions, and, second, to provide finance to loans to households for business purposes, but had a muted effect on loans for consumption.



Thank you

Banco de Portugal's 2021 Online Conference on Financial Stability

11 October 2021



**BANCO DE
PORTUGAL**
EUROSYSTEM

Annex

Banco de Portugal's 2021 Online Conference on Financial Stability

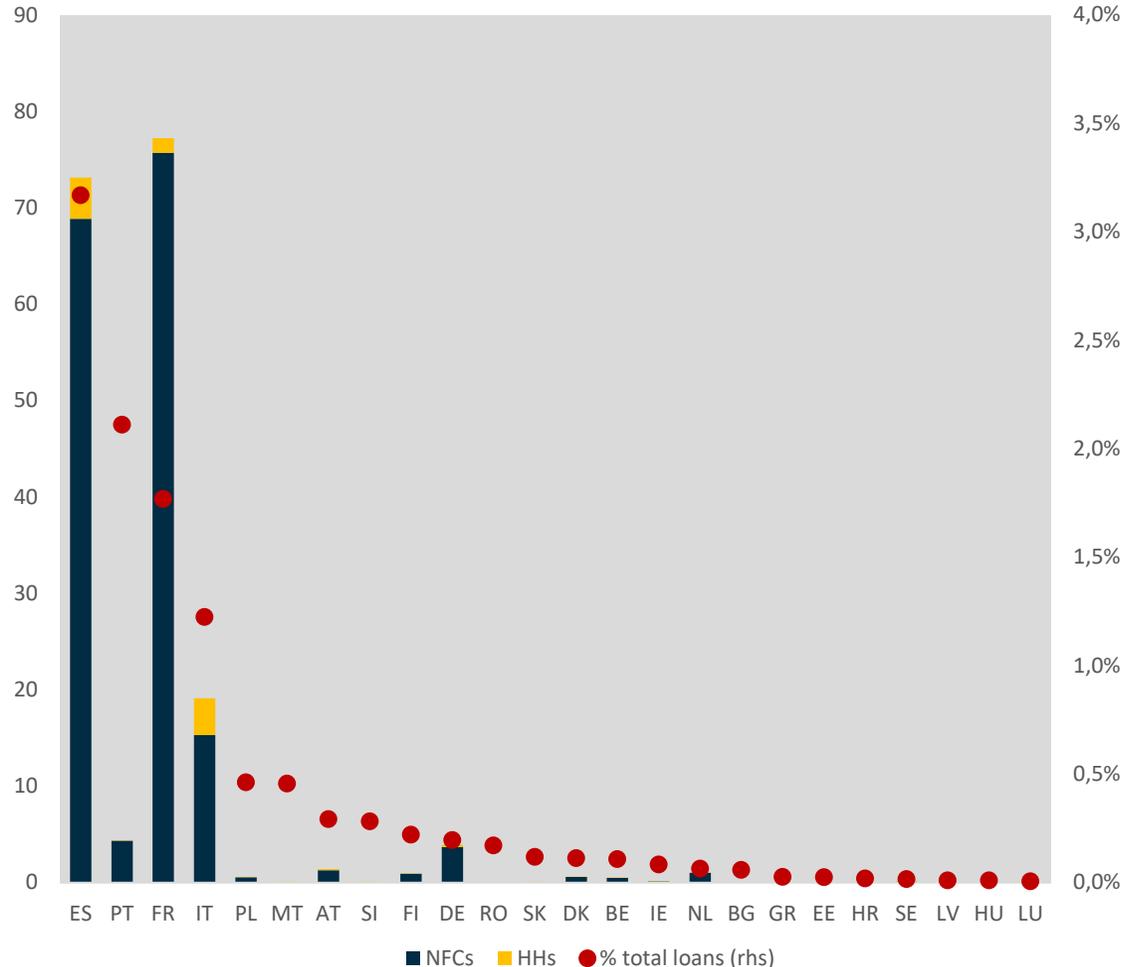
11 October 2021



**BANCO DE
PORTUGAL**
EUROSYSTEM

A.1: Stock-taking on governmental COVID-19 measures – State-guarantee schemes

Newly originated loans subject to PGSs as a percentage of total loans (rhs) and loan volumes (EUR billion, lhs) by country – June 2020



The biggest volumes of loans subject to PGSs were reported by banks in France and Spain, 78 and 73 EUR billion, respectively (1.8% and 3.2% of banks' total loan volume).

Loans subject to PGSs were also significant for banks in Italy, and, in terms of the share of total loans, for banks in Portugal (2.1% of total loans).

Most of the support is extended to NFCs. Given that loans under these schemes are granted as new loans the impact on the stock of loans is considerably smaller (source: Report of the ESRB WG on financial stability implications of fiscal measures to protect the real economy from the COVID-19 pandemic, forthcoming).

Source: EBA Report on first evidence on the use of moratoria and public guarantees in the EU banking sector, November 2020 (EBA/Rep/2020/31).



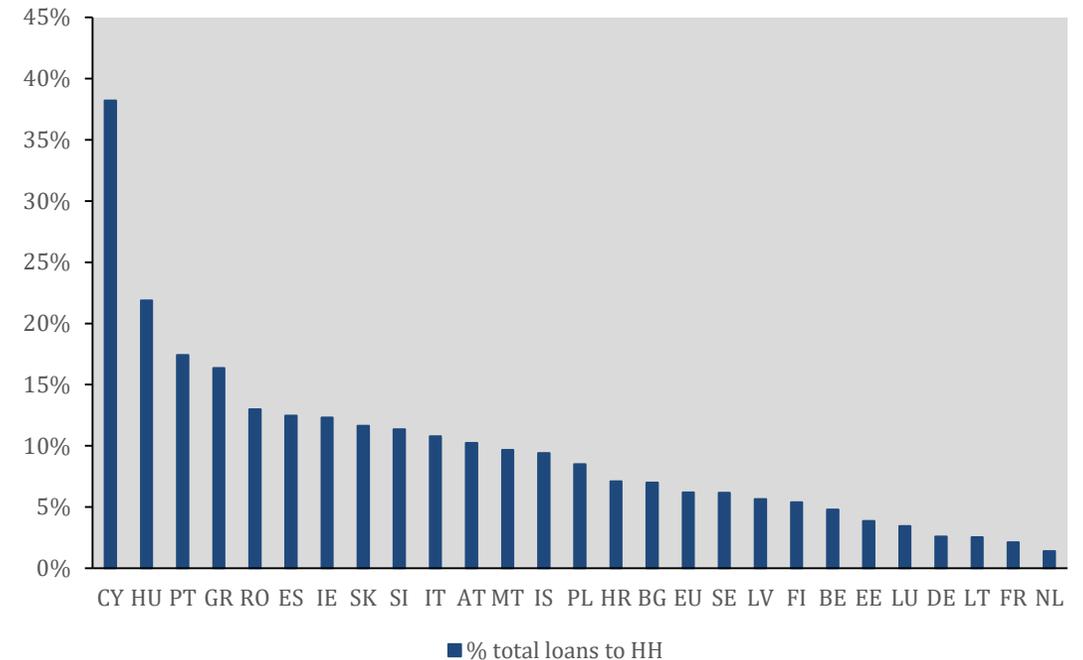
A.2: Stock-taking on governmental COVID-19 measures - moratoria

The use of moratoria on loan repayments was heterogeneous across countries. Cyprus is the country with the highest share of loans under moratoria in terms of total loans to HHs (almost 40%).

Banks in Hungary and Portugal also reported extended use of moratoria, as around 20% of their reported loans to HHs were under this scheme.

(source: Report of the ESRB WG on financial stability implications of fiscal measures to protect the real economy from the COVID-19 pandemic, forthcoming).

Volumes of loans to household granted as a percentage of total loans to households by country – June 2020



Source: EBA Report on first evidence on the use of moratoria and public guarantees in the EU banking sector, November 2020 (EBA/Rep/2020/31)

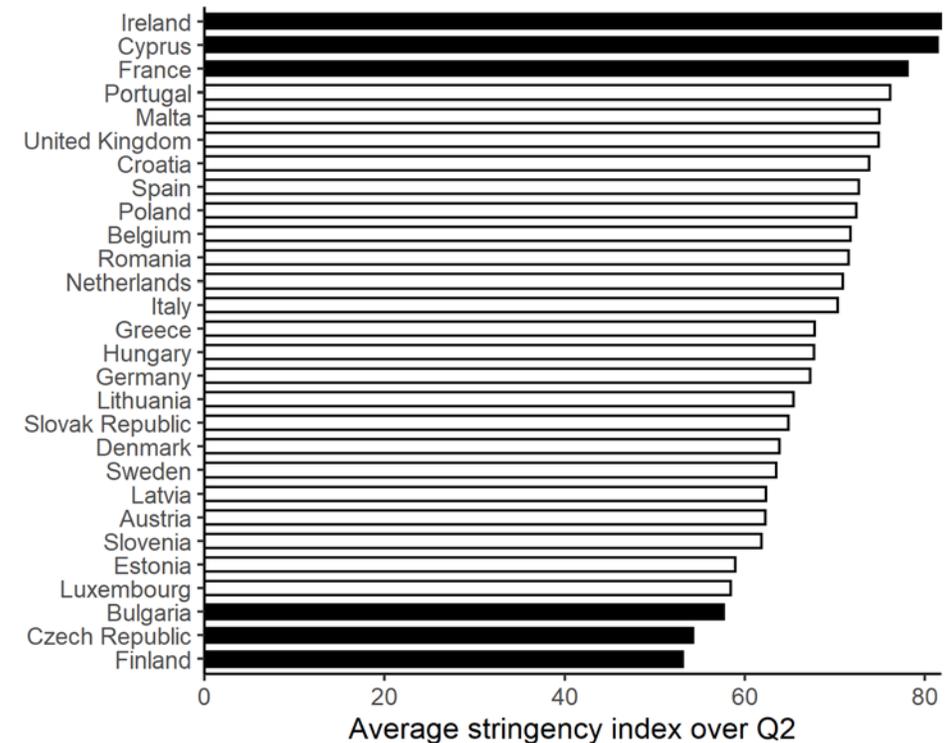


A.3: Stock-taking on governmental COVID-19 measures – containment stringency

The data comes from the Oxford COVID-19 Government Response Tracker led by the Blavatnik School of Government (Hale, Webster, Petherick, Phillips, and Kira (2020)).

The index is a simple additive score of eight indicators measured on an ordinal scale, rescaled to vary from 0 to 100.

The indicators are: school closing, workplace closing, cancel public events, restrictions on gatherings, close public transport, stay at home requirements, restrictions on internal movement, international travel controls, and public info campaigns.



Source: Hale, Thomas, Sam Webster, Anna Petherick, Toby Phillips, and Beatriz Kira (2020). Oxford COVID-19 Government Response Tracker, Blavatnik School of Government.



A4: Variables

Outcome variables		
Variable	Description	Source
Index HH loans	Index of MFI domestic loans to households (stock), in local currency (100=June 2019)	SDW
Index loans for each HH's segment	Index of MFI domestic loans to households for house purchase, consumption and other lending (stock), in local currency (100=June 2019)	SDW

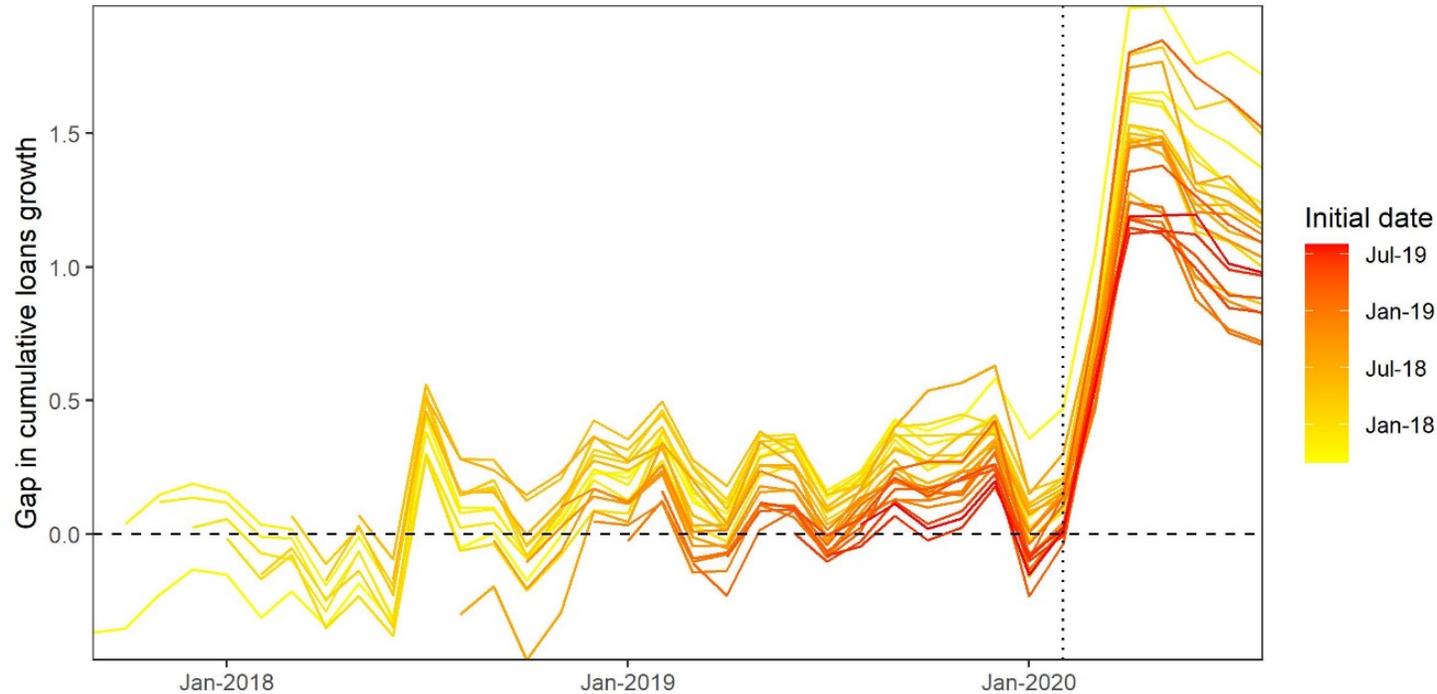
Pre-intervention characteristics		
Variable	Description	Source
Lag log real GDP	1 year lag of the logarithm of real GDP (volume index)	OECD
Inflation	CPI annual growth rate	OECD
Loans ratio	MFI total loans over total assets	SDW
Deposits ratio	MFI total deposits over total liabilities	SDW
Size	Size of banking system (logarithm of MFI total assets)	SDW
Lag log real house prices	1 year lag of the logarithm of the index of real house prices (100=2015)	OECD
Interest rate to HH	Average of the interest rates on new business to households by purpose (housing and consumption), weighted by the relevance of new business volumes for each purpose on HH's segment.	SDW
Index HH loans (Jan 2020)	One lag of the outcome variable	SDW
Index HH loans (Oct 2019)	Four lags of the outcome variable	SDW
Index HH loans (Jul 2019)	Seven lags of the outcome variable	SDW

Notes:

- (i) the variables selection was based on A. Calza et al. (2003), Castro and Santos (2010), Behrendt, Stefan (2016), Abadie et al. (2010), and Egert et al. (2007), restricted by data quality issues.



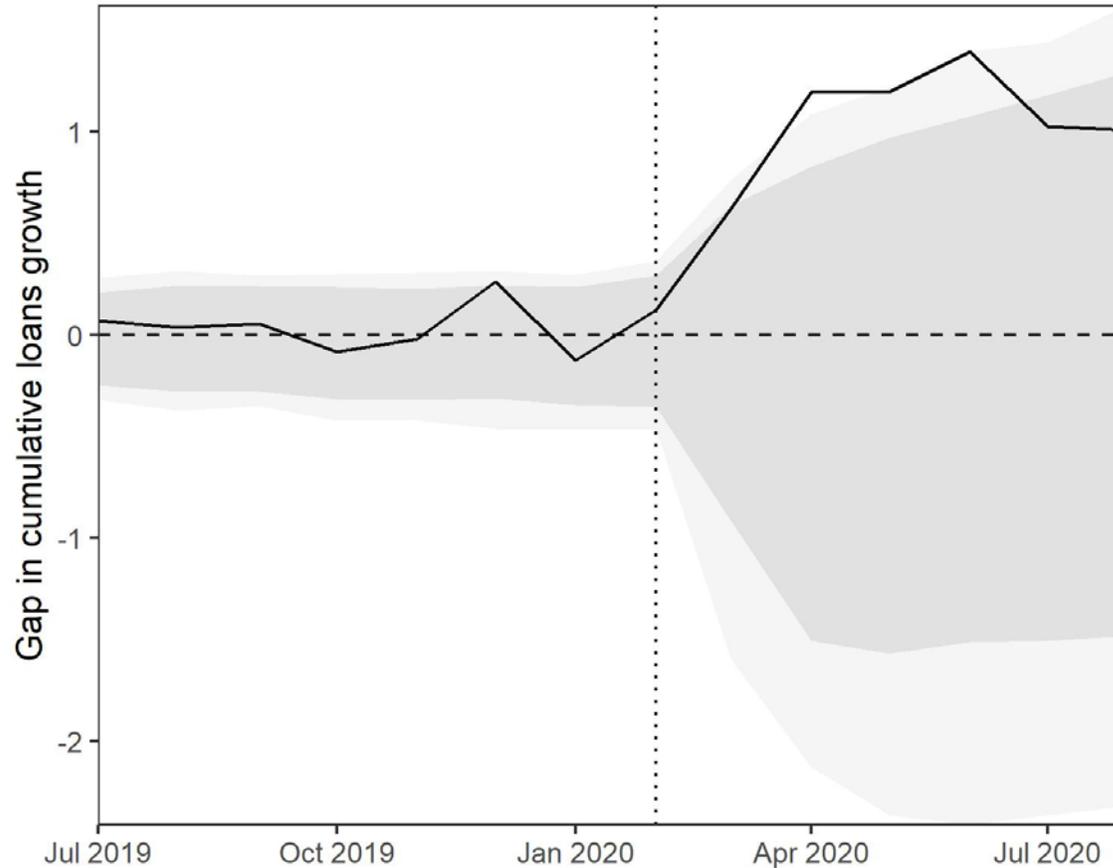
A.5: Average treatment effect: robustness to initial date



- Each line is a run of the SCM with a different pre-treatment initial date.
- Reddish lines have shorter pre-treatment periods and yellowish have longer.
- A positive ATE is found in all estimations, and its magnitude does not change linearly with time.



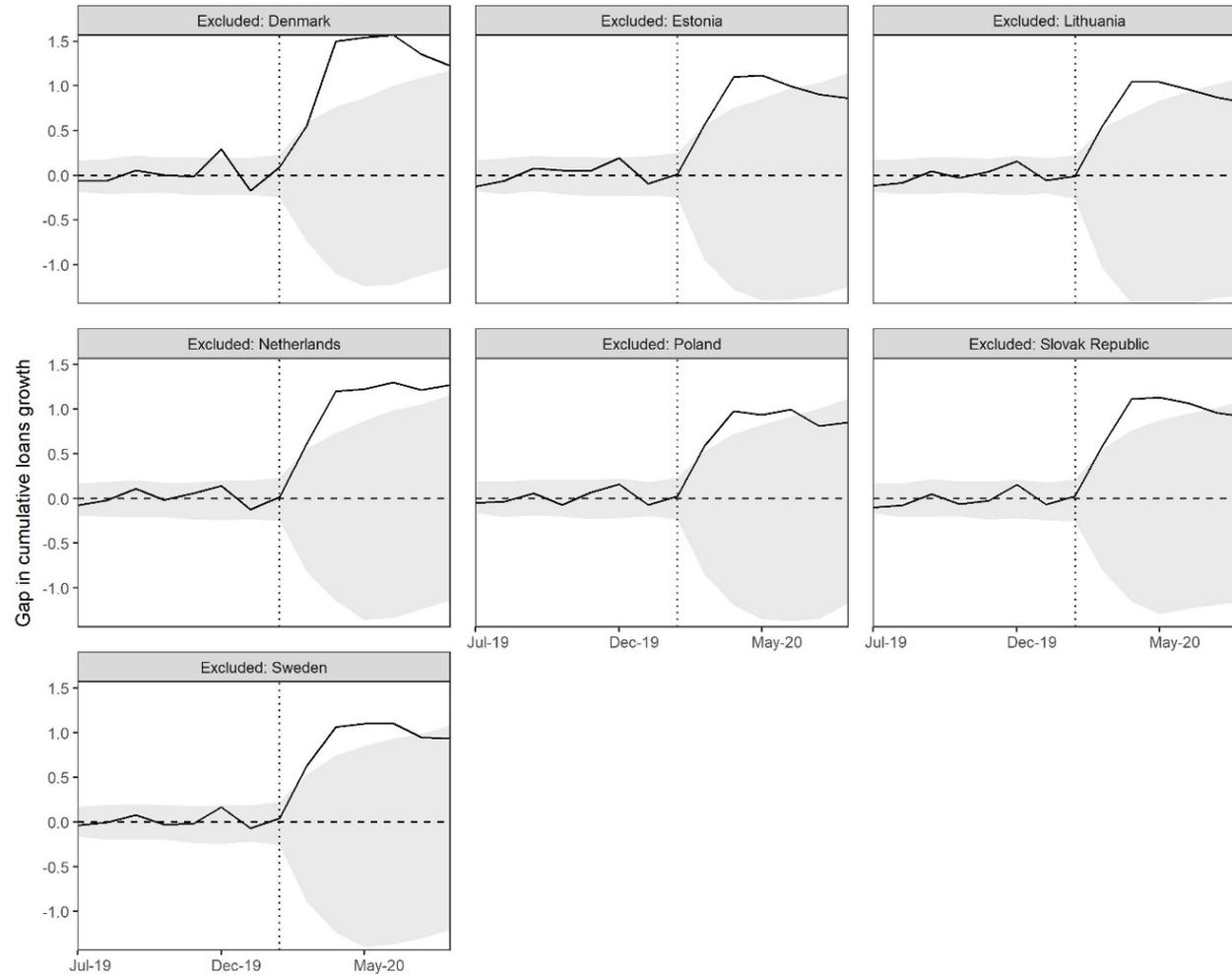
A.6: Average treatment effect: robustness to monetary policy



- The positive ATE is robust to the exclusion of countries that are not part of the Euro area.
- Treated countries: Estonia, Lithuania, Netherlands, and Slovakia.
- All countries in the control group are in the Euro area.



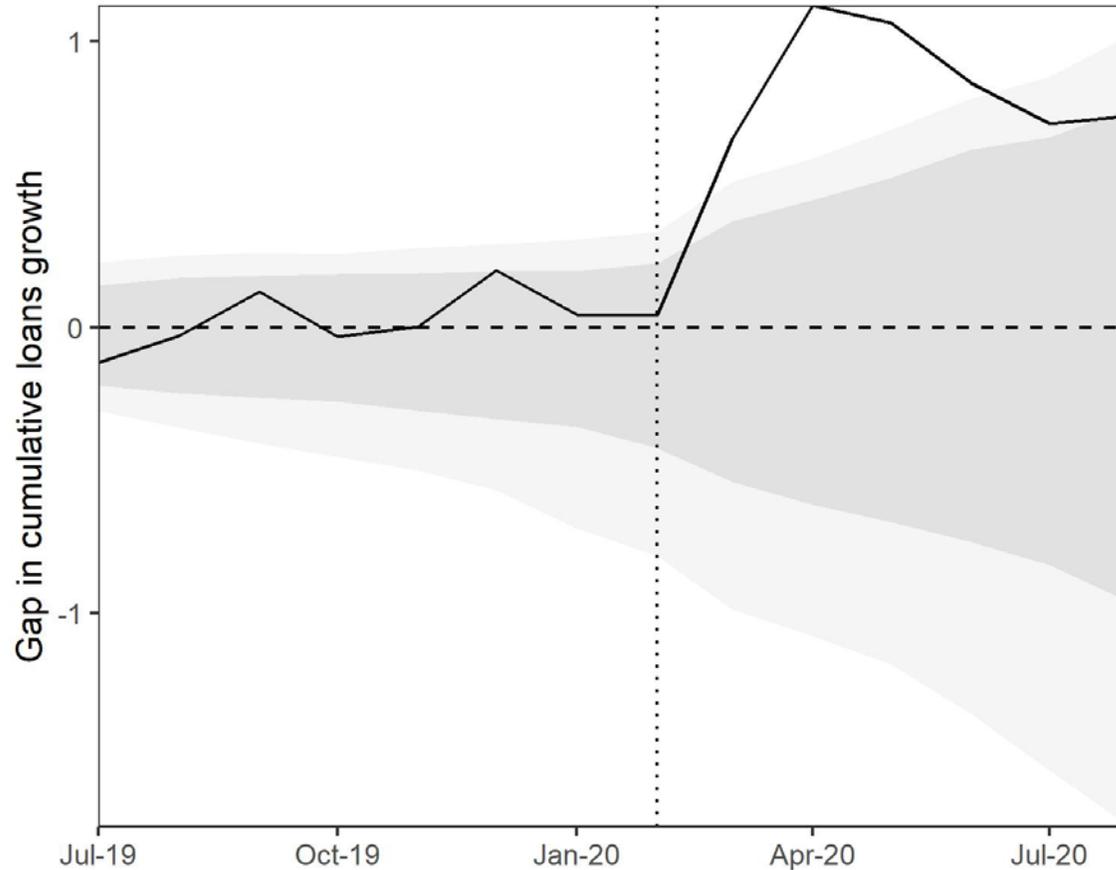
A.7: Average treatment effect: Leave-one-out ATEs



- The positive ATE is robust to the exclusion of each treated country.



A.8: Average treatment effect: robustness to CCyB reciprocration



- The positive ATE is robust to the exclusion of countries that because of the reciprocration framework resulted in a combined release of around 0.25%, which is the minimum step to impose the CCyB.
- Control countries excluded: Austria, Belgium, and Latvia.
- Remaining control countries: Germany, Greece, Luxembourg, and Slovenia.



A9. Methodology

- Let J be the number of available control countries and $W = (W_1 + \dots + W_J)'$ a $(J \times 1)$ vector of nonnegative weights which sum to one. The scalar $W_j (j = 1, \dots, J)$ represents the weight of country j in the synthetic treated country. We estimate a different W_j for each treated country.
- Let X_1 be a $(K \times 1)$ vector of pre-measures values of K credit growth predictors for the treated country.
- Let X_0 be a $(K \times J)$ matrix which contains the values of the same variables for the J possible control countries.
- Let V be a diagonal matrix with nonnegative components. The diagonal elements of V reflect the relative importance of the different credit growth predictors.
- The vector of weights W^* is chosen to minimize $W = (X_1 - X_0 W)'$ $V (X_1 - X_0 W)$ subject to $W_j \geq 0, (j = 1, 2, \dots, J)$ and $W_1 + \dots + W_J = 1$.
- Therefore the vector W^* defines the combination of control countries which best resemble each of the treated countries in credit growth determinants at the outset of the measures.



A9. Methodology

- Let Y_1 be a $(T \times 1)$ vector whose elements are the values of credit growth for each of the treated countries during T time periods.
- Let Y_0 be a $(T \times J)$ matrix which contains the values of the same variables for the control countries.
- The result of the SCM is a counterfactual credit growth path that each of the treated countries would experienced in the absence of the measures taken (the release of capital buffers).
- The aforementioned counterfactual credit growth path is computed as the credit growth of each synthetic treated country, $Y_1^* = Y_0 W^*$.
- The estimated effect of the buffer release on credit growth (the treatment effect, TE) is the difference of the actual and the synthetic series ($Y_1 - Y_1^*$).

