

Preventing a banking crisis: fiscal support and loan loss provisions during the COVID-19 pandemic

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1 Introduction

2 Methodology & Data

3 Results

4 Conclusion

Motivation

- The COVID-19 pandemic led to the worst economic crisis since the Great Depression
- At the onset of the crisis, policymakers were concerned that the economic crisis would transition into a financial crisis (e.g., [IMF, 2020](#))
- Contrary to expectations, however, the banking sector proved remarkably resilient

Motivation

- A natural question that arises is whether this resilience should only be attributed to improved banking regulation or also to the unprecedented fiscal support
- We aim to contribute to this debate by examining the effect of (different types of) fiscal support on banks' credit risk using an international sample of banks

Methodology

- To empirically examine this, we focus on banks' loan loss provisions
- Loan loss provisions directly influence banks' earnings volatility, and provide an accurate assessment of banks' loan portfolio risk attributes (Goncharenko and Rauf, 2021; Krüger et al., 2018)
- Loan loss provisions are of great concern to policymakers because the pro-cyclicality of banks' provisioning can adversely affect banks' resilience and lending capacity, thereby aggravating economic crises (Beatty and Liao, 2011; Goncharenko and Rauf, 2021; Huizinga and Laeven, 2019)

Findings

- We construct a dataset on fiscal support measures from 38 different countries to determine the effect of fiscal support on banks' loan loss provisions
- We find that fiscal support mitigated the effect of the COVID-19 crisis on financial institutions through reduced loan loss provisions
Channel
- This effect goes beyond a macroeconomic stabilization effect

Findings

- We decompose fiscal support into direct and liquidity support
- We find that the negative relationship between fiscal support and banks' provisioning expenses is exclusively driven by direct support measures
- These findings are robust to an instrumental variable approach
- These findings have important implications for governments' fiscal strategy

Contribution

- ① Banks' loan loss provisioning during periods of economic distress (e.g., [Beatty and Liao, 2011](#); [Bushman and Williams, 2015](#); [Goncharenko and Rauf, 2021](#); [Laeven and Majnoni, 2003](#))
→ Bank' loan loss provisioning during the COVID-19 crisis
- ② The cost-benefit trade-offs of government interventions in the banking sector (e.g., [Bayazitova and Shivdasani, 2011](#); [Dam and Koetter, 2012](#); [Duchin and Sosyura, 2014](#); [Gropp et al., 2014](#))
→ The effects of different types of support measures during the COVID-19 crisis
- ③ The effect of the COVID-19 crisis on the banking sector (e.g., [Altavilla et al., 2021](#); [Berger and Demirgüç-Kunt, 2021](#); [Demirgüç-Kunt et al., 2021](#); [Duan et al., 2021](#); [Hasan et al., 2021](#))
→ Banks' credit risk during the COVID-19 crisis

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Methodology

- In a first analysis, we study the relationship between **overall fiscal support** and banks' loan loss provisions (LLP)
- We estimate the following model (based on [Beatty and Liao, 2011](#); [Laeven and Majnoni, 2003](#); [Silva, 2021](#)):

$$LLP_{bt} = \beta Fiscal\ support_{ct-1} + \delta M_{ct} + \gamma X_{bt} + \lambda_b + \lambda_t + \epsilon_{bt} \quad (1)$$

where $Fiscal\ support_{ct-1}$ is the level of total fiscal support in the previous quarter

Methodology

- In a second analysis, we decompose fiscal support into **direct and liquidity support**
- We estimate the following model:

$$LLP_{bt} = \beta_D \text{Direct support}_{ct-1} + \beta_L \text{Liquidity support}_{ct-1} + \delta M_{ct} + \gamma X_{bt} + \lambda_b + \lambda_t + \epsilon_{bt} \quad (2)$$

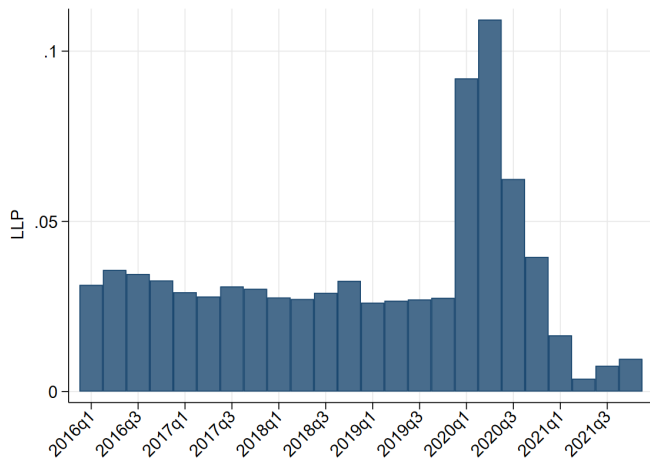
Data

- Quarterly country-level data for fiscal support measures [Details](#)
 - Quarterly bank-level data for financial institutions
 - Quarterly country-level data for economic and institutional factors
- Our final data sample includes 1,037 banks from 38 countries over the period 2016Q1-2021Q4

Data

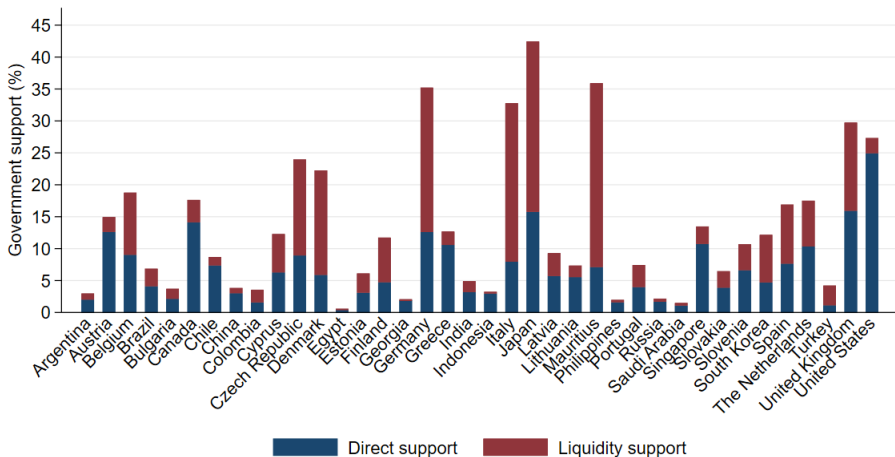
	N	Mean	Median	SD	Min	Max
<i>Bank level variables</i>						
LLP	23,080	0.095	0.031	0.204	-0.230	1.391
RBP	23,278	0.437	0.380	0.361	-0.387	2.361
$\ln(\text{Total assets}_{t-1})$	23,808	15.083	14.750	2.134	11.434	20.839
LLR_{t-1}	23,624	1.460	0.839	2.013	0.154	13.783
NPL_{t-1}	23,047	1.602	0.810	2.578	0.001	17.585
NPL growth	22,326	2.921	-1.366	33.326	-70.916	198.895
Loan growth	23,166	1.953	1.421	6.207	-17.287	31.225
Tier 1 ratio _{t-1}	22,471	14.975	13.479	5.815	7.620	45.750
<i>Country level variables</i>						
Real GDP growth	912	0.65	0.72	3.71	-29.33	27.11
Unemployment rate	912	7.27	6.45	3.76	1.87	24.33
Real GDP forecast	912	3.28	2.90	1.98	-8.52	9.90
Uncertainty	912	0.09	0.07	0.06	0.00	0.49
Fiscal support _{t-1}	304	8.79	5.30	9.80	0.00	42.45
Direct support _{t-1}	304	4.07	2.87	4.36	0.00	24.94
Liquidity support _{t-1}	304	4.73	2.15	6.95	0.00	29.64

Data



Evolution of loan loss provisions

Data



Fiscal support across countries

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Results

	(1) LLP	(2) LLP	(3) LLP
Fiscal support _{t-1}	-0.0033*** (0.0007)	-0.0019*** (0.0005)	-0.0015** (0.0006)
Observations	20,683	20,683	20,683
Adjusted R-squared	0.3542	0.5296	0.5385
Controls	Yes	Yes	Yes
Bank FE	No	Yes	Yes
Time FE	Yes	No	Yes

Based on column (3), a one standard deviation increase in fiscal support is associated with a 0.015 percentage point decline in LLP, which explains 15% of banks' average LLP [Details](#)

Results

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Fiscal support _{t-1}	-0.0033*** (0.0007)	-0.0019*** (0.0005)	-0.0015** (0.0006)	-0.0015** (0.0006)
Real GDP forecast				0.0018 (0.0026)
Uncertainty				0.1191 (0.1076)
Observations	20,683	20,683	20,683	20,683
Adjusted R-squared	0.3542	0.5296	0.5385	0.5389
Controls	Yes	Yes	Yes	Yes
Bank FE	No	Yes	Yes	Yes
Time FE	Yes	No	Yes	Yes

Results

- We find that fiscal support had a negative effect on banks' loan loss provisions
- A one standard deviation increase in fiscal support is associated with a 0.015 percentage point decline in LLP in the next quarter, which can explain 15% of banks' average LLP
- Loan loss provisions were not only based on banks' loan portfolio composition and economic outlook, but to a large extent on fiscal support

Results

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Direct support _{t-1}	-0.0050*** (0.0010)	-0.0031*** (0.0007)	-0.0027*** (0.0008)	-0.0027*** (0.0007)
Liquidity support _{t-1}	0.0004 (0.0009)	0.0013*** (0.0005)	0.0009 (0.0006)	0.0007 (0.0006)
Real GDP forecast				0.0022 (0.0027)
Uncertainty index				0.0709 (0.1084)
Observations	20,683	20,683	20,683	20,683
Adjusted R-squared	0.3572	0.5312	0.5395	0.5397
Controls	Yes	Yes	Yes	Yes
Bank FE	No	Yes	Yes	Yes
Time FE	Yes	No	Yes	Yes

Based on column (3), a one standard deviation increase in direct support is associated with a 0.020 percentage point decline in LLP, which explains 20% of banks' average LLP [Details](#)

Results

- We find that direct support had a negative effect on banks' loan loss provisions, while liquidity support did not (which accords with [Altavilla et al., 2021](#); [Casanova et al., 2021](#))
- A one standard deviation increase in direct support is associated with a 0.020 percentage point decline in LLP in the next quarter, which explains 20% of banks' average LLP
- This has important policy implications for the design of governments' fiscal strategy during economic downturns

Additional analyses

- Exploiting bank heterogeneity
- Instrumental variable estimation
- Controlling for other policy interventions

Additional analyses – Bank heterogeneity

Banks with larger and riskier loan portfolios benefited more from fiscal support measures Decomposition

	(1)	(2)	(3)	(4)
	LLP	LLP	LLP	LLP
Fiscal support _{t-1}	-0.0016*** (0.0006)	-0.0013** (0.0006)	-0.0016** (0.0006)	-0.0013** (0.0006)
Fiscal support _{t-1} × Capital dummy	0.0003 (0.0003)			
Fiscal support _{t-1} × Loan dummy		-0.0004** (0.0002)		
Fiscal support _{t-1} × NPL dummy			0.0002 (0.0003)	
Fiscal support _{t-1} × LLR dummy				-0.0009*** (0.0003)
Observations	20,683	20,683	20,683	20,683
Adjusted R-squared	0.5389	0.5389	0.5389	0.5391
Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Additional analyses – IV approach

- Countries more severely hit by the pandemic may have adopted both stricter lockdowns—which adversely affected banks' credit risk—and broader support measures (see [Aizenman et al., 2022](#))
- First-stage regression:

$$Fiscal\ support_c = \alpha + \rho_1 Regime\ durability_c + \rho_2 Presidential\ system_c + \rho_3 Government\ effectiveness_c + \gamma X_b + \delta M_c + \epsilon_c \quad (3)$$

- Second-stage regression:

$$LLP_b = \alpha + \beta \widehat{Fiscal\ support}_c + \gamma X_b + \delta M_c + \epsilon_b \quad (4)$$

Additional analyses – IV approach

The results are robust to instrumental variable estimation First stage

	(1) LLP	(2) LLP
Fiscal support	-0.0306* (0.0143)	
Direct support		-0.0315* (0.0160)
Liquidity support		-0.0293 (0.0157)
Observations	807	807
Adjusted R-squared	0.467	0.467
Controls	Yes	Yes

Additional analyses – Central bank interventions

The results are robust to controlling for central bank interventions

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Fiscal support _{t-1}	-0.0030*** (0.0007)	-0.0014** (0.0005)		
Direct support _{t-1}			-0.0049*** (0.0009)	-0.0025*** (0.0007)
Liquidity support _{t-1}			0.0007 (0.0009)	0.0006 (0.0007)
Monetary stimulus _{t-1}	0.0224 (0.0131)	0.0501* (0.0275)	0.0116 (0.0134)	0.0289 (0.0295)
Δ Policy rate	0.0001 (0.0024)	0.0002 (0.0020)	-0.0001 (0.0024)	0.0003 (0.0020)
Observations	20,676	20,676	20,676	20,676
Adjusted R-squared	0.3658	0.5393	0.3687	0.5399
Controls	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes

Additional analyses – Public health interventions

The results are robust to controlling for public health interventions Extra

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Fiscal support _{t-1}	-0.0035*** (0.0007)	-0.0017*** (0.0006)		
Direct support _{t-1}			-0.0052*** (0.0008)	-0.0027*** (0.0007)
Liquidity support _{t-1}			0.0011 (0.0009)	0.0005 (0.0007)
Stringency index _{t-1}	-0.0008 (0.0006)	-0.0007** (0.0003)	0.0002 (0.0004)	-0.0002 (0.0003)
Observations	20,683	20,683	20,683	20,683
Adjusted R-squared	0.3644	0.5390	0.3682	0.5397
Controls	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes

Additional robustness checks

- Sample composition
- Alternative estimation windows
- Alternative model specifications

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Conclusion

- Recessions tend to go hand in hand with financial crises ([Jordà et al., 2011](#)), but it seems that the COVID-19 crisis marks an exception
- Our results suggests that fiscal support, especially direct support, played an important role in this respect
- While the pandemic is an exogenous shock to the economy, overly protecting the real economy to the benefit of the financial sector may lead to a moral hazard problem that increases banks' risk-taking (see [Black and Hazelwood, 2013](#))

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Appendix

Government support data

- 1 Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic (International Monetary Fund)
- 2 Bruegel data set on fiscal response to the economic fallout from the coronavirus (Bruegel)
- 3 COVID-19 Financial Response Tracker (Yale Program on Financial Stability)
- 4 Official government statements

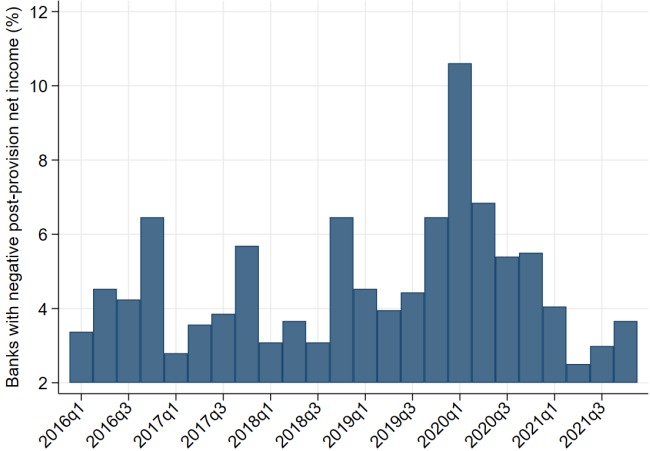


Findings

- There are two reasons why our results indicate that fiscal support can have contributed to banks' resilience during the COVID-19 crisis:
- ① Fiscal support sustained banks' buffers Figure
- ② Fiscal support mitigated regulatory concerns ([Andries et al., 2017](#); [Beatty and Liao, 2011](#); [Nicoletti, 2018](#))



Findings



The fraction of banks with negative post provision net income nearly tripled in 2020Q1

Results

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Fiscal support _{t-1}	-0.0033*** (0.0007)	-0.0019*** (0.0005)	-0.0015** (0.0006)	-0.0015** (0.0006)
RBP	0.2281*** (0.0181)	0.2366*** (0.0226)	0.2411*** (0.0223)	0.2415*** (0.0223)
Loan growth	-0.0012*** (0.0004)	-0.0006** (0.0003)	-0.0006 (0.0004)	-0.0006 (0.0004)
ln(Total assets _{t-1})	0.0025* (0.0013)	0.0406** (0.0187)	0.0261* (0.0146)	0.0232* (0.0135)
LLR _{t-1}	0.0114* (0.0059)	0.0012 (0.0076)	0.0017 (0.0075)	0.0017 (0.0074)
NPL growth	0.0005*** (0.0000)	0.0004*** (0.0000)	0.0004*** (0.0000)	0.0004*** (0.0000)
NPL _{t-1}	0.0142*** (0.0043)	0.0155*** (0.0047)	0.0158*** (0.0046)	0.0159*** (0.0046)
Tier 1 ratio _{t-1}	-0.0013 (0.0008)	0.0010 (0.0014)	0.0008 (0.0015)	0.0008 (0.0015)
Real GDP growth	-0.0002 (0.0021)	-0.0031 (0.0019)	-0.0021** (0.0009)	-0.0021** (0.0010)
Unemployment rate	0.0052** (0.0020)	0.0099*** (0.0023)	0.0059*** (0.0015)	0.0056*** (0.0017)
Real GDP forecast				0.0018 (0.0026)
Uncertainty				0.1191 (0.1076)
Observations	20,683	20,683	20,683	20,683
Adjusted R-squared	0.3542	0.5296	0.5385	0.5389
Bank FE	No	Yes	Yes	Yes
Time FE	Yes	No	Yes	Yes



Results

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Direct support _{t-1}	-0.0050*** (0.0010)	-0.0031*** (0.0007)	-0.0027*** (0.0008)	-0.0027*** (0.0007)
Liquidity support _{t-1}	0.0004 (0.0009)	0.0013*** (0.0005)	0.0009 (0.0006)	0.0007 (0.0006)
RBP	0.2291*** (0.0180)	0.2372*** (0.0226)	0.2415*** (0.0223)	0.2421*** (0.0223)
Loan growth	-0.0012*** (0.0004)	-0.0006** (0.0003)	-0.0006 (0.0004)	-0.0006 (0.0004)
ln(Total assets _{t-1})	0.0014 (0.0014)	0.0502** (0.0193)	0.0347** (0.0150)	0.0322** (0.0137)
LLR _{t-1}	0.0117* (0.0059)	0.0023 (0.0077)	0.0025 (0.0075)	0.0024 (0.0075)
NPL growth	0.0005*** (0.0000)	0.0004*** (0.0000)	0.0004*** (0.0000)	0.0004*** (0.0000)
NPL _{t-1}	0.0134*** (0.0044)	0.0157*** (0.0047)	0.0158*** (0.0046)	0.0159*** (0.0045)
Tier 1 ratio _{t-1}	-0.0015* (0.0008)	0.0010 (0.0014)	0.0007 (0.0015)	0.0007 (0.0015)
Real GDP growth	-0.0001 (0.0020)	-0.0031* (0.0017)	-0.0020** (0.0009)	-0.0020** (0.0009)
Unemployment rate	0.0057*** (0.0020)	0.0102*** (0.0023)	0.0073*** (0.0016)	0.0071*** (0.0019)
Real GDP forecast				0.0022 (0.0027)
Uncertainty index				0.0709 (0.1084)
Observations	20,683	20,683	20,683	20,683
Adjusted R-squared	0.3572	0.5312	0.5395	0.5397
Bank FE	No	Yes	Yes	Yes
Time FE	Yes	No	Yes	Yes

Additional analyses

	(1) LLP	(2) LLP	(3) LLP	(4) LLP	(5) LLP
Direct support _{t-1}	-0.0022** (0.0008)	-0.0030*** (0.0007)	-0.0026*** (0.0008)	-0.0026*** (0.0007)	-0.0024*** (0.0008)
Liquidity support _{t-1}	0.0010 (0.0006)	0.0008 (0.0006)	0.0007 (0.0006)	0.0008 (0.0006)	0.0006 (0.0006)
Direct support _{t-1} × Size dummy	-0.0011* (0.0006)				
Direct support _{t-1} × Capital dummy		0.0007* (0.0004)			
Direct support _{t-1} × Loan dummy			-0.0001 (0.0002)		
Direct support _{t-1} × NPL dummy				-0.0006* (0.0003)	
Direct support _{t-1} × LLR dummy					-0.0010*** (0.0003)
Observations	20,683	20,683	20,683	20,683	20,683
Adjusted R-squared	0.5400	0.5398	0.5397	0.5398	0.5399
Controls	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes



Additional analyses

	(1) LLP	(2) LLP	(3) LLP	(4) LLP	(5) LLP
Direct support _{t-1}	-0.0027*** (0.0007)	-0.0027*** (0.0007)	-0.0027*** (0.0007)	-0.0027*** (0.0007)	-0.0028*** (0.0007)
Liquidity support _{t-1}	-0.0012 (0.0035)	0.0008 (0.0005)	0.0008 (0.0006)	0.0007 (0.0007)	0.0009 (0.0006)
Liquidity support _{t-1} × Size dummy	0.0019 (0.0033)				
Liquidity support _{t-1} × Capital dummy		-0.0002 (0.0006)			
Liquidity support _{t-1} × Loan dummy			-0.0004 (0.0004)		
Liquidity support _{t-1} × NPL Dummy				-0.0000 (0.0005)	
Liquidity support _{t-1} × LLR dummy					-0.0009 (0.0011)
Observations	20,683	20,683	20,683	20,683	20,683
Adjusted R-squared	0.5397	0.5397	0.5397	0.5397	0.5397
Controls	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes



Additional analyses

	(1)	(2)	(3)
	Fiscal support	Direct support	Liquidity support
Regime durability	0.0920*** (0.0135)	0.119*** (0.00957)	-0.0290*** (0.00782)
Presidential system	-7.335*** (1.184)	1.140* (0.572)	-8.506*** (0.812)
Government effectiveness	0.0829 (0.0437)	0.0563* (0.0269)	0.0339 (0.0269)
RBP	-1.557** (0.568)	-0.436 (0.239)	-1.162** (0.397)
Loan growth	0.168*** (0.0332)	0.0770*** (0.0171)	0.0915*** (0.0219)
$\ln(\text{Total assets}_{t-1})$	-0.278* (0.117)	-0.258*** (0.0650)	-0.0192 (0.0775)
LLR_{t-1}	-0.372 (0.278)	-0.178 (0.117)	-0.179 (0.224)
NPL growth	-0.000127 (0.00201)	0.000683 (0.00111)	-0.000637 (0.00116)
NPL	0.0630 (0.227)	0.109 (0.0937)	-0.0293 (0.183)
Tier 1 ratio $_{t-1}$	-0.101*** (0.0302)	-0.0496** (0.0160)	-0.0489** (0.0183)
Real GDP growth	0.606*** (0.166)	0.413*** (0.0963)	0.170 (0.142)
Unemployment rate	-0.627*** (0.124)	-0.227** (0.0836)	-0.390*** (0.0919)
Real GDP forecast	-1.985*** (0.290)	-0.225 (0.139)	-1.740*** (0.199)
Uncertainty	-6.451 (7.428)	12.77* (5.772)	-18.45** (5.809)
Observations	807	807	807
F-test of excluded instruments	F(3,792) = 42.05 Prob > F = 0.00	F(3,792) = 101.68 Prob > F = 0.00	F(3,792) = 45.13 Prob > F = 0.00
Hansen test	$\chi^2_{(2)}$ p-value = 0.7809	$\chi^2_{(1)}$ p-value = 0.5163	$\chi^2_{(1)}$ p-value = 0.5163

Additional analyses

	2018-2021		2020-2021	
	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Fiscal support _{t-1}	-0.0016*** (0.0005)		-0.0008 (0.0006)	
Direct support _{t-1}		-0.0027*** (0.0006)		-0.0017* (0.0010)
Liquidity support _{t-1}		0.0002 (0.0004)		0.0003 (0.0008)
Observations	13,733	13,733	6,109	6,109
Adjusted R-squared	0.5394	0.5400	0.5134	0.5135
Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes



Additional analyses

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Fiscal support _{t-1}	-0.0018** (0.0007)	-0.0007 (0.0006)		
Direct support _{t-1}			-0.0048** (0.0018)	-0.0037* (0.0021)
Liquidity support _{t-1}			-0.0002 (0.0011)	0.0009 (0.0010)
Observations	7,965	7,965	7,965	7,965
Adjusted R-squared	0.3290	0.5139	0.3292	0.5141
Controls	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes



Additional analyses

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
LLP _{t-1}	0.0960*** (0.0279)	0.1050** (0.0344)	0.0938*** (0.0279)	0.103** (0.0345)
LLP _{t-2}		0.0520** (0.0235)		0.0490* (0.0235)
Fiscal support _{t-1}	-0.0019*** (0.0003)	-0.0019*** (0.0003)		
Direct support _{t-1}			-0.0026*** (0.0004)	-0.0025*** (0.0004)
Liquidity support _{t-1}			0.0000 (0.0005)	-0.0002 (0.0005)
Observations	18,577	17,510	18,577	17,510
Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Arellano-Bond test	p=0.337	p=0.608	p=0.356	p=0.646

Additional analyses

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Δ Fiscal support _{t-1}	-0.2625** (0.1095)			
Δ Fiscal support _{t-1,t-2}		-0.1909** (0.0911)		
Δ Direct support _{t-1}			-0.4445*** (0.1552)	
Δ Liquid support _{t-1}			0.0373 (0.1518)	
Δ Direct support _{t-1,t-2}				-0.3223** (0.1286)
Δ Liquid support _{t-1,t-2}				0.0180 (0.0996)
Observations	19,854	19,005	19,854	19,005
Adjusted R-squared	0.5381	0.5376	0.5382	0.5378
Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes