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Foreign bank lending during COVID-19

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ABSTRACT

We study whether foreign banks' exposure to the pandemic in their home countries affected their lending in Türkiye. Although foreign banks issued more loans than domestic banks, the ones with higher exposure to the pandemic decreased their lending significantly: 1 percentage point higher number of deaths per thousand people in their home countries led to an almost 0.5 percent reduction in lending. This reduction was alleviated by the fiscal support provided in their home countries. Our results support an international spillover of the pandemic shock and the implemented fiscal policies via banks.

1. Introduction

The COVID-19 pandemic has highlighted the importance of a well-functioning banking system with stable loan provisions to the real economy. In emerging market economies, the share of credit from foreign banks in total credit supply is around 20% on average (Hardy, 2019). In this context, it is essential to study the lending responses of foreign banks to the pandemic to investigate whether foreign banks promote financial stability by providing additional loans or interrupt it by cutting lending even more than domestic banks during an economic downturn. In this paper, we study the lending responses of foreign banks relative to domestic banks in Türkiye, a large emerging economy, during the COVID-19 pandemic.

Foreign banks might increase financial stability by alleviating financial constraints and providing stable access to credit. However, in times of distress, they might instead decrease their lending in the host countries to focus their lending in their home countries. To investigate this, we aim to answer the following questions: Did foreign banks lend more or less relative to domestic banks during the pandemic? Did foreign banks with higher exposure to COVID-19 in their home countries decrease their loan supply to borrowers in Türkiye? Did the fiscal support that their home country governments provided alleviate the reduction in foreign banks' loan supply? And finally, could firms lessen the effect of the pandemic shock by switching to other banks?

To answer these questions, we use comprehensive monthly bank–firm level credit register data provided by the Central Bank of the Republic of Türkiye (CBRT). These data enable us to include firm × year–month fixed effects in our analysis to control for all time-varying firm characteristics that might be correlated with changes in loan demand. This allows us to distinguish loan supply from loan demand. We focus on firms with multiple bank lenders by including firm × year–month fixed effects. We additionally control for firm × bank fixed effects to absorb any time-invariant characteristics of the firm–bank pairs that might capture the relationship lending.

Unlike the prior crises, the COVID-19 pandemic was a health shock that initially affected firms and households rather than banks. We use the pandemic period to investigate foreign banks' lending responses to the shock. Our analysis focuses on the period from January 2019 to September 2020 to study the initial shock, which was mostly exogenous with high uncertainty on the severity and the duration of the crisis.

Türkiye provides a useful setting to investigate foreign bank lending in emerging economies during the pandemic for three reasons: First, Türkiye's financial system is bank-dominated, where more than

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95% of outstanding loans are provided by banks (Akgunduz et al., 2021). Second, almost 38% of the outstanding loans during the pre-pandemic period, from the beginning of 2019 until December 2019, were issued by foreign banks. Third, nearly 55% of firms have multiple bank lenders, which determines the sample size since we use firm × year–month fixed effects in our analysis to control for loan demand.

We proceed in four steps: First, we examine the lending responses of foreign banks relative to domestic banks during the pandemic. According to the literature, on the one hand, foreign banks might decrease their lending in the host countries (see, e.g., Claessens and Van Horen, 2012; Popov and Udell, 2012; Puri et al., 2011; Schnabl, 2012; Albertazzi and Bottero, 2014; Ongena et al., 2016) and instead concentrate their lending in their home countries (see, e.g., Giannetti and Laeven, 2012). The documented reason behind this behavior is the higher informational and agency costs due to the distance between the borrowers and the bank headquarters (see, e.g., Mian, 2006; De Haas and Van Lelyveld, 2014). On the other hand, foreign banks are mostly part of larger bank holding companies with more diversified portfolios and access to funding in international markets. This enables them to continue the provision of credit during distress times (see, e.g., Dages et al., 2000; Crystal et al., 2002; Mody and Peria, 2004; De Haas and Van Lelyveld, 2004, 2006, 2010). The latter hypothesis is more likely to hold in Türkiye as foreign banks with large international parent companies are expected to have more stable funding resources relative to domestic banks in emerging economies during the pandemic.

According to our results, foreign banks issued 6.6 percent more loans than domestic banks in Türkiye during the pandemic from the beginning of April 2020 until the end of September 2020. We find that this relative increase comes solely from short-term loans with a one-year or less maturity: Foreign banks issued 10.2 percent more short-term loans than domestic banks. They issued relatively more FX (foreign currency) loans (14.8 percent) compared to domestic currency loans (5.9 percent).

Second, we study whether foreign banks with a higher exposure to the COVID-19 pandemic in their home countries decreased their loan supply to borrowers in Türkiye. By including firm × year–month fixed effects, we study whether the same firm received fewer loans issued by foreign banks with a higher exposure to COVID-19 in their home countries relative to loans issued by foreign banks with a lower exposure to the pandemic. We measure each foreign bank's exposure to COVID-19 by the monthly aggregated number of deaths per thousand people in the foreign bank's home country. This measures the severity of the pandemic in foreign banks' home countries. We expect that foreign banks with a home country that experienced a more severe pandemic would reduce their lending in Türkiye as a response to the pandemic.

Our results show that a one percentage point higher exposure to the pandemic, i.e., a one percentage point higher number of deaths per thousand people, significantly reduced foreign banks' loan supply by almost 0.5 percent. This implies that foreign banks transmitted the shock from their home countries to the host country by reducing their loan supply. The decrease in short- and long-term loans is similar. They cut their domestic currency loans more than their foreign currency loans. A 1 percentage point increase in their exposure led to a 0.5 percent decrease in their domestic currency loans and a 0.16 percent decrease in their foreign currency loans. The difference could be attributed to their willingness to decrease their exposure to exchange rate risk during the pandemic.

Third, we investigate whether the fiscal support their home countries provided helped foreign banks avoid a reduction in their loan supply in the host country. To examine this, we use the fiscal support as a percentage of the GDP reported on IMF's Fiscal Policies Database as part of the country's fiscal measures in response to the COVID-19 pandemic.[1] The fiscal support includes equity injections, loans, asset purchases or debt assumptions as well as guarantees and quasi-fiscal operations as contingent liabilities. We expect that foreign banks from countries with higher fiscal support would experience a lower reduction in their loan supply in Türkiye.

We find that a one percentage point higher fiscal support per GDP led to a 0.1 basis point less reduction in foreign banks' loan supply. In addition, those from countries with no fiscal support experienced a 1.3 percent decrease in their loan supply for a one percentage point higher exposure to the pandemic. This implies that the fiscal support by their home governments helped foreign banks to alleviate the reduction in their loan supply in Türkiye.

Last, we analyze whether firms could avoid a reduction in their total loans by switching to less affected foreign banks or domestic banks. In the firm-level analysis, we define each firm's exposure as the weighted average exposure of its foreign banks to the COVID-19 pandemic in their home countries. It is calculated as the weighted average number of deaths per thousand people in its foreign banks' home countries, where the weights are the pre-pandemic proportions of loans that each foreign bank issued at the end of 2019. Similarly, we compute a firm-level weighted average fiscal support to investigate whether the fiscal support of the foreign banks' home countries had an impact at the firm level.

According to our findings, firms with high-exposure foreign banks experienced a significant reduction in their total loans. A 1 percentage point increase in foreign banks' exposure resulted in an almost 0.8 percent reduction in firms' total loans. Both short-term (0.8 percent) and long-term loans (0.4 percent) decreased due to the shock, where the decline is more pronounced in short-term loans. In addition, the reduction in FX loans (0.2 percent) is less than in domestic currency loans (0.9 percent). When we analyze the firm-level impact of the fiscal support provided to the foreign banks in their home countries, we find a significantly positive effect: Firms with foreign banks that received higher fiscal support experienced a significantly less reduction in their total loans.

Overall, our results show that although foreign banks issued more loans relative to domestic banks during the pandemic in Türkiye, the severity of the pandemic in foreign banks' home countries affected their loan supply adversely, i.e., they transmitted the shock from their home countries to the host country by a reduction in their loan supply. Yet, the fiscal support provided by the governments in their home countries alleviated this adverse effect. This suggests that the fiscal policies adopted in foreign banks' home countries were transmitted to their host countries as a positive shock to their loan supply. As a result, firms with lending relationships with high-exposure foreign banks experienced a significant decrease in their overall lending, mitigated by the fiscal support provided in foreign banks' home countries.

Our paper contributes to the literature on differences between foreign and domestic banks' loan supply during crisis times in emerging markets. Several papers show evidence from mainly emerging markets that foreign banks do not cut their lending as much as their domestic counterparts during a financial crisis, which is due to the support of their parent banks (see, e.g., Dages et al., 2000; Crystal et al., 2002; Mody and Peria, 2004; De Haas and Van Lelyveld, 2004, 2006, 2010). Our findings that foreign banks on average issued more loans in Türkiye during the COVID-19 pandemic are in line with this strand of the literature.

At the same time, several papers show that capital shocks to the parent companies at home can reduce foreign bank subsidiaries' lending in host countries. The seminal papers, Peek and Rosengren (1997) and Peek and Rosengren (2000) provide evidence of how the sharp decline in Japanese stock prices was transmitted to the United States by a reduction in the loan supply of the Japanese subsidiaries. Several follow-up studies show similar evidence of the international transmission of shocks via foreign banks (see, e.g., Mian, 2006; Claessens and Van Horen, 2012; Popov and Udell, 2012; Puri et al., 2011; Schnabl, 2012; Giannetti and Laeven, 2012; De Haas and Van Lelyveld, 2014;

[1] https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19.

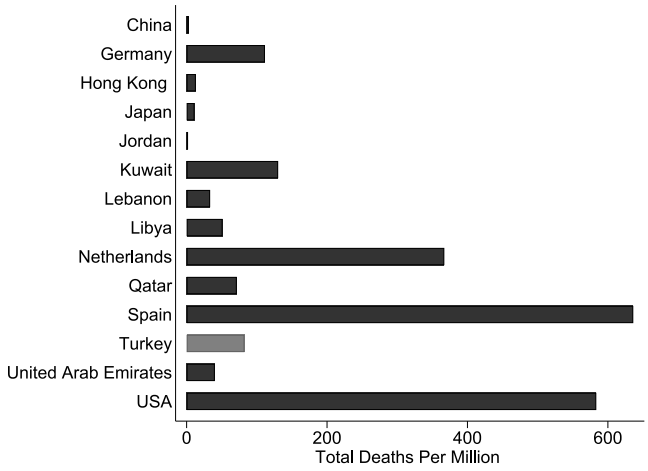

Fig. 1. COVID-19 related deaths in home countries.
This figure plots the total number of deaths per million in population due to COVID-19 as of September 2020.

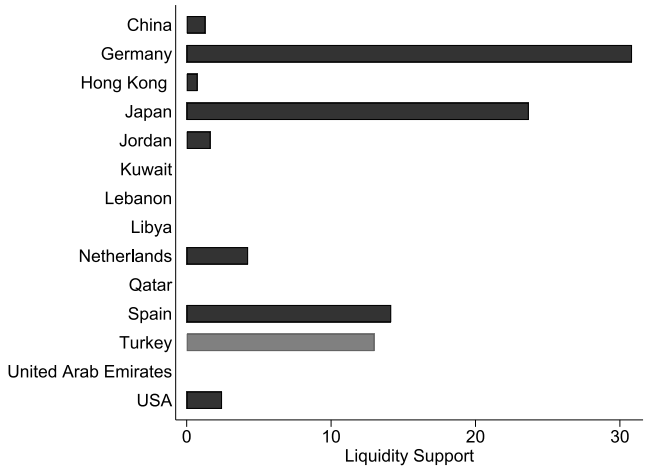

Fig. 2. Fiscal support by home country.
This figure plots the fiscal support as a proportion of GDP as of September 2020. Fiscal support data are obtained from the IMF's Fiscal Policies Database as part of the country's fiscal measures in response to the COVID-19 pandemic (October 2020). It includes equity injections, asset purchases, loans, debt assumptions, and guarantees.

Albertazzi and Bottero, 2014; Ongena et al., 2016). Our paper contributes to this literature by providing evidence on the international transmission of the COVID-19 pandemic shocks via foreign banks. In a recent study, Sen et al. (2022) examine foreign banks' loan supply during the pandemic using bank-level data in a multi-country analysis. They find that foreign banks continued their stable loan provision in emerging markets, although lockdown measures were stringent in those countries. We further their study by using bank-borrower matched data that enables us to fully separate loan demand from loan supply.[2]

Finally, we contribute to the more recent literature on the international credit channel of monetary policy (see, e.g., Avdjiev et al., 2018; Temesvary, 2018; Temesvary et al., 2018; Buch et al., 2019; Lindner et al., 2019; Morais et al., 2019; Alper et al., 2020; Bräuning and Ivashina, 2020a,b; Demirgüç-Kunt et al., 2020). The literature shows that monetary policy can be transmitted across countries through foreign or global banks' lending. Our finding that the fiscal support provided by foreign banks' home country governments mitigated the reduction in their loan supply in Türkiye contributes to this literature.

The paper is organized as follows: Section 2 describes the COVID-19 pandemic. Section 3 illustrates the data and the empirical methodology. Section 4 presents our main results, and Section 5 summarizes the robustness checks. Section 6 concludes.

2. The COVID-19 pandemic in Türkiye

COVID-19 was first diagnosed in Wuhan, China, in December 2019. In January 2020, the pandemic spread to the United States; in March 2020, it spread significantly to Europe. The COVID-19 pandemic caused around 765 million cases and 6.9 million deaths as of May 3, 2023, when the WHO declared the end of the pandemic.

The pandemic's course and intensity varied across the home countries of foreign banks operating in Türkiye. Fig. 1 presents the total deaths per million in each home country for foreign banks in Türkiye as of September 2020. The intensity of the pandemic was highest in Europe, which has a comparatively older population. On the other hand, compared to Asia, Arabic-speaking countries faced higher death rates. As of September 2020, deaths per million in Türkiye were between Europe and the Arabic-speaking countries.

[2] Our paper is also related to Temesvary and Wei (2024) that study the impact of US banks' exposure to COVID-19 in foreign countries on their lending in the US during the pandemic.

Containment measures taken to prevent the spread of COVID-19, such as lockdowns, led to a significant decline in economic activity. Global GDP shrank by 3.5 percent in 2020, representing the largest decline since World War II (IMF, 2021). To mitigate the adverse effects of the pandemic, several fiscal and monetary measures were implemented by the governments and central banks. The size of these policies was generally related to the size of the economic contraction and the room for the monetary and fiscal space that governments had at the onset of the pandemic. To show the large variation in the government responses, we plot the fiscal support, as a percentage of GDP, provided in the home countries of the foreign banks operating in Türkiye as of September 2020 in Fig. 2. We utilize the fiscal support data from IMF's Fiscal Policies Database as part of the country's fiscal measures in response to the COVID-19 pandemic. It includes equity injections, asset purchases, loans, debt assumptions, and guarantees (on loans, deposits, etc.).

As shown in Fig. 2, Germany implemented generous fiscal support accounting for around 30 percent of its GDP. Although deaths from COVID-19 were not very high, Japan used fiscal support actively as well to support economic growth that was already low before the onset of the pandemic. As Spain was hit hard by COVID-19, it spent 14 percent of its GDP on fiscal support. Türkiye had limited fiscal expansion scope but used monetary policy aggressively as well. On the lower end of the scale, the share of the fiscal support in GDP in the United States was around 2 percent, and most Arabic-speaking countries did not provide any fiscal support to the economy as of September 2020.

Türkiye's policy responses to the pandemic reflect a balance between managing public health and sustaining economic activity, ultimately leading to a mixed recovery with unique characteristics. Initial measures included restrictions on international travel and selective curfews for vulnerable age groups. However, as case numbers remained high, broader weekend curfews and partial lockdowns were implemented between April and May 2020. These restrictions, though less severe than full lockdowns in other countries, significantly impacted economic activity. In the second quarter of 2020, GDP contracted by 10.3% annually, driven by declines in exports, tourism, and domestic demand. Manufacturing output fell sharply due to disruptions in supply chains and containment measures, while the services sector – normally resilient during downturns – was disproportionately affected by the restrictions.

Türkiye's economic policy response during the pandemic relied heavily on monetary measures, complemented by targeted fiscal support. The government extended loan guarantees to firms and households amounting to 6.4% of the GDP, providing a crucial safety net

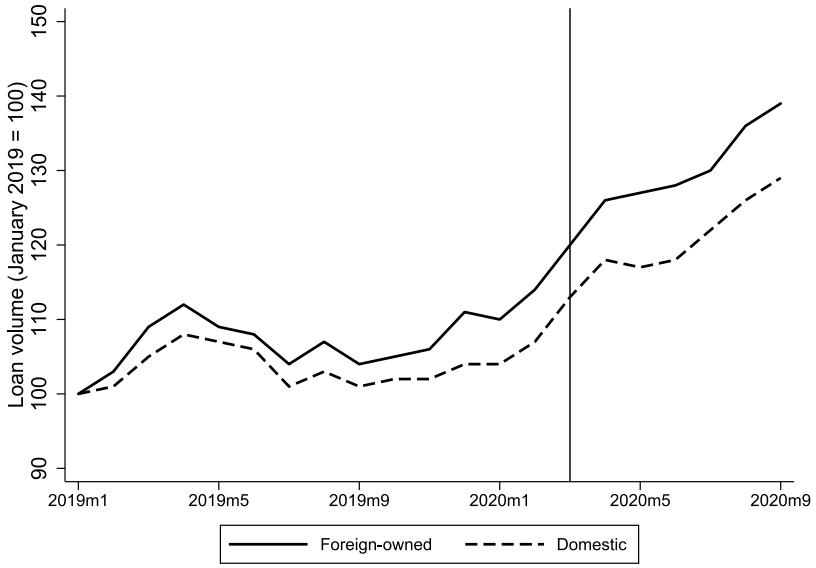

Fig. 3. Parallel trends. This figure plots the total volume of loans for foreign and domestic banks separately from January 2019 until September 2020.

to mitigate the financial impact of the pandemic. State-owned banks offered loan service deferrals equivalent to 2.6% of the GDP, alleviating short-term liquidity pressures on borrowers. Businesses benefited from tax deferrals of around 1.4% of the GDP, enabling them to preserve cash flows during the downturn. The government provided equity injections into state-owned banks, equivalent to 0.4% of the GDP, ensuring the financial sector could continue to extend credit to the economy. The Credit Guarantee Fund (KGF) was enhanced to provide guarantees for loans issued to businesses, particularly SMEs. The fund's capacity was doubled, ensuring firms could access much-needed liquidity during the crisis. Additionally, eligibility criteria for KGF-backed loans were relaxed to include a broader range of businesses. A short-term work scheme covering 0.6% of the GDP supported employees in firms affected by the pandemic, reaching 3.3 million workers at its peak in May 2020. This scheme expired in March 2021. Layoffs of formal workers were prohibited, though firms were allowed to place employees on unpaid leave. These workers received cash-fee support from the government. Vulnerable households received direct one-time cash transfers under a Social Support program, providing critical assistance during the crisis. Moreover, the CBRT continued an easing cycle, lowering the policy rate from 10.75% in February 2020 to 8.25% by May 2020. Additional measures included government bond purchases, longer-maturity repo transactions, and the expansion of collateral pools for Turkish Lira and foreign exchange operations.

3. Data and empirical methodology

3.1. Data

We use the Credit Register data, containing comprehensive monthly bank–firm level loan data made available by the Central Bank of the Republic of Türkiye. Our sample consists of 24 privately-owned commercial banks.[3] Table 1 presents the summary statistics. In our sample, the average outstanding loan is 2.25 million TL. Although the number of outstanding short-term loans is much larger (4.2 million versus 2.6 million), each loan's volume is much smaller on average than long-term loans. The average short-term loan is 0.6 million TL, whereas the average long-term loan is 3.2 million TL. On the other hand, the number of loans in the domestic currency is much larger than in foreign currencies (4.8 million versus 0.2 million). However, the volume of an average FX loan (36.8 million TL) is much larger than an average loan denominated in TL (0.9 million TL).

In our analysis, we define a bank as a foreign bank if the majority (at least 50%) is owned by foreigners.[4] In our sample, we have 16 foreign banks and eight domestic banks. Foreign banks have a large credit market share in Türkiye.[5] As reported in Table 1, almost 38% of outstanding loans in the pre-pandemic period were issued by foreign banks, which is much larger than 20% that is reported as the average credit market share of foreign banks in emerging market economies by Hardy (2019). The market share of foreign banks was stable at around 39% during the pandemic period. This large market share highlights the importance of foreign banks for Türkiye's economy.

We merge the credit register data with the bank balance sheet data from 2019 collected by the Banking Regulation and Supervision Agency to include bank size, equity, non-core funding, liquid assets, return on equity (ROE), and non-performing loans as further controls. According to the summary statistics reported in Table 2, the banks in our sample have an average size of around 98 billion TL. Domestic banks, with an average total assets of almost 175 billion TL, are larger than foreign banks, with an average size of around 60 billion TL. The average equity ratio of foreign banks is almost 20%, which is much larger than the equity ratio of domestic banks (11.5%). Similarly, foreign banks have, on average, more liquid assets relative to domestic banks. When we look at their funding, foreign banks finance a large fraction of their assets with non-core liabilities (43%), whereas domestic banks use only 28% of non-core funding. Although both types of banks have a similar non-performing loans to total loans ratio of around 7.5%, foreign banks have higher profitability. The average return on equity for foreign banks (13%) is more than triple that of domestic banks (4%).

As a final step, we merge the credit register data with the COVID-19 deaths (per thousand people) in the home countries of foreign banks, which measures the severity of the pandemic in these countries. We first download the daily number of deaths due to COVID-19 in each country from "Our World in Data" (https://ourworldindata.org/). We subsequently aggregate the number of deaths monthly and scale it by

[3] Participation banks (also known as Islamic banks) and development and investment banks are not part of our sample.

[4] Our sample does not include foreign bank branches that are not independent institutions. Only 0.035% of the loan data belongs to such branches. As a result, excluding or including them does not change our findings.

[5] Turkish firms cannot borrow directly from foreign banks located in other countries. These loans need to go through domestic banks.

Table 1
Summary statistics.

	Mean	Median	Std. dev.	p10	p25	p75	p90	N
Pre-pandemic								
Loans	2248	90	51,000	6	19	396	1376	4,889,375
Short-term loans	633	30	15,200	3	10	121	533	4,187,103
Long-term loans	3206	172	64,000	12	46	500	1609	2,601,893
TL loans	860	82	14,800	5	19	349	1095	4,817,989
FX loans	36,800	2401	240,000	189	632	10,600	48,200	185,921
Foreign bank	0.376	0	0.484	0	0	1	1	4,889,375
Pandemic								
Loans	2834	89	60,400	5	19	400	1529	2,319,076
Short-term loans	975	32	20,800	3	9	165	840	1,984,438
Long-term loans	4142	162	77,800	19	51	472	1661	1,119,860
TL loans	1106	83	16,700	5	19	360	1244	2,288,286
FX loans	51,500	3434	300,000	285	919	15,100	73,700	78,438
Deaths per thousand	0.017	0	0.058	0	0	0.008	0.026	2,319,076
Liquidity support (in billions of USD)	15.447	0	38.249	0	0	0	51.031	2,319,076
Liquidity support (percent of GDP)	1.234	0	3.045	0	0	0	3.537	2,319,076
Foreign bank	0.394	0	0.489	0	0	1	1	2,319,076

This table reports the summary statistics for our main variables. Our sample comprises 24 privately-owned commercial banks in Türkiye. Short-term, long-term, TL, and FX loans are reported in thousands of TL. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020.

Table 2
Summary statistics — bank characteristics.

	Mean	p50	Std. Dev.	p10	p25	p75	p90	N
All banks								
NPL ratio	0.075	0.063	0.083	0	0.037	0.090	0.127	24
RoE	0.070	0.112	0.842	0.002	0.073	0.155	0.179	24
Liquidity	0.426	0.393	0.138	0.268	0.309	0.532	0.648	24
Non-core funding	0.380	0.318	0.233	0.142	0.248	0.401	0.705	24
Equity ratio	0.170	0.110	0.181	0.069	0.089	0.154	0.270	24
Total assets (billion TL)	98.198	25.415	147.575	1.734	7.959	131.959	388.085	24
Foreign banks								
NPL ratio	0.072	0.058	0.102	0	0.011	0.077	0.146	16
RoE	0.126	0.136	1.032	0.022	0.073	0.166	0.197	16
Liquidity	0.477	0.462	0.138	0.295	0.353	0.606	0.661	16
Non-core funding	0.430	0.360	0.265	0.142	0.248	0.623	0.893	16
Equity ratio	0.197	0.107	0.217	0.069	0.090	0.202	0.566	16
Total assets (billion TL)	60.032	18.542	103.623	1.734	4.447	46.147	181.932	16
Domestic banks								
NPL ratio	0.079	0.069	0.026	0.053	0.059	0.099	0.127	8
RoE	0.040	0.101	0.162	−0.346	0.045	0.119	0.139	8
Liquidity	0.323	0.318	0.061	0.258	0.267	0.369	0.419	8
Non-core funding	0.279	0.292	0.101	0.100	0.219	0.355	0.401	8
Equity ratio	0.115	0.116	0.036	0.065	0.083	0.148	0.158	8
Total assets (billion TL)	174.532	68.975	196.365	1.467	19.722	374.293	468.812	8

This table reports the summary statistics on bank-level characteristics from 2019 end-of-the-year balance sheets collected by the Banking Regulation and Supervision Agency. "NPL Ratio" is the ratio of non-performing loans to all loans. "RoE" is the return on equity. "Liquidity" is the ratio of liquid assets to total assets. "Non-core funding" is the ratio of non-core funding to total funding. "Equity ratio" is the ratio of total equity to total assets.

population per thousand people to calculate the monthly number of COVID-19 deaths per thousand people in each country.[6]

3.2. Empirical methodology

In this paper, we aim to study the lending responses of foreign banks during the COVID-19 pandemic in Türkiye. We proceed in four steps. As the first step, we examine whether foreign banks issued more or fewer loans than domestic banks in Türkiye. To achieve this, we use a difference-in-differences estimation method to compare lending before (Jan 2019–Dec 2019) and during the pandemic (Apr 2020–Sep 2020) for foreign versus domestic banks. Our comprehensive monthly bank–firm level loan data, as part of the credit register data provided by the Central Bank of the Republic of Türkiye, enables us to control loan demand following Khwaja and Mian (2008). We saturate estimation models with firm × year–month fixed effects so that we can control for changes in the loan demand.[7] By including firm × year–month fixed effects, we focus on firms that borrow from multiple banks and compare the changes in the loan supply by foreign versus domestic banks. We investigate whether the same firm experienced a relative increase or decrease in the amount of loans issued by foreign banks compared to the amount of loans issued by domestic banks. We additionally control for firm × bank fixed effects to absorb any time-invariant unobserved characteristics for firm–bank pairs (see, e.g., Baskaya et al., 2017; Akgunduz et al., 2021).

[6] In our sample, one foreign bank has two separate home countries. For this bank, the variables are calculated as the weighted average COVID-19 deaths of the two countries, where the weights are the ownership shares.

[7] There was a significant exchange rate deterioration of the Turkish Lira during our sample period. Including firm × year–month fixed effects enables us to additionally control for changes in the exchange rate during this period.

Table 3
Foreign bank loans.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post × Foreign	0.10525***	0.10236***	0.05459***	0.10156***	0.09908***	0.11390***	0.06579***
	(0.00472)	(0.00474)	(0.00519)	(0.00469)	(0.00467)	(0.00471)	(0.00614)
Post × NPL	−0.82225***						−1.64920***
	(0.14649)						(0.24602)
Post × RoE		−0.03710*					−0.32395***
		(0.02195)					(0.03847)
Post × Liquidity			−1.26025***				−1.84733***
			(0.06669)				(0.08606)
Post × Non-core funding				−0.06341*			0.11610
				(0.03822)			(0.07250)
Post × Equity ratio					0.75679***		0.32739*
					(0.10037)		(0.18566)
Post × Size						0.07842***	0.09326***
						(0.00308)	(0.00494)
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	7,208,451	7,208,451	7,208,451	7,208,451	7,208,451	7,208,451	7,208,451
R-squared	0.913	0.913	0.913	0.913	0.913	0.913	0.913

The dependent variable is the logarithm of the volume of loans. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. Bank characteristics are obtained from the bank balance sheets of 2019. "NPL Ratio" is the ratio of non-performing loans to all loans. "RoE" is the return on equity. "Liquidity" is the ratio of liquid assets to total assets. "Non-core funding" is the ratio of non-core funding to total funding. "Equity ratio" is the ratio of total equity to total assets. "Size" is the log-transformed total assets. All regressions include firm × year–month and bank × firm fixed effects. All standard errors are clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1

Our difference-in-differences estimation (DiD) model is structured as follows:

$$log(Loans_{i,j,t}) = \alpha Foreign_i \times Post_t + \beta X_i \times Post_t + \delta_{j,t} + \delta_{i,j} + u_{i,j,t}, \quad (1)$$

where $log(Loans_{i,j,t})$ is the logarithm of total loan amount of firm j from bank i in year–month t, $\delta_{j,t}$ are firm × year–month fixed effects, and $\delta_{i,j}$ are bank × firm fixed effects. $Foreign_i$ is an indicator variable equal to one for foreign banks, i.e., the majority of the bank (at least 50%) is owned by foreigners, and zero for domestic banks. The time period captures eighteen months from January 2019 until September 2020, excluding January, February, and March 2020.[8] $Post_t$ takes a value of one for the pandemic period from April 2020 to September 2020 and zero for the pre-pandemic period from January to December 2019. X_i includes bank characteristics that might affect banks' lending during the pandemic and consist of bank size, equity, non-core funding, liquid assets, return on equity (ROE), and non-performing loans. We control for the interaction of these bank characteristics with the $Post_t$ dummy to account for the possible effects of any bank characteristics on banks' lending during the pandemic. We cluster the standard errors at the firm level.

To analyze the change in the foreign banks' loan supply over time, we repeat our analysis for each month separately:

$$log(Loans_{i,j,t}) = \sum_{m=1}^{6} \alpha_m Foreign_i \times Month_{m,t} + \beta X_i \times Post_t + \delta_{j,t} + \delta_{i,j} + u_{i,j,t}, \quad (2)$$

where $Month_{m,t}$ takes the value of one for the specific month m in the post-treatment period and zero for the pre-treatment period, e.g., $Month_{1,t}$ takes the value of one for April 2020 and $Month_{6,t}$ takes the value of one for September 2020.

In the second step, we examine whether the severity of the pandemic in foreign banks' home countries affected their loan supply in Türkiye, i.e., whether foreign banks transmitted the pandemic shock from their home countries to the host country. To measure the severity of the pandemic, we use the monthly aggregated number of deaths due to COVID-19 per thousand people in each country. We estimate the following model:

$$log(Loans_{i,j,t}) = \alpha_1 Foreign_i \times Post_t + \alpha_2 Deaths\ per\ thousand_{i,t} \times Post_t + \beta X_i \times Post_t + \delta_{j,t} + \delta_{i,j} + u_{i,j,t}, \quad (3)$$

where $Deaths\ per\ thousand_{i,t}$ is the monthly aggregated number of deaths per thousand people in foreign bank i's home country.[9] The coefficient of interest is α_2, corresponding to the interaction term between the number of COVID-19 deaths per thousand people and the pandemic period. This variable measures whether foreign banks from countries with more COVID-19 deaths experienced a relative reduction in their loan supply during the pandemic relative to foreign banks with fewer COVID-19 deaths.

In the third step, we investigate whether the country's fiscal measures in response to the COVID-19 pandemic in foreign banks' home countries affected the reduction in their loan supply in Türkiye. One expects that a foreign bank from a country with more extensive fiscal measures taken during the pandemic might decrease its loan supply less in the host country due to the fiscal support from its home government. To study this, we use the following difference-in-difference-in-differences (DDD) estimation model:

$$\begin{aligned} log(Loans_{i,j,t}) = {} & \alpha_1 Foreign_i \times Post_t + \alpha_2 Deaths\ per\ thousand_{i,t} \times Post_t \\ & + \alpha_3 Liquidity\ support_i \times Post_t \\ & + \alpha_4 Liquidity\ support_i \times Deaths\ per\ thousand_{i,t} \times Post_t \\ & + \beta X_i \times Post_t + \delta_{j,t} + \delta_{i,j} + u_{i,j,t}, \end{aligned} \quad (4)$$

where $Liquidity\ support_i$ is the fiscal support that foreign bank i's government provided during the pandemic as a percentage of the

[8] January and February 2020 are considered as pre-pandemic for Türkiye since the pandemic started in March 2020. However, some foreign banks' home countries had the first COVID-19 case either in January or February, which makes these two months the pandemic. To avoid this confusion, we decided to exclude January and February from our analysis. In addition, we exclude March 2020 since the first case in Türkiye was detected on March 11, 2020. This makes the first half of the month pre-pandemic and the second half pandemic (Akgunduz et al., 2021). In Section 5.3, we report robustness tests that include these months in our analysis and show that our results are similar.

[9] As $Deaths\ per\ thousand$ is non-zero only for foreign banks, we use $Deaths\ per\ thousand_{i,t} \times Post_t$ instead of the triple interaction of $Foreign_i \times Deaths\ per\ thousand_{i,t} \times Post_t$. In addition, the double interaction $Deaths\ per\ thousand_{i,t} \times Post_t$ is equivalent to $Deaths\ per\ thousand_{i,t}$ as $Deaths\ per\ thousand$ is non-zero only during the post period. We write it as a double interaction for ease of interpretation.

country's GDP reported on the IMF's Fiscal Policies Database as part of the country's fiscal measures in response to the COVID-19 pandemic. The fiscal support includes equity injections, loans, asset purchases or debt assumptions, guarantees, and quasi-fiscal operations as contingent liabilities. The coefficient estimate of the triple interaction, α_4, measures the impact of the fiscal support provided by a foreign bank's home country on the reduction of that bank's loan supply in Türkiye due to the severity of the pandemic in its home country.

In the final step, we study the impact at the firm level. First, we analyze the effect of the foreign banks' COVID-19 exposure on firms' total loans. This enables us to investigate whether firms could switch to other banks when they experience a reduction in their loans from highly-exposed foreign banks. To do the analysis at the firm level, we implement the following model:

$$\begin{aligned} log(Loans_{j,t}) = {} & \alpha_1 Foreign\ share_j \times Post_t \\ & + \alpha_2 Weighted\ deaths\ per\ thousand_{j,t} \times Post_t \\ & + \delta_j + \delta_{n,p,s,t} + u_{j,t}, \end{aligned} \tag{5}$$

where $log(Loans_{j,t})$ is the logarithm of total loan amount of firm j from all banks in year–month t and δ_j are firm fixed effects. In the firm-level analysis, we cannot include firm × year–month fixed effects to control for changes in loan demand; we instead add industry × province × SME-status × year–month fixed effects, $\delta_{n,p,s,t}$, to control for loan demand following Degryse et al. (2019). $Foreign\ share_j$ is the pre-pandemic proportion of firm j's total loans issued by foreign banks calculated at the end of 2019. $Weighted\ deaths\ per\ thousand_{j,t}$ measures firm j's foreign banks' exposure to the COVID-19 pandemic. It is calculated as the weighted average number of COVID-19 deaths per thousand people in the home countries of its foreign banks, where the weights are the pre-pandemic loan portfolio shares that each foreign bank issues:

$$Weighted\ deaths\ per\ thousand_{j,t} = \sum_i \frac{Loans_{i,j}}{Loans_j} Deaths\ per\ thousand_{i,t}, \tag{6}$$

where $Loans_{i,j}$ is the amount of loans issued by bank i to firm j and $Loans_j$ is the total amount of loans issued to firm j, both are calculated at the end of the year 2019.

Second, we examine whether foreign banks' fiscal support has an impact at the firm level by estimating the following regression:

$$\begin{aligned} log(Loans_{j,t}) = {} & \alpha_1 Foreign\ share_j \times Post_t \\ & + \alpha_2 Weighted\ deaths\ per\ thousand_{j,t} \times Post_t \\ & + \alpha_3 Weighted\ liquidity\ support_j \times Post_t \\ & + \alpha_4 Weighted\ liquidity\ support_j \\ & \times Weighted\ deaths\ per\ thousand_{j,t} \times Post_t \\ & + \delta_j + \delta_{n,p,s,t} + u_{j,t}, \end{aligned} \tag{7}$$

where $Weighted\ liquidity\ support_j$ measures the fiscal support provided in the home countries of the foreign banks that firm j had a lending relationship by the end of 2019 and is computed as the weighted average fiscal support per GDP, where the weights are again the pre-pandemic loan portfolio shares of each foreign bank:

$$Weighted\ liquidity\ support_j = \sum_i \frac{Loans_{i,j}}{Loans_j} Liquidity\ support_i. \tag{8}$$

4. Main results

This section presents the empirical results. We begin by documenting the change in foreign banks' loan supply relative to domestic banks during the COVID-19 pandemic in Türkiye. We show whether foreign banks transmitted the pandemic shock from their home countries to Türkiye by reducing their loan supply. As a next step, we present the impact of higher fiscal support by their home governments on the transmission of the pandemic shock. Finally, we show firm-level results to investigate whether foreign banks' pandemic exposure affected firms' total loans. This enables us to examine whether firms could avoid a reduction in their loans by switching to other banks.

4.1. Foreign bank lending during the pandemic

We estimate the regression Eq. (1) to investigate whether foreign banks increased or decreased their loan supply relative to domestic banks during the pandemic. To employ a difference-in-differences estimation model, one needs to ensure the validity of the parallel trends assumption. To check this, we plot the total volume of loans for foreign and domestic banks separately for the time period from January 2019 to September 2020. Fig. 3 shows that, although foreign banks increased their lending slightly more than domestic banks during 2019, there was a relatively similar trend between domestic and foreign banks' lending during the pre-pandemic period. With the onset of the pandemic, domestic banks' lending decreased sharply in May and June 2020, whereas the loan volume of foreign banks continued to increase during this time. Although domestic banks' loan supply recovered from July 2020 onward, the loan volume remained much lower compared to foreign banks.

Including firm × year–month fixed effects in the regressions enables us to control for loan demand accurately by estimating whether the same firm received fewer loans issued by foreign banks than domestic banks. Table 3 presents the results. Columns (1) to (6) report the regression results, including different bank controls. Column (7) reports the baseline results with all bank controls interacted with the post dummy. According to the reported coefficient in column 7, foreign banks issued 6.6 percent more loans during the pandemic than domestic banks in Türkiye.

We next study whether there is a difference between short- and long-term loans. As reported in column (2) of Table 4, foreign banks issued 10.2 percent more short-term loans. According to our results in column (3), there is no significant change in their long-term loans. Thus, the relative increase in their loan supply comes from an increase in their short-term loans. Our sample period covers the initial phase of the pandemic with heightened informational frictions due to the uncertainty of the severity of the shock. This finding implies that foreign banks might have preferred issuing short-term loans to decrease their exposure to informational problems. This result is in line with the findings of Beck et al. (2018) that foreign banks are more likely to issue shorter maturity loans to mitigate information asymmetries and agency conflicts.

In addition, we find that foreign banks issued more loans denominated in foreign currencies (14.8 percent) compared to loans denominated in domestic currency (5.9 percent), as documented in columns (4) and (5). This implies that foreign banks avoided an increase in their exposure to exchange rate risk during the pandemic.

To examine whether foreign banks' lending response changed over time, we repeat our analysis for each month during the pandemic by estimating the regression Eq. (2). The results are reported in Table 5. According to our results from column (1), foreign banks first issued significantly fewer loans than domestic banks at the onset of the pandemic, which might be attributed to the uncertainty related to the pandemic. They issued 1.11 percent less loans in April 2020. From May onwards, they started to issue significantly more loans, stable until September 2020: 7.1 percent more in May and 8.5 percent more in September. When we study their short-term loans separately, we find that foreign banks issued significantly more short-term loans each month during the pandemic, where the amount changed from 7.5 percent in April to 11.7 percent. Examining their long-term loans monthly reveals that although they do not have a significant change in their long-term loans on average during the pandemic, they issued significantly fewer long-term loans in April by 8.7 percent. This reduction is the reason for the significant relative decrease in their total loan

Table 4
Foreign bank loans: Short-term versus long-term loans and TL versus FX loans.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.06579***	0.10183***	−0.00173	0.05889***	0.14780***
	(0.00614)	(0.00787)	(0.00896)	(0.00644)	(0.01999)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 5
Foreign bank loans: Monthly estimates.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
April × foreign	−0.01120*	0.07472***	−0.08713***	−0.01998***	0.12280***
	(0.00632)	(0.00823)	(0.00919)	(0.00662)	(0.01982)
May × foreign	0.07058***	0.08695***	0.00221	0.06389***	0.15053***
	(0.00650)	(0.00856)	(0.00928)	(0.00681)	(0.02089)
June × foreign	0.08191***	0.08722***	0.02640***	0.07593***	0.15636***
	(0.00665)	(0.00874)	(0.00944)	(0.00696)	(0.02100)
July × foreign	0.08842***	0.12399***	0.01652*	0.08182***	0.15194***
	(0.00673)	(0.00879)	(0.00956)	(0.00703)	(0.02201)
August × foreign	0.08830***	0.12411***	0.02412**	0.08110***	0.15773***
	(0.00682)	(0.00888)	(0.00969)	(0.00712)	(0.02309)
September × foreign	0.08457***	0.11730***	0.03510***	0.07886***	0.15330***
	(0.00686)	(0.00892)	(0.00985)	(0.00716)	(0.02369)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 6
Repo rates during the pandemic.

	(1)	(2)
	Repo rates	Repo rates
Post × Foreign	−0.5209*	−1.5339***
	(0.286)	(0.432)
Post × Bank controls	No	Yes
Bank FE	Yes	Yes
Year-quarter FE	Yes	Yes
N	152	152
R-squared	0.578	0.748

The dependent variable is the repurchase agreement (repo) rates. This analysis is performed at the bank × year-quarter level as the repo rates are available only at the quarter level. The pre-pandemic period is between 2019Q1 to 2019Q4. The pandemic period is 2020Q2 and 2020Q3. All regressions include bank and year-quarter fixed effects. In addition, column (2) controls for post × bank characteristics. All standard errors are clustered at the bank level.
*** p<0.01, ** p<0.05, * p<0.1

supply in April. From June onwards, they issued significantly more long-term loans each month: 2.6 percent in June to 3.5 percent in September.

When we analyze the number of loans denominated in foreign and domestic currencies separately, we find that foreign banks experienced a significant decrease in their loans issued in the domestic currency at the onset of the pandemic, whereas their foreign currency loans increased. In April 2020, foreign banks issued 2 percent fewer loans denominated in TL and 12.3 percent more loans denominated in foreign currencies. This implies that foreign banks were cautious at the onset of the pandemic and decreased their exposure to the exchange rate risk. From May onwards, they issued more loans independent of the currency. Yet, the magnitude of the effect is different: they issued 6.4 percent more loans denominated in TL and 15.1 percent more denominated in foreign currencies in May 2020. This difference was stable over time.

To study the mechanism behind our results, we examine whether the cost of borrowing was cheaper for foreign banks than their domestic peers during the pandemic (see, e.g., Reinhardt and Riddiough, 2015; Caparusso and Hardy, 2022). Table 6 reports the results of the change in the repurchase agreement (repo) rates.[10] Our results show that foreign banks could borrow repos at approximately 1.5 percentage points lower rates than their domestic peers. This suggests that the ability to borrow cheaply during the pandemic might have helped foreign banks to be able to lend more than domestic banks.

When we further study the impact of the pandemic on foreign banks' balance sheets relative to domestic banks in Türkiye, we find that, as shown in Table 7, foreign banks had more deposits and liabilities issued in foreign currencies, which might explain why they issued relatively

[10] This analysis is performed at the bank × year-quarter level as the repo rates are available only at the quarter level.

Table 7
Banks' balance sheet during the pandemic.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	FX liabilities	FX deposits	Non-core funding	Equity ratio	ROA	Liquidity ratio	NPL ratio
Post × Foreign	0.0247***	0.10183***	0.005	0.0138***	0.0026	−0.0005	−0.0053**
	(0.0075)	(0.0084)	(0.0049)	(0.0042)	(0.002)	(0.0014)	(0.0026)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year–month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	360	360	360	360	360	360	360
R-squared	0.956	0.836	0.965	0.907	0.456	0.967	0.986

Dependent variables are the bank balance sheet items. FX liabilities are the share of FX liabilities in total liabilities, and FX deposits are the share of FX deposits in total liabilities. Non-core funding is the ratio of non-core funding to total funding. The equity ratio is the ratio of total equity to total assets. Return on assets (ROA) is the net income ratio to total assets. Liquidity is the ratio of liquid assets to total assets, and the non-performing loans (NPL) ratio is the ratio of non-performing loans to total loans. This analysis is performed at the bank × year–month level. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. All regressions include bank and year–month fixed effects. All standard errors are clustered at the bank level.
*** p<0.01, ** p<0.05, * p<0.1

Table 8
COVID-19 spillovers via foreign banks.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.09415***	0.12967***	0.02020**	0.08919***	0.15700***
	(0.00631)	(0.00812)	(0.00925)	(0.00662)	(0.02076)
Post × Deaths per thousand	−0.48221***	−0.46874***	−0.33756***	−0.50416***	−0.15745***
	(0.01617)	(0.02152)	(0.02061)	(0.01645)	(0.05327)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. "Deaths per thousand" is the monthly number of COVID-19 related deaths per thousand people in the foreign bank's home country. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 9
COVID-19 spillovers via foreign banks and fiscal support.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.17561***	0.17111***	0.11857***	0.18122***	0.17597***
	(0.00712)	(0.00924)	(0.01064)	(0.00748)	(0.02408)
Post × Deaths per thousand	−1.33001***	−0.63309***	−1.81038***	−1.53321***	−0.82051***
	(0.09150)	(0.13128)	(0.10842)	(0.09694)	(0.19042)
Post × Deaths per thousand × Liquidity support	0.00119***	0.00035***	0.00185***	0.00139***	0.00075***
	(0.00009)	(0.00013)	(0.00011)	(0.00010)	(0.00019)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. "Deaths per thousand" is the monthly number of COVID-19 related deaths per thousand people in the foreign bank's home country. "Liquidity support" is the amount of fiscal support provided by the home country government, measured as a share of the country's GDP. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All double interactions are included in the regressions; only the relevant ones are reported. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

more foreign currency loans in this period. Although their profitability, measured by return on assets (ROA), was similar to domestic banks, they were holding significantly higher capital ratios during the pandemic. Moreover, the share of non-performing loans on foreign banks' balance sheets was much lower than their domestic peers, implying that the additional lending they provided during the pandemic was not riskier than that of domestic banks.

Overall, our results imply that foreign banks, on average, issued more loans during the pandemic, which is most likely due to their ability to borrow cheaply in this period. This finding is consistent with the hypothesis that foreign banks act as stabilizers in emerging economies during crises by providing additional credit to the real economy.

4.2. International transmission of the pandemic shock

As the next step, we analyze whether foreign banks that experienced a more severe pandemic in their home countries issued fewer loans in Türkiye. This enables us to study the possible spillover of the pandemic shock across countries via foreign banks. We measure the severity of the pandemic in foreign banks' home countries by the monthly aggregated

number of deaths per thousand people. This measures these banks' exposure to COVID-19 in their home countries.[11] To study the effect of the exposure on their loan supply in Türkiye, we implement the regression specification in Eq. (3). By including firm × year–month fixed effects, we study whether the same firm received fewer loans issued by foreign banks with a higher exposure to COVID-19 in their home countries relative to loans issued by foreign banks with a lower exposure to the pandemic.

Our results are documented in Table 8. According to the coefficient estimate in column (1), a one percentage point higher exposure to the pandemic, i.e., a one percentage point higher number of deaths per thousand people, led to a significant reduction in foreign banks' loan supply by almost 0.5 percent. Studying them separately reveals that the decrease in short- and long-term loans is of similar magnitude as reported in columns (2) and (3). When we analyze the loans in different currencies separately, foreign banks cut their domestic currency loans more. The coefficient estimates in columns (4) and (5) indicate that a one percentage point increase in their exposure to the pandemic led to a 0.5 percent decrease in their TL loans and a 0.16 percent decrease in their foreign currency loans. This difference could be due to their attempt to avoid further exposure to possible exchange rate risk related to the pandemic.

The findings show evidence of the spillover of the pandemic shock via foreign banks by documenting that they transmitted the pandemic shock from their home countries to the host country, Türkiye, by reducing their loan supply.

The next interesting question is whether the fiscal support provided by the governments in foreign banks' home countries helped them to alleviate the reduction in their loan supply in the host country. To investigate this, we use the fiscal support (as a percentage of the GDP) reported on IMF's Fiscal Policies Database as part of the country's fiscal measures in response to the COVID-19 pandemic (https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19). The fiscal support includes equity injections, loans, asset purchase or debt assumptions as well as guarantees and quasi-fiscal operations as contingent liabilities.[12] To study the impact of fiscal support on the effect of the exposure to the pandemic (in home countries) on foreign banks' loan supply in Türkiye, the regression specification in Eq. (4) is implemented.

Table 9 reports the results. As shown in column (1), a one percentage point higher fiscal support per GDP led to a 0.1 basis point less reduction in foreign banks' loan supply. This implies that the decline in their loan supply was mitigated by the fiscal support provided by their governments. The results reported in columns (2) to (5) show a significant positive effect in both short- and long-term loans and the loans denominated in foreign currencies and TL.

In addition, foreign banks from countries with no fiscal support experienced a 1.3 percent decrease in their loan supply for a one percentage point higher exposure to the pandemic. This is much higher than the average effect reported above (0.5 percent). The decrease in their long-term loans was larger. They decreased their short-term loans by 0.6 percent and long-term loans by 1.8 percent as their exposure to the pandemic increased by one percentage point. This is consistent with the literature that shows that the transmission of shocks affects loans with different maturities differently (see, e.g., Black and Rosen, 2011; Temesvary et al., 2018; Morais et al., 2019). Similarly, they decreased the loans denominated in domestic currency more than those denominated in foreign currencies. A 1 percentage point higher exposure led to a reduction of 1.5 percent in domestic currency loans and 0.8 percent in foreign currency loans.

Overall, these findings imply that the spillover of the pandemic shock via foreign banks is alleviated by the fiscal support provided by the governments in their home countries.

4.3. Firm-level results

In our final analysis, we investigate whether firms that experienced a decrease in their loans issued by highly-exposed foreign banks could switch to less-exposed foreign or domestic banks to avoid a reduction in their total loans. For each firm, we calculate a weighted average exposure of its foreign banks to the COVID-19 pandemic in their home countries, which measures each firm's exposure to the COVID-19 shock via its foreign banks. This is computed as the weighted average number of deaths per thousand people in its foreign banks' home countries, where the weights are the pre-pandemic shares of loans that each foreign bank issued at the end of 2019. To estimate the impact of a firm's foreign banks' exposure to the pandemic in their home countries on its total loans, we use the regression specification in Eq. (5).

According to our results presented in Panel A of Table 10, firms, on average, could not avoid a reduction in their total loans. As reported in column (1), a one percentage point increase in a firm's foreign banks' exposure to the pandemic led to an almost 0.8 percent decrease in total loans. The reduction happened in short- and long-term loans, yet it is more pronounced in short-term loans. Columns (2) and (3) show that a one percentage point higher exposure resulted in a 0.8 percent cut in short-term loans and a reduction of 0.4 percent in long-term loans. Most of the reduction comes from a large decrease in domestic loans, which decreased by 0.9 percent for a one percentage point higher exposure, whereas the reduction in FX loans is only 0.2 percent.

We next analyze whether the fiscal support provided in foreign banks' home countries affected the reduction in firms' total loans. To measure the fiscal support at the firm level, we compute a weighted average fiscal support that measures each firm's foreign banks' fiscal support, where the weights are again the shares of the firm's loans that each foreign bank issues. The regression specification in Eq. (7) is implemented to study the impact of fiscal support on firms' total loans. Panel B of Table 10 reports the results. As shown in column (1), firms with foreign banks from countries with higher fiscal support provisions experienced a significantly less reduction in their total loans.

In sum, our results imply that the exposure of a firm's foreign banks to the pandemic in their home countries affected the firm's total loans. Firms with pre-pandemic lending relationships with highly-exposed foreign banks experienced reduced total loans. This implies that firms could not switch to other banks to substitute for the decrease in their loans. However, the fiscal support provided to foreign banks in their home countries mitigated the reduction in firms' total loans. This suggests that the fiscal policies taken in foreign banks' home countries had real effects on firms in Türkiye.

This finding contributes to the literature that establishes the international transmission of fiscal policy responses via the bank lending channel (see, e.g., Avdjiev et al., 2018; Temesvary, 2018; Temesvary et al., 2018; Buch et al., 2019; Lindner et al., 2019; Morais et al., 2019; Alper et al., 2020; Bräuning and Ivashina, 2020a,b; Demirgüç-Kunt et al., 2020).

5. Additional robustness checks

5.1. Alternative measures for the pandemic exposure and the fiscal support

We first utilize the GDP growth during the pandemic as an alternative measure for foreign banks' exposure to the pandemic. One can argue that the change in the GDP is more directly linked to the countries' economic strength in this period. For this analysis, we replace deaths per thousand with the reduction in the GDP growth in 2020,

[11] In Section 5.1, we show that our results are robust to using alternative exposure measures: the GDP decline, number of COVID-19 cases, and the Oxford stringency index.

[12] As an alternative fiscal support measure, we utilize the economic support index of the Oxford Coronavirus Government Response Tracker and show that our main results hold in Section 5.1.

Table 10
Firm-level results.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
(A)					
Post × Foreign share	−0.02960***	0.00200	−0.03994***	−0.02541***	0.11622***
	(0.00481)	(0.00532)	(0.00518)	(0.00496)	(0.01462)
Post × Weighted deaths per thousand	−0.81633***	−0.82884***	−0.42753***	−0.85777***	−0.22660**
	(0.04082)	(0.05035)	(0.03875)	(0.04449)	(0.08852)
Industry × Province × SME status × Year–month FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
N	6,194,633	5,567,211	4,146,538	6,131,339	323,222
R-squared	0.890	0.829	0.906	0.877	0.958
(B)					
Post × Foreign share	−0.09612***	−0.07627***	−0.07518***	−0.09401***	0.10882***
	(0.00575)	(0.00663)	(0.00604)	(0.00598)	(0.01556)
Post × Weighted deaths per thousand	−0.70485***	−0.55845**	−0.74338***	−0.77378***	−0.18629*
	(0.18026)	(0.24621)	(0.15213)	(0.17512)	(0.10118)
Post × Weighted deaths per thousand × Weighted liquidity support	0.18730***	0.17371***	0.10206***	0.17853***	0.03711**
	(0.01340)	(0.02530)	(0.01102)	(0.01377)	(0.01737)
Industry × Province × SME status × Year–month FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
N	6,194,633	5,567,211	4,146,538	6,131,339	323,222
R-squared	0.890	0.829	0.906	0.877	0.958

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. "Weighted deaths per thousand" is the weighted average monthly number of COVID-19 related deaths per thousand people in the firm's foreign banks' home countries, and "Weighted liquidity support" is the weighted amount of fiscal support provided by the home country governments measured as a share of the countries' GDP, where the weights are the end of 2019 loan shares of foreign banks with which the firm had a relationship. All columns include industry × province × SME status × year–month and firm fixed effects. All double interactions are included in the regressions; only the relevant ones are reported. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 11
Robustness: GDP growth rate as an alternative COVID-19 exposure.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.36413***	0.30788***	0.24865***	0.39343***	0.21048***
	(0.01335)	(0.01757)	(0.01855)	(0.01375)	(0.04884)
Post × GDP decline	−0.03604***	−0.02465***	−0.02978***	−0.03985***	−0.00795
	(0.00147)	(0.00194)	(0.0019)	(0.00149)	(0.00533)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. We use the "GDP decline" to measure the exposure to COVID-19. "GDP decline" is the reduction in GDP growth during 2020, which is set to zero for positive GDP growth rates. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 12
Robustness: Number of new cases as an alternative COVID-19 exposure.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.08990***	0.11358***	0.03803***	0.08656***	0.14989***
	(0.00629)	(0.00801)	(0.00912)	(0.00656)	(0.02068)
Post × Cases per thousand	−0.00031***	−0.00015***	−0.00054***	−0.00035***	−0.00003
	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00006)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. "Cases per thousand" is the monthly number of COVID-19 cases per thousand people in the foreign bank's home country. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 13
Robustness: Oxford stringency index as an alternative COVID-19 exposure.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.12372***	0.19964***	0.19805***	0.11420***	0.31638***
	(0.01176)	(0.01729)	(0.01523)	(0.01209)	(0.0456)
Post × Stringency index	−0.00083***	−0.00140***	−0.00283***	−0.00079***	−0.00245***
	(0.00014)	(0.00021)	(0.00016)	(0.00014)	(0.00053)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. To measure the exposure to COVID-19, we use the stringency index of the Oxford Coronavirus Government Response Tracker that measures the strictness of government policies in each country based on nine metrics: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 14
Robustness: Oxford economic support as an alternative fiscal support measure.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.76720***	0.38752***	1.44007***	0.82516***	0.59257***
	(0.0454)	(0.07745)	(0.0553)	(0.04638)	(0.20242)
Post × Stringency index	−0.00297***	0.00009	−0.01220***	−0.00326***	−0.00541**
	(0.0005)	(0.00087)	(0.00058)	(0.00051)	(0.00226)
Post × Stringency index × Liquidity support	0.00001*	−0.00004***	0.00014***	0.00002**	0.00004
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00003)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,208,451	5,825,579	2,917,081	7,081,784	180,619
R-squared	0.913	0.872	0.945	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. To measure the exposure to COVID-19, we use the stringency index of the Oxford Coronavirus Government Response Tracker that measures the strictness of government policies in each country based on nine metrics: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls. "Liquidity support" is measured by the economic support index of the Oxford Coronavirus Government Response Tracker. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All double interactions are included in the regressions; only the relevant ones are reported. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

where we set the positive changes to zero. This estimates the decline in the GDP of each country during the pandemic. As reported in Table 11, the results with the GDP decline are very similar to the baseline results. We find that foreign banks with home countries that experienced a larger GDP decline cut their lending relatively more.

In addition, we replace death rates with the number of COVID-19 cases per thousand as another robustness test. Table 12 shows that our results are robust to using this alternative exposure measure.

We next use the stringency index of the Oxford Coronavirus Government Response Tracker as an alternative measure for foreign banks' exposure to the pandemic in their home countries. The Oxford Coronavirus Government Response Tracker is a project that collected information on individual government policy measures implemented to tackle COVID-19 and grouped this information to form indexes (see, e.g., Hale et al., 2021). The stringency index measures the strictness of government policies that were put in place in each country based on nine metrics: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls (https://ourworldindata.org/metrics-explained-covid19-stringency-index). The results with the Oxford stringency index yield very similar results as shown in Table 13. We find that a higher stringency index is associated with a greater reduction in foreign banks' lending.

In addition, as an alternative measure for fiscal support, we use the economic support index of the Oxford Coronavirus Government Response Tracker, which provides an overall measure of financial assistance implemented by the governments. As presented in Table 14, foreign banks that have home countries with larger economic support experienced a lower loan reduction. This mitigation effect was valid mainly for long-term loans and loans issued in the domestic currency.

Overall, our baseline results are robust to using alternative measures for COVID-19 exposure and the fiscal support implemented in foreign banks' home countries.

5.2. Including firms with a single lender

In our baseline estimation, we follow Khwaja and Mian (2008) and control for loan demand by including firm × year–month fixed effects in our regressions. This setting restricts our analysis to firms with multiple lenders. To include firms with a single bank in our analysis, we follow the proposition of Degryse et al. (2019) and replace the firm × year–month fixed effects with industry × province × SME-status × year–month fixed effects as a robustness check. This allows us to estimate the effects for both multi- and single-bank firms. The results are presented in Table 15. The estimates are similar to our baseline regressions.

Table 15
Robustness: Including firms with a single lender.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.03831***	0.05756***	−0.03476***	0.02731***	0.22201***
	(0.00483)	(0.00585)	(0.00639)	(0.00514)	(0.01416)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Industry × Province × SME status × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	10,091,276	8,621,571	4,902,934	9,949,659	327,693
R-squared	0.859	0.785	0.908	0.843	0.959

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between April and September 2020. All regressions include industry × province × SME-status × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 16
Robustness: Including March 2020 in the pandemic period.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.06329***	0.09261***	0.01243	0.05770***	0.14255***
	(0.00580)	(0.00733)	(0.00836)	(0.00606)	(0.01929)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,599,611	6,150,540	3,067,735	7,465,714	190,799
R-squared	0.912	0.871	0.944	0.903	0.970

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and December 2019. The pandemic period is between March 2020 and September 2020. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

Table 17
Robustness: Including January and February 2020 in the pre-pandemic period.

	(1)	(2)	(3)	(4)	(5)
	Total	Short-term	Long-term	TL loans	FX loans
Post × Foreign	0.06539***	0.10442***	−0.00527	0.05906***	0.13624***
	(0.00559)	(0.00723)	(0.00806)	(0.00587)	(0.01778)
Post × Bank controls	Yes	Yes	Yes	Yes	Yes
Firm × Year–month FE	Yes	Yes	Yes	Yes	Yes
Bank × Firm FE	Yes	Yes	Yes	Yes	Yes
N	7,998,229	6,461,659	3,235,952	7,857,536	200,994
R-squared	0.913	0.870	0.944	0.904	0.971

The dependent variable is the logarithm of the volume of loans. Short-term loans have a maturity of less than a year. Long-term loans have a maturity of more than a year. TL and FX loans denote the currency of the loan. The pre-pandemic period is between January and February 2020. The pandemic period is between April and September 2020. All regressions include firm × year–month and bank × firm fixed effects and controls for post × bank characteristics. All standard errors are clustered at the firm level.
*** p<0.01, ** p<0.05, * p<0.1

5.3. Including January, February, and March 2020 in our sample period

We exclude March 2020 in our main analysis with the argument that the pandemic started around mid-March in Türkiye, which makes the first half of March pre-pandemic and the second half pandemic. One can argue that the severity of the shock was larger at the onset of the pandemic, and, as a result, March 2020 should be considered as a pandemic month. To check the validity of our results, we repeat our analysis, including March 2020, in the pandemic period in our regressions. The results are reported in Table 16. We find very similar results to our baseline estimates.

Similarly, January and February 2020 are excluded from our sample period since they would be considered as pre-pandemic for Türkiye and pandemic for some foreign banks' home countries. To avoid confusion, our baseline regression does not include these two months. As a robustness check, we include these two months as part of the pre-pandemic period. Table 17 reports that results remain very similar.

6. Conclusion

In this paper, we investigate the spillover of the pandemic shock through foreign bank lending channels by examining whether foreign banks' exposure to the pandemic in their home countries affected their lending in Türkiye. Our study uses comprehensive monthly bank–firm level credit register data provided by the Central Bank of the Republic of Türkiye. As an emerging economy, Türkiye provides a useful setting with a bank-dominated financial system, where 95% of outstanding loans are provided by banks, and 38% of these loans were issued by foreign banks during the pre-pandemic period. Most importantly, more than 70% of firms have multiple bank lenders, which determines the sample size in our analysis as we use firm × year–month fixed effects to control for loan demand.

We find evidence that foreign banks, on average, issued significantly more loans relative to domestic banks during the pandemic. However, the ones with higher exposure to the pandemic in their home countries decreased their loan supply in Türkiye. We find that a one percentage point higher number of deaths per thousand people in their home

countries is associated with an almost 0.5 percent reduction in their loan supply. This implies that foreign banks transmitted the shock from their home countries to the host country via bank lending channels.

We further show that the fiscal support provided in their home countries helped mitigate the lending reduction. According to our findings, a one percentage point higher fiscal support per GDP in their home countries is linked to a 0.1 basis point less decline in their loan supply in Türkiye. This suggests that the fiscal policies taken in foreign banks' home countries can be transmitted to the host country as a positive shock on foreign bank lending.

In addition, our firm-level results show that firms with a pre-pandemic lending relationship with highly-exposed foreign banks could not avoid a reduction in their total loans by switching to other banks. This implies that the foreign bank lending channel had real effects on firms in Türkiye.

Overall, we document the international spillover of pandemic shocks via foreign bank lending channels. The spillover is alleviated by the fiscal support implemented in foreign banks' home countries, which provides evidence for the international credit channel of fiscal policy via foreign banks.

CRediT authorship contribution statement

Yusuf Emre Akgündüz: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Seyit Mümin Cılasun:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **H. Özlem Dursun-de Neef:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Yavuz Selim Hacıhasanoğlu:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Ibrahim Yarba:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization.

Data availability

The data that has been used is confidential.

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