Trade disruptions and cross-border banking integration*

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Abstract

Does global financial market integration alleviate or exacerbate the transmission of major disruptions in global trade? Using novel data linking regional banking markets with import flows in Brazil, we document that the presence of globally-active banks at the municipal level is associated with a weakened transmission of trade disruptions to imports. For identification, we exploit municipalities' exposure to pandemic-related lockdowns in their trade partners abroad, controlling for local imports demand. The supply-driven and robust results suggest that global banks compensate for the effect of lockdowns by providing wider access to US dollar funding as well as by reducing cross-border information frictions. This evidence highlights a strong link between global financial integration and the resilience of real-sector integration.

Keywords: financial integration, international trade, real integration, trade disruptions, international banking.

JEL Codes: F15, F36, F65, G10, G15, G21.

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1 Introduction

The emergence and growing importance of global supply chains have fundamentally shaped the way production is organized worldwide. Despite having slightly fallen since the 2008-2009 Great Financial Crisis, trade conducted through global supply chains still represents more than 70 percent of international trade (Arnold et al., 2023). The discussions around major supply chain upheavals in recent years – ranging from the 2018 China–U.S. trade war to supply chain dislocations in the wake of the COVID-19 pandemic – further highlight the importance of production inputs being exchanged across borders for the global economy. These production linkages have historically rested on strong ties of financial integration, with global banks being an engine of global trade (see, e.g., Claessens and Van Horen, 2021). In a context in which trade flows have been threaded by unprecedented economic and political risks, the question of whether global financial integration can enhance trade resilience is, therefore, of paramount importance.

This paper estimates the effect of cross-border banking integration on the resilience of import flows to an emerging country, through the lens of a difference-in-difference model that exploits municipal-level variation both in global banks' market penetration as well as in the exposure to plausible exogenous disruptions in import flows in the context of the COVID-19 pandemic. We exploit novel administrative data on bilateral import flows between firms within each municipality in Brazil and municipalities' trade partners abroad. Further augmenting the data set with a register of bank branches' balance sheets, we explore whether the presence of globally active banks makes import flows more resilient in the context of trade disruptions triggered by pandemic-related lockdowns abroad.

The identification strategy rests on observing bilateral trade relationships between each Brazilian municipality and the countries in which imports originate. We exploit this feature in the data to draw estimations of supply-driven disruptions in import flows while controlling for local imports' demand. This estimation approach is based on three main building blocks. First, we observe lockdowns in Brazil's trade partners following the outbreak of the COVID-19 pandemic in March 2020. To the extent that different countries imposed heterogeneous degrees of COVID-related restrictions, we conjecture that import flows from more restrictive countries should have been differentially affected. Second, our bank-municipality data allows for comparing the cross-section of municipalities according to the local market share of globally-integrated banks, as defined below. Finally, we control for municipality-month fixed effects in a panel at the municipality-country-month level, allowing us to absorb unobserved heterogeneity across import flows that can be attributed to import demand.

Our robust results show that the presence of globally-integrated banks moderates the contraction in imports originated in lockdown-exposed economies. First, we show that a larger exposure to COVID-related restrictions starting in March 2020 is associated with weaker import flows from affected countries, even when controlling for import demand. Second, we find that this contraction in imports is moderated by the presence of globally-integrated banks in Brazil's municipal-level banking markets. We define these banks as those that, regardless of their domestic or foreign ownership, show a significant activity outside Brazil via the presence of related entities in the U.S. While this measure attempts to capture the heterogeneity of banks' global integration, moving beyond a narrowly defined ownership dimension, we find similar results when defining banks' global integration by foreign ownership or by banks' access to FX funding from abroad.

In the empirical analysis, we combine multiple administrative datasets capturing regional banking activity across Brazil as well as bilateral trade flows between municipalities and foreign countries. We first construct a panel of banks' balance sheets and income statements from call reports published by the Brazilian Central Bank. This information comprises variables aggregated at the bank-level capturing assets and liabilities reported in local currency (Brazilian Reais, BRL). Second, we integrate these data into individual balance-sheet information on banks' branches reported at the municipal level. This sample covers banks' activities from 2017 to 2021.

In a third step, we use international trade statistics from the Comex Stat Database reported by the Brazilian Ministry of Economy to construct a panel at the municipality-country level recording import and export monthly trade flows on a bilateral basis. This information is the official source used to construct the Brazilian trade balance statistics. We merge the trade panel to our regional banking database aggregated at the municipal-level, ending up with a panel at the municipality-country-month level. Finally, we use data from the Oxford Coronavirus Government Response Tracker (OxCGRT) project to calculate a Stringency Index, representing a composite measure of nine metrics that capture multiple dimensions of lockdown-related restrictions during the COVID-19 pandemic (see Mathieu et al., 2020)[1]. We merge this country-level index to our main dataset, obtaining a measure of countries' exposure to lockdown policies. The final sample consists of 2,601 municipalities importing goods on a monthly basis from a total of 257 countries over the period from 2019 to 2021, adding up to 2,096,150 observations.

Armed with these data, we estimate the (log) change in imports (in US dollars) as a function of an interaction term between a Post dummy – equal to one for the months after March 2020 – and a dummy equal to one for those countries with an average stringency index above the 75th percentile of the sample's distribution between 2020 and 2021. To reduce concerns about imports being explained by other country or municipality characteristics, we include country as well as municipality-time fixed effects.

To isolate the effect of global banks' presence on import flows we expand this baseline model including a triple interaction term between our difference-in-difference estimator and

[1]These metrics include measures of 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.

the ex-ante asset market share of globally-integrated banks per municipality, measured as of 2019. The main challenge for the identification is the fact that imports' demand and supply may change simultaneously, particularly given the exceptional context of 2020, making the isolation of a supply-side effect driven by the stringency index difficult. We address this problem by saturating our specifications with municipality-month fixed effects, effectively controlling for unobserved heterogeneity across multiple import flows originated in all countries that trade with a given municipality. Moreover, regressions controlling for country-month fixed effects and bilateral municipality-country fixed effects further tighten the identification, reducing concerns that the results could be confounded by usual determinants of trade flows (Arnold et al., 2023).

We find that the presence of globally-integrated banks is associated with a higher resilience of import flows when global supply chains become disrupted. This effect is not only statistically significant but also economically meaningful: after March 2020, municipalities at the 75th percentile of global banks' market share distribution experienced a decrease in imports 0.53 p.p. smaller compared to municipalities at the 25th percentile of the distribution from countries with a relatively high stringency index – a notable difference that represents approx. 19 percent of a standard deviation in imports' growth in the sample.

Having established this result, we next explore possible mechanisms explaining the role of global banks in supporting trade. Previous literature highlights the importance of international banking in moderating financial frictions affecting trading firms (Chor and Manova, 2012), for instance through their physical presence close to both importers and exporters (Claessens and Van Horen, 2021). Global banks may also benefit from privileged access to FX markets by exploiting their global networks (Ivashina et al., 2015; Eguren-Martin et al., forthcoming). Using a variety of tests, we find evidence that while these channels play an important role in our setting, the results can be better explained by globally-integrated banks having privileged access to FX funding abroad, channeling FX liquidity needed to sustain trade.

In a final set of results, we explore market heterogeneities to shed light on the implications of our findings, reaching two key conclusions. First, we find the effect to be driven by the import of intermediate goods in contrast to final/consumption goods, highlighting that the mechanism we unravel can play a material role in shaping the resilience of global value chains. Second, when exploring heterogeneities across municipalities, we find the effect to be stronger when indicators of financial development are particularly high, indicating a possible reallocation of capital towards low-risk regions and thus leading to distributional effects.

We provide an exhaustive set of additional tests corroborating our findings and addressing multiple identification concerns. For instance, we show that the results hold up when controlling for country characteristics and by bilateral (municipality-country) fixed effects that could explain import flows. We acknowledge that our measure of global banks' presence could be correlated with other municipality characteristics that may affect macroeconomic conditions during the pandemic. However, when including municipality or country characteristics in a competing triple-interaction fashion the results remain in place. We also find that the term structure of the results coincides with the timing of the pandemic and that the results remain unaltered under alternative definitions of global banks' presence or municipal market shares.

Taken together, the results provide novel evidence of how cross-border banking integration can make trade flows more resilient in periods when trade becomes globally impaired. This finding highlights a positive interaction between real and financial integration, building on previous evidence on the role of globally-integrated banks as a factor that can reduce transaction costs and information frictions in international trade (Hertzel et al., 2018). Global value chains rest on the possibility of firms being able to raise capital to purchase specialized production inputs abroad (Antràs and Chor, 2022). While real-sector shocks can impair those firms' capacity to access credit and sustain production chains, we find that global financial integration can play a key role in making import-dependent firms more resilient.

Our findings speak to several strands of literature related to the interaction between financial globalization and trade, the financial side of global value chains, and the impact of cross-border banking integration, particularly in emerging countries. We build on previous literature unraveling channels through which financial integration can foster trade. In this context, Portes and Rey (2005) and Bronzini and D'Ignazio (2005) show that the presence of foreign banks matters for the emergence of import flows from those banks' home countries. Several other studies have identified mechanisms linking bank lending with trade flows (see, e.g., Paravisini et al., 2017, Niepman and Schmidt-Eisenlohr, 2017, Caballero et al., 2018). We complement the findings by Claessens and Van Horen (2021), who show that foreign banks' market entry is associated with an increase in exports to foreign banks' home countries, mainly through the alleviation of financial frictions. Our approach is different in that we focus on whether globally-active banks, regardless of their ownership status, can facilitate trade when real-sector shocks occur.[2]

Our approach is closer to studies exploring the relationship between banks' lending behavior and trade during times of economic turmoil, particularly through the lens of dynamics in global value chains. Several studies have looked at the effect on exporting firms of financial shocks observed at the bank-level (see, e.g., Amiti and Weinstein, 2011, Paravisini et al., 2015, Amiti and Weinstein, 2018), with most evidence having been drawn in the context of the Great Financial Crisis (see Chor and Manova, 2012). These studies do not explore the effect on trade of foreign banks' presence when supply chains become disrupted for reasons

[2]The endogenous relationship between trade and finance has been well-documented in the literature, with studies pointing to a positive effect of financial development on trade flows (see, e.g., Beck, 2018, Berman and Héricourt, 2010) but also to trade as a driver of financial integration (see e.g., Braun and Raddatz, 2008, Hertzel et al., 2018). From a corporate finance perspective, access to financial capital has been found to be a key driver of firms' decision to enter into export businesses, with financial frictions playing a central role in defining firms' access to funds. See, e.g., Foley and Manova (2015) for a survey of the related literature.

beyond the financial sector itself. Our work also builds on previous findings by Hertzel et al. (2018), who show that the formation of global supply chains can increase firms' access to cross-border financing, moderating financial frictions from the perspective of lending banks. We complement these findings by unraveling different channels through which cross-border banking integration can make global value chains more resilient to trade shocks. The literature on supply chains, as surveyed by Antràs and Chor (2022), has mostly studied the fragility of production networks in a domestic context (see, e.g., Osadchiy et al., 2016) or their role as mechanisms for the transmission of financial shocks across buyer-supplier linkages (Alfaro et al., 2021). We complement this literature by showing, in a global context, that financial integration can enhance the resilience of buyer-supplier linkages when trade becomes impaired.

Finally, our results also inform discussions about the impact of cross-border banking integration on real-economic outcomes. Motivated to a large extent by the events around the Great Financial Crisis, previous studies have focused on unraveling spillover effects of global banks' presence. Studies have identified cross-border transmission channels triggered by foreign monetary policy (Cetorelli and Goldberg, 2012b), by the stance of macroprudential policies abroad (Buch and Goldberg, 2017), or by funding shocks affecting global banks' liabilities (see, e.g., Noth and Ossandon Busch, 2021). In contrast to this emphasis on negative aspects of cross-border banking integration, other studies have shown that global banks can widen access to finance (Martinez Peria and Mody, 2004), foster competition (Claessens et al., 2001), and mitigate domestic financial frictions (Birca and De Haas, 2013). We complement this literature by exploring the impact of banking globalization on the resilience of global supply chains.

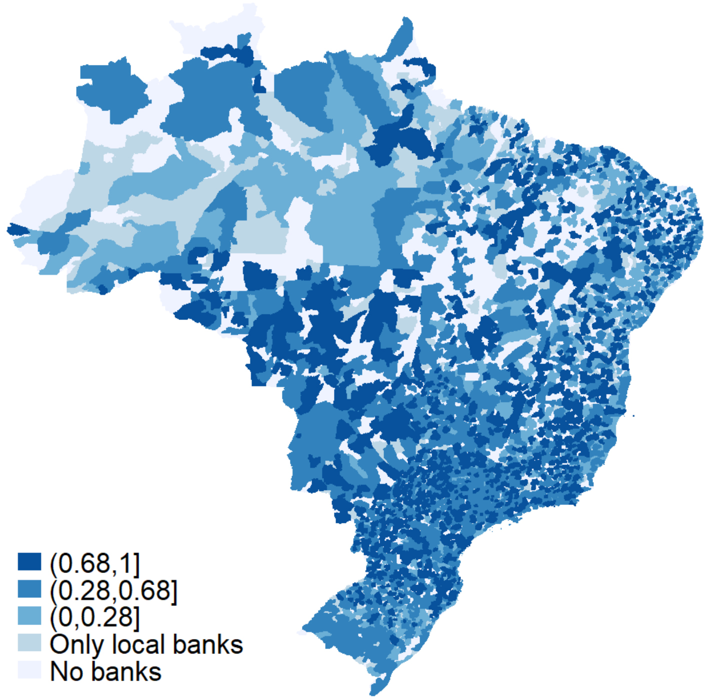


Figure 1 Presence of global banks in Brazil

NOTES: The figure shows the average market share of globally-active banks per municipality in Brazil between 2018 and 2019.

2 Data description and sample construction

Our empirical approach aims at identifying the effect of global banks' presence at the municipality level in Brazil on the stability of import flows from abroad, disrupted by an exogenous shock represented by production and COVID-related restrictions in the exporting countries in the wake of the COVID-19 pandemic. For this purpose, we combine three main sources of data, consisting of an administrative register of bank branches' balance sheets; a record of bilateral trade at the municipality-country level; and different measures capturing the extent of COVID-related restrictions in Brazil's trade partners. These data can be described as follows.

First, our analysis is based in measuring the presence of globally-integrated banks in

Brazilian municipalities. Figure 1 shows that globally active banks are present across all regions in Brazil, with higher market shares, on average, in the economically relevant south east. We exploit this widespread presence across regions by combining granular data on the balance sheets and income statements at the level of banks' headquarters and their corresponding individual bank branches for the entire universe of the Brazilian banking system per month. The branch-level data comes from the ESTBAN database (Estatística Bancária Mensal por Município), reporting call reports collected by the Brazilian Central Bank. To link both datasets, we manually construct an identifier to connect each branch to its corresponding headquarters as well as identifiers for whether a bank is (i) foreign-owned or (ii) whether it has a related entity within the same banking group in the U.S.[3]

Armed with this data, we compute the market share of globally-integrated banks – i.e., those with a related entity in the U.S. – as well as the market share of foreign-owned banks. While we compute market shares using the share of global banks' total assets per municipality as a fraction of total bank assets in that region, we validate our results with an alternative measure based on credit market shares. The detailed information about banks and branches allows computing other variables used when extending our baseline model, including banks' ratio of foreign interbank liabilities to total assets (as a proxy for their US dollar access abroad) and proxies for branches' credit and deposit interest rates, as described below. In total, we work on a sample of 206 banks operating in 3,865 municipalities, adding up to 15,265 individual bank branches. We label 41 of these banks as globally-integrated, with 36 of them being foreign-owned.

Second, we merge the banking data with a record of international trade statistics from the Comex Stat Database reported by the Brazilian Ministry of Economy. This source provides us with a panel at the municipality-country level of both import and export flows,

[3]This source has been used to explore, e.g., the role of internal capital markets and credit in Brazil (see, e.g., Coleman and Feler, 2015 or Bustos et al., 2016).

with breakdowns by 6,306 product categories based on the Harmonized System of the World Customs Organization. For identification purposes, we exclude municipalities with only one trade partner over time. We also consider in robustness tests alternative specifications when dropping, e.g., export-intensive municipalities or imports originating in certain world regions, as explained below. We categorize products as either consumption or intermediate goods to explore differential effects according to the nature of import flows.

Figure 2 illustrates the time series of monthly aggregated imports in Brazil. This graph reflects the sharp contraction in trade flows beginning in March 2020 and the subsequent recovery throughout the second half of that year. This peak-to-through dynamic is in line with established narratives about global trade in the context of the COVID-19 pandemic (see, e.g., Bas et al., 2022). The fact that we can trace import dynamics per municipality-country pairs opens the scope to investigate the effect of country-specific lockdowns on trade flows and to explore whether global banks' presence affects the extent of the relationship between import flows and lockdowns. In our panel we trace over time 83,846 municipality-country pairs at the monthly level for the period between January 2019 and January 2022.

Finally, we merge to our dataset country-level series from the Stringency Index published by the Oxford Coronavirus Government Response Tracker (OxCGRT) project measuring the extent of COVID-related restrictions (see Hale et al., 2021 for details of the data). This source has two key advantages for our analysis. First, it allows tracing these restrictions over time since the pandemic's outbreak, providing a sense of their possible impact on production and logistics. Second, we can exploit heterogeneities in the cross-section of countries in terms of their lockdown policies, comparing their trade flows and exploring the link between pandemic-related restrictions and imports. To validate our findings, we also replicate the analysis using the Google Mobility Index as an alternative proxy for restrictions.

Our final sample consists of 2,601 municipalities importing goods from a total of 257 coun-

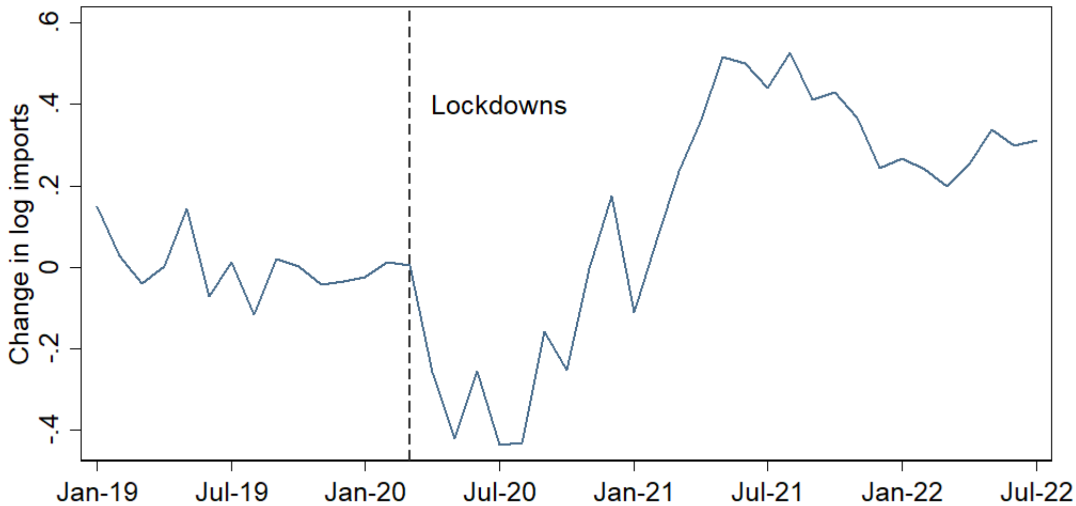


Figure 2 Brazil's imports during the pandemic

NOTES: The Figure describes Brazil's import behavior during the Great lockdown. The graph displays the log import change between January 2019 and July 2022. The vertical line is set in March 2020, when most governments had implemented measures to contain the COVID-19 spread.

tries. The average municipality reports 17 different import partners with China, the United States, and Germany being the largest exporters to Brazil between 2018 and 2022. After merging the data, we end up with a total of 2,096,150 observations and 83,846 municipality-country pairs, which represent our main unit of observation.

3 Identification Strategy

Our identification strategy relies on a difference-in-difference estimator augmented with a triple interaction term to capture the effect of global banks' presence on trade flows. Our first specification is formalized in Eq. (1):

$$\begin{aligned} \Delta Imports_{i,j,t} = & \alpha + \beta_1 \left[Stringency_j \times Post_t \right] + \beta_2 Post_t \\ & + \beta_3 Stringency_j + \mu_{i,t} + \gamma_j + \varepsilon_{i,j,t} \end{aligned} \tag{1}$$

In Eq. (1) we estimate the log change on imports month-on-month (originally reported in US Dollars). Trade flows are computed bilaterally for municipality i and country j over time t. β_1 is our coefficient of interest and thus represents the differential effect on imports for an exporting country reporting a high stringency index after the pandemic's outbreak in March 2020 ($Post_t$). The exposure to lockdown policies is measured with a dummy variable equal to one for those countries with an average stringency index above the 75th percentile of the respective distribution ($Stringency_j$). We focus the analysis on this dichotomy definition to ease the interpretation and identify import sources with high exposure to COVID-related restrictions.[4]

This model estimates unbiased results assuming that the growth rate of imports was following, before March 2020, a similar trend when comparing countries differentially exposed to COVID-related restrictions. We verify this parallel trend assumption in Table A.9 in the Appendix, in which we regress the log change in imports against the treatment dummy $Stringency_j$. We find the resulting coefficient to be not statistically significant, in line with the notion that import flows from countries that ultimately became more affected by COVID-related restrictions did not systematically differ from others before March 2020. This test allays concerns that our measure of countries' exposure to COVID-related restrictions could capture other unobservables either at the country level or specific to certain bilateral municipality-country trade flows.

We augment this baseline regression by adding a triple interaction term in Eq. 2 as

[4]We cluster standard errors at the country level, taking into account a potential serial correlation of import flows originated in the same country. The treatment assignment is also clustered at the country-level, meaning that the error term for different trade relationships originated in the same country could be correlated in the cross-section. We report the results with alternative clustering approaches in the Appendix on Table A.14.

follows:

$$
\begin{aligned}
\Delta Imports_{i,j,t} =& \alpha + \beta_1 \left[Stringency_j \times Post_t\right] + \beta_2 Post_t + \beta_3 Stringency_j \\
& + \beta_4 Global_i^A + \beta_5 \left[Stringency_j \times Global_i^A\right] + \beta_6 \left[Post_t \times Global_i^A\right] \\
& + \beta_7 \left[Stringency_j \times Post_t \times Global_i^A\right] + \mu_{i,t} + \gamma_j + \varepsilon_{i,j,t}
\end{aligned} \tag{2}
$$

This addition in Eq. (2) allows exploring whether the difference-in-difference estimator in Eq. (1) varies according to municipalities' ex-ante market share of globally-integrated banks, which we measure as an average between January 2019 and February 2020 for each municipality j. Thus, β_7 captures whether the presence of global banks ($Global_i^A$) affects the pass-through of lockdown policies in country j to weaker trade flows to municipality i. Both estimated equations include all constitutive terms of the interactions considering the variables both as single terms and in double interactions, although some of them will be absorbed by the fixed effects.

A key identification challenge is that imports could be determined by shifts in both demand and supply, making it difficult to isolate the supply-side effect triggered by COVID-related restrictions where imports originate. Particularly in the context of the COVID-19 pandemic, this problem is central since restrictions in the importing country (i.e., Brazil) could have led to a contraction in imports' demand potentially correlated with restrictions abroad.

We address this problem in both equations by saturating the specification with municipality-month fixed effects ($\mu_{i,t}$), absorbing any unobserved heterogeneity across multiple import flows that reach a given municipality. We expect this term to control for municipality-specific macro trends but also for aggregate time dynamics explaining imports flows to Brazil. The addition of the term γ_j controls for country fixed effects, capturing time-invariant characteristics of the exporting countries, including, e.g., their size, geographical location, and the

Table 1 Summary Statistics

	(1) Mean	(2) Std. Dev.	(3) p25	(4) p50	(5) p75	(6) Min.	(7) Max.
Imports to Brasil							
Imports (USD)	167,066	3,359,079	0	0	0	0	1,915,693,133
Log change in imports	0.008	2.739	0	0	0	-19.943	19.943
Foreign banks presence							
$Global_i^A$	0.500	0.356	0.212	0.451	0.881	0	1
$Global_i^C$	0.594	0.354	0.337	0.590	0.983	0	1
RFX_i^A	0.014	0.008	0.008	0.011	0.021	0	0.060
RFX_i^C	0.016	0.008	0.010	0.015	0.025	0	0.045
Lockdowns							
Stringency index	48.541	21.654	32.792	48.240	65.317	0	100
Community mobility indicator	-0.574	32.897	-20.665	-5.338	12.169	-81.592	210.447
Economic support index	35.359	32.388	0	35.887	62.500	0	100
Country characteristics							
GDP percapita (USD)	17,278	25,845	2,174	6,869	20,319	224	196,829
Export-to-GDP ratio	0.278	0.227	0.126	0.221	0.387	0	1.524
Exports (USD billion)	125.2	305.3	3.3	13.7	96.6	0.0	2492.8
Distance to Brasil	9,443	4,243	5,952	9,375	11,797	1,097	19,058
Municipality characteristics							
GDP percapita (USD)	6,571	6,821	2,797	4,875	8,046	1,267	143,302
Export-to-GDP ratio	0.177	0.272	0.021	0.075	0.214	0	2.632
Export partners	25	29	3	14	35	1	202
Herfindahl–Hirschman index	5,081	2,870	2,569	4,780	7,508	208	10,000
Financial development (municipalities)							
Credit-to-GDP ratio	0.224	0.196	0.083	0.189	0.316	0	3.951
Credit-deposit rate spread	-109.1	6301.8	0	0	0	-364957.0	1581.3

Notes: This table reports the summary statistics for the working sample. Cols. 1 to 5 report the mean, the standard deviation (S.d.), and the percentiles 25, 50, and 75 of the respective distributions. The final columns report variables' minimum and maximum values.

characteristics of their exporting industry. In further extensions, we tighten the identification controlling for country-month fixed effects and bilateral municipality-country fixed effects, reducing concerns that the results could be confounded by common determinants of trade identified in the trade literature (see, e.g., Head and Mayer, 2014). We note that these latter specifications control for time-variant country and municipality characteristics as well as by the specificities of bilateral trade flows, including, e.g., the type of goods being imported, the distance between a municipality and the exporting country, or other unobserved country-level determinants of import flows.

Table 1 reports descriptive statistics for the working sample, including our main variables of interest and those used in the robustness analysis. Overall, the regression analysis is based on a sample of 2,096,150 observations at the municipality-country-time level, which are slightly reduced once the aforementioned fixed effects are in place. We provide a definition for each variable specifying the data sources in Table A.15 in the appendix.

4 Results

The baseline results for the triple difference estimation are shown in Table 2. First, the coefficient for the interaction term including the dummy variables for countries with a stringency index above the 75th percentile (*Stringency*) and the post-period between March 2020 and March 2021 (*Post*) has the expected sign and is negative. However, the coefficient for the post-period alone is positive and significant which likely reflects the recovery in imports after the initial COVID shock displayed in Figure 2.

The main variable of interest is the triple interaction term that includes the share of assets from globally-integrated banks active in the United States ($Global_i^A$), the dummy variable for the post-period (*Post*), and countries with high levels of the stringency index (*Stringency*). The results show that the coefficient is positive and highly significant (column 1). This suggests that the presence of globally-active banks helps to alleviate the transmission of shocks to imports from countries with stringent COVID-19 policies [5]. Importantly, the results remain significant when controlling for municipality-time and country fixed effects which effectively absorb all demand factors (column 3).[6]

[5] Table A.11 shows that these results also hold when excluding sporadic trade relationships (municipality-country trade relationships with import records below the 10th or 25th percentile of the frequency of bilateral trade, as measued by the share of periods in the sample in which a municipality-country pair reports an import flow). It is important to note that the size of the coefficient is twice as large without sporadic trade relationships.

[6] We also control for the potential presence of seasonality in the data by including common-quarter fixed effects as shown in Table A.13. The results are robust to different combinations of common-quarter fixed effects.

Table 2 BENCHMARK RESULTS - EFFECTS ON IMPORTS IN THE PRESENCE OF GLOBAL BANKS

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0297***				
	(0.0038)				
$Stringency$	0.0049*	0.0060**			
	(0.0029)	(0.0030)			
$Stringency \times Post$	-0.0145**	-0.0167**	-0.0167**		
	(0.0064)	(0.0066)	(0.0066)		
$Global_i^A$	0.0066*				
	(0.0036)				
$Stringency \times Global_i^A$	-0.0111**	-0.0136**	-0.0153***	-0.0143***	
	(0.0053)	(0.0053)	(0.0052)	(0.0052)	
$Post \times Global_i^A$	-0.0218***				
	(0.0061)				
$Stringency \times Post \times Global_i^A$	0.0285***	0.0332***	0.0332***	0.0313***	0.0313***
	(0.0099)	(0.0108)	(0.0108)	(0.0108)	(0.0108)
$Constant$	-0.0051**	0.0084***	0.0104***	0.0078***	0.0060***
	(0.0021)	(0.0008)	(0.0010)	(0.0003)	(0.0007)
Municipality-month FE	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	No	No
Country-month FE	No	No	No	Yes	Yes
Country-municipality FE	No	No	No	No	Yes
Observations	2,096,150	2,088,950	2,088,950	2,088,825	2,088,825
R-squared	0.0000	0.0326	0.0326	0.0352	0.0372

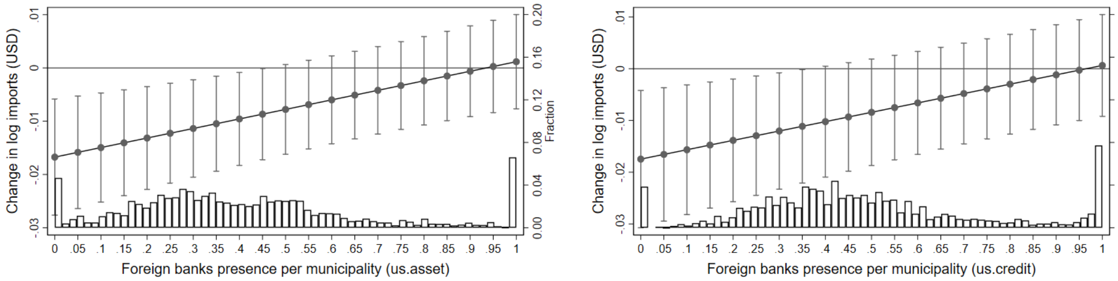
NOTES: The table exhibits the effects on the month-on-month log change in imports using different sets of fixed effects. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable $Global_i^A$ measures the presence of global banks at the municipality level in 2019. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

To assess the sensibility of the results to the definition of market shares, Table A.1 in the Appendix replicates the estimations in Table 2 for the credit-market share from global banks active in the United States ($Global_i^C$).The interaction term of interest remains positive and significant in this alternative specification. This result confirms the finding that import shocks to Brazilian municipalities are mitigated by a higher degree of cross-border banking integration.

In Table A.12, we explore whether the presence of global banks is relevant to preserve the existence of trade relationships over time. Using a probit model, we examine the probability of having positive import flows between municipalities and countries t months after a supply shock. Our results indicate that the presence of global banks helps to maintain existent trade relationships between 3 and 6 months after facing a supply shock. Thus, cross-border banking integration does not only attenuate trade shocks on the intensive margin but also on the extensive margin.

Furthermore, Figure 3 illustrates a marginal effects plot of the effect of the triple interaction term on the growth rate of imports for different values of $Global_i^A$ and $Global_i^C$. The upward slope for the marginal effects provides further evidence that global financial market integration helps to shield against COVID-induced trade shocks. The marginal effects reported in Figure 3 confirm that the effect is not only statistically significant but also economically meaningful: following the shock, municipalities at the 75th percentile of global banks' market share distribution face a decrease in imports that is 0.53 p.p. smaller compared to municipalities at the 25th percentile of the distribution from countries with a relatively high stringency index. This differential impact represents approx. 19 percent of a standard deviation in imports' growth.

Finally, Figure A.1 assesses the validity of the parallel trends hypothesis. In this figure, each estimated coefficient results from a separate regression following Equation 2, but using the percentage change in imports between March 2020 and t months after/before, as the dependent variable. Our findings suggest that the presence of globally active banks has no significant effects on the imports change before March 2020 for treated and control observations. In contrast, we find positive and significant effects up to 9 months after the supply shock takes place, suggesting that the presence of globally-active banks helps to alleviate the



(a) $Global_i^A$ (b) $Global_i^C$

Figure 3 Marginal effects of the stringency index on imports

NOTES: The Figures show the marginal effects of confinement measures on the change in log imports conditional on the share of global banks per municipality surrounded by 95% confidence intervals (left axis). On the right axis, the distribution of the share of global banks per municipality is depicted. The Figures present the results for two definitions of share of global banks per municipality: $Global_i^A$ for Panel (a) and $Global_i^C$ for Panel (b).

transmission of shocks to imports from countries with stringent COVID-19 policies.

5 Robustness tests

We conduct several robustness checks to examine the sensitivity of the baseline results. First, we re-estimate the specification in column 3 (Table 2) for different lengths of the post-period, considering windows of 3, 6, 9, 12, and 24 months after March 2020. These results are reported in Table 3 (the pre-period is kept constant at 12 months). The findings show that the coefficient remains positive and significant for all alternative lengths of the post-period. However, the size of the coefficient becomes increasingly larger for shorter post-periods, and the coefficient for a post-period of 3 months is twice as large compared to the one for a period of 12 months. This finding provides insight on the term structure of the effect.

Second, we conduct a horse race with other explanatory variables to rule out that the previous findings are not driven by factors such as the level of economic development, the

Table 3 RESULTS FOR DIFFERENT POST-ESTIMATION WINDOWS

	(1)	(2)	(3)	(4)	(5)
	$\Delta Imports$				
	3 months	6 months	9 months	12 months	24 months
$Stringency \times Post$	-0.0387**	-0.0172**	-0.0148*	-0.0167**	-0.0097*
	(0.0154)	(0.0083)	(0.0076)	(0.0066)	(0.0050)
$Stringency \times Global_i^A$	-0.0126**	-0.0143***	-0.0147***	-0.0153***	-0.0149***
	(0.0054)	(0.0053)	(0.0053)	(0.0052)	(0.0052)
$Stringency \times Post \times Global_i^A$	0.0692***	0.0377***	0.0341***	0.0332***	0.0230***
	(0.0173)	(0.0130)	(0.0118)	(0.0108)	(0.0076)
$Constant$	-0.0068***	0.0042***	0.0089***	0.0104***	0.0064***
	(0.0010)	(0.0009)	(0.0009)	(0.0010)	(0.0010)
Observations	1,336,928	1,587,602	1,838,276	2,088,950	3,091,646
R-squared	0.0331	0.0328	0.0327	0.0326	0.0321

NOTES: The table presents the results of the baseline specification using different post-estimation windows. The dependent variable in all regressions is the month-on-month log change in imports. Column 1 presents the results using a post-period of 3 months; column 2 uses a post-period of 6 months; column 3 employs a post-period of 9 months, and so on. All specifications use a pre-estimation period of 12 months and include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

size of the municipality, or export intensity. Municipalities with a higher level of economic development are expected to be more resilient to import shocks via the provision of more financing options which potentially could explain our findings. In a similar vein, the size of the municipality and export intensity are likely to alleviate trade shocks. Hence, we need to verify whether our results hold when controlling for these factors. Table A.2 in the Appendix displays the results for the horse race with five potential candidate variables that may explain our findings. We start by looking at different measures of export intensity (exports to GDP and the number of export partners per municipality) that could influence our results shown in columns 2 and 5 on Table A.2. The coefficient for the triple interaction term with $Global_i^A$ continues to be statistically significant with a positive sign, while the coefficients for both measures of export intensity have a negative sign but are not significant.

To further examine the implications of export intensity for our results we run estimations for municipalities belonging to the bottom and top quartiles for exports to GDP shown in Table A.4. The results indicate that the coefficient for interaction term with $Global_i^A$ is positive and significant for the bottom quartile while becoming smaller and less precisely estimated for the top quartile of municipalities. These findings suggest that international financial integration remains important for mitigating negative trade shocks even when controlling for export intensity at the municipal level.

We next examine whether the level of economic development proxied by GDP per capita can influence our findings. Regions with a large presence of global banks could be also regions with higher levels of economic development that have more possibilities to sustain trade during the shock period. To address this concern, we include in column 3 on Table A.2 a competing interaction term with municipalities' GDP per capita, measured as of 2019. The coefficient for the interaction term with $Global_i^A$ remains positive and significant whereas the coefficient for GDP per capita is found to be negative and significant. These results imply that the market share of globally-active banks has a strong and independent role in alleviating the transmission of trade shocks.

Out baseline results could also reflect other market structures in the banking sector in regions with a large presence of global banks. For instance, a lack of competition may lead to higher interest rates that make access to credit in crisis periods particularly difficult, affecting the resilience of trade flows. If globally-active banks tend to operate in more competitive markets, our results could reflect the impact of competition and not necessarily a benefit driven by the presence global banks. To assess the importance of this narrative, we run an estimation including a competing interaction term with a Herfindahl-Hirschman Index (HHI) computed at the municipality level. This result is shown in column 6 on Table A.2. The coefficient for HHI is positive but not significant at conventional levels while the interaction

Table 4 RESULTS AFTER COUNTRY EXCLUSION

	(1)	(2)	(3)	(4)	(5)
	$\Delta Imports$				
	All	China	US	Europe	Asia-China
$Stringency \times Post$	-0.0167**	-0.0194***	-0.0161**	-0.0102	-0.0207***
	(0.0066)	(0.0068)	(0.0066)	(0.0070)	(0.0074)
$Stringency \times Global_i^A$	-0.0153***	-0.0152***	-0.0147***	-0.0163**	-0.0176***
	(0.0052)	(0.0055)	(0.0053)	(0.0063)	(0.0057)
$Stringency \times Post \times Global_i^A$	0.0332***	0.0322***	0.0323***	0.0297**	0.0422***
	(0.0108)	(0.0117)	(0.0110)	(0.0115)	(0.0110)
$Constant$	0.0104***	0.0102***	0.0102***	0.0096***	0.0103***
	(0.0010)	(0.0009)	(0.0010)	(0.0015)	(0.0010)
Num. of countries	257	256	256	205	207
Observations	2,088,950	2,037,325	2,041,400	1,479,700	1,556,225
R-squared	0.0326	0.0308	0.0323	0.0411	0.0418

NOTES: The table shows the effects on the month-on-month log change in imports. Column 1 presents the results from the baseline specification using the whole sample, column 2 excludes China, column 3 excludes the US, column 4 excludes countries from Europe, and column 5 excludes countries from Asia except China. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

term with $Global_i^A$ remains significant.[7]

We also investigate if specific countries or global regions are driving our findings. Consequently, we conduct estimations excluding one country or region at a time to assess the sensitivity of our results. Table 4 shows that the interaction term with $Global_i^A$ is significant in all estimations, corroborating the robustness of the results from the baseline regressions. This test confirms our findings when excluding relevant trade partners/regions such as the US, China, Europe, or all Asian countries including China.

Another concern is that other factors at the country level correlated with the Stringency index could potentially explain our findings. We perform a horse race test including competing interaction terms with the size of each economy, their level of development, export

[7]The results also remain in place when adding a competing interaction term with municipalities' population (column 4) as a proxy for municipalities' size, a factor that does not seem to explain our findings.

intensity, a measure of fiscal support measures during the pandemic, and a the distance to Brazil. The results shown in Table A.3 confirm that the coefficient of interest remains positive and significant. The only variable that was found to be significant and with a positive sign was the fiscal support index. This suggests that fiscal support measures in the exporting countries were to some extent effective in alleviating the trade shock to Brazil.

Finally, we check whether the results hold for an alternative measure of COVID-19 lockdowns. To this end, we use the Google COVID-19 Community Mobility Reports as an alternative to the stringency index. Table A.6 (column 2) shows that the triple differences term with this mobility index is positive and significant at the 10 percent level.[8]

6 Channels explaining the role of globally-active banks

The previous sections report robust findings showing that international financial integration – via the presence of globally-active banks – dampens the transmission of COVID-induced trade shocks. In this chapter, we explore channels highlighted in the literature that may explain how the presence of globally-active banks can mitigate shocks to imports from abroad. These channels include global banks' access to US dollar funding and their physical presence in multiple markets across countries.

6.1 Globally-integrated banks provide US dollar trade financing

The effect of global banks' presence on trade resilience documented in the previous sections is consistent with evidence pointing out to a privileged access to US dollar funding by globally-

[8] In addition, we also report in Table A.10 in the Appendix results in which the Stringency index enters the regression with different lags, considering 1, 3, 6, 9, and 12 months. This test aims at capturing the timing of the results and unraveling whether they materialize on impact or rather with a certain time delay. We find the results to hold up for lags up to 9 months after a peak in the Stringency index, with the size of the coefficient of interest increasing with the lags.

active banks (see, e.g., Ivashina et al., 2015). Global banks can benefit from a direct presence in key financial centers, allowing them to channel FX liquidity across countries. For example, Eguren-Martin et al. (forthcoming) show for a sample of global banks operating from the UK how this physical access to FX markets abroad is associated with more stable cross-border credit flows in crisis periods. Moreover, cross-border banking networks can also be used to shift liquidity via internal capital markets and provides banks a greater ability to manage FX risks (see, e.g., Cetorelli and Goldberg, 2012a).

Given the prominent role of the US dollar for trade invoicing, we conjecture that our results could be explained by globally-active banks benefiting from a more stable access to US dollar liquidity abroad. This mechanism would allow importing firms geographically close to these banks to obtain external US dollar funding in greater volumes and under more favorable conditions, providing an explanation for the resilience of trade flows documents above. This interpretation would be consistent with the central role of US dollar for global economic and financial activity (BIS).[9]

To explore this channel, we adjust our baseline specification in Eq. (2) replacing our measure of global banks' presence by a municipality-level proxy of banks' access to US dollar funding abroad. For this purpose we compute the market-share weighted average ratio of foreign interbank liabilities to total assets across banks within each municipality. This variable is computed by calculating each bank's ratio of foreign interbank liabilities to total assets. Then, we compute the average ratio for all banks within a municipality weighted by the market share of each bank (based on banks' total assets). Thus, this variable, labeled RFX_i^A below, captures the access to foreign funding by all Brazilian banks active in a municipality.

In Table 5 we report the results when replacing the variable $Global_i^A$ by RFX_i^A in our

[9] In addition, the presence of globally-active banks in emerging countries has been associated with increases in banking sector competition, potentially lowering the cost of external finance (Claessens and Van Horen, 2021).

Table 5 Global banks' access to US dollars

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0317***				
	(0.0039)				
$Stringency$	0.0043	0.0046			
	(0.0032)	(0.0032)			
$Stringency \times Post$	-0.0157**	-0.0168**	-0.0168**		
	(0.0066)	(0.0070)	(0.0070)		
RFX_i^A	0.2135				
	(0.1485)				
$Stringency \times RFX_i^A$	-0.3587	-0.3911	-0.4785**	-0.4337*	
	(0.2372)	(0.2436)	(0.2221)	(0.2390)	
$Post \times RFX_i^A$	-1.0012***				
	(0.2441)				
$Stringency \times Post \times RFX_i^A$	1.1751***	1.2474***	1.2474***	1.1613***	1.1613***
	(0.4059)	(0.4316)	(0.4316)	(0.4455)	(0.4455)
$Constant$	-0.0047**	0.0084***	0.0101***	0.0075***	0.0060***
	(0.0023)	(0.0008)	(0.0011)	(0.0005)	(0.0008)
Municipality-month FE	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	No	No
Country-month FE	No	No	No	Yes	Yes
Country-municipality FE	No	No	No	No	Yes
Observations	2,096,150	2,088,950	2,088,950	2,088,825	2,088,825
R-squared	0.0000	0.0326	0.0326	0.0352	0.0372

Notes: The table exhibits the effects on the month-on-month log change in imports using different sets of fixed effects. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable RFX_i^A measures the presence of global banks at the municipality level in 2019. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

baseline specification from Eq. (2). We find that a wider access to US dollar abroad is associated with a statistically significant decrease in the impact of COVID-related restrictions on imports growth. This finding supports the idea that globalized banks can have a privileged access to FX funding and that this access explains the dampening effect of global banks' presence on the transmission of shocks to global value chains.[10]

[10]Table A.8 in the Appendix confirms that these results also hold when computing RFX_i^A using banks'

While these results illustrate the importance of global banks' access to US Dollar markets as a driver of our main findings, globally-active banks that belong to a foreign-owned conglomerate may represent a distinctive case of banks with a special access to US Dollar funding. This ownership dimension has been highlighted in previous research as a key factor explaining the relationship between financial and real-sector integration via trade (see, e.g., Claessens and Van Horen, 2021).

We address the role of banks' foreign ownership dimension in Table A.7 in the Appendix, where we replicate our main specification by replacing the global-bank metric by the municipal-level market share of foreign-owned banks (measured as a pre-shock average). While the coefficient of interest is positive as expected, it is not statistically significant. A possible reason for this result is that we are comparing regions with foreign banks' presence against other regions with globalized banks that are, however, Brazilian owned. Thus, we run a second test in which we define a foreign ownership dummy as 1 if a region hosts a foreign bank and 0 if a region has no foreign bank and simultaneously belongs to the bottom-50th percentile of our bank globalization variable ($Global_i^A$). When using this dummy in the triple-differences regression on column 2, we find that the presence of foreign banks significantly decrease the negative impact of trade disruptions on imports compared to other rather autarkic regions. The estimated coefficient increases in size when these autarkic regions are more narrowly defined as those below the bottom-25th percentile of $Global_i^A$. This result confirms that our broad bank globalization definition combines the effect of both *de facto* and *de jure* globalization mechanisms, represented by US dollar access and foreign ownership, respectively.

Finally, we also look at a complementary angle of banking globalization, namely that of the direct cross-border banking integration between Brazil and the countries in which imports originate. While Brazil's trade partners may differ to a large extent on their own integration

credit-market shares per municipality.

to global financial markets, those that host banks directly providing cross-border credit to Brazilian firms may be in a better position to support the trade links in the period of analysis. We use the BIS Locational Banking Statistics to compute a measure of Brazil's cross-border credit liabilities vis-à-vis banks located in its trade partners.

Armed with this data, we replicate our baseline specification separately for import flows from countries connected vs. disconnected to Brazil via credit flows. The results, reported in Table A.5, show that while the main effect remains in place for both subsamples, it becomes larger for financially disconnected countries (column 2). A similar conclusion is reached when comparing countries at the top 75th percentile of the share of credit flows to Brazil vs. those below that threshold, with imports from the latter ones benefiting more from the presence of global banks in Brazil (columns 3 and 4). We interpret these findings as suggesting that the presence of global banks is particularly beneficial for trade flows when a trade partner is financially disconnected with Brazil, a situation in which global banks can arguably substitute the lack of direct bilateral financial ties.

6.2 Globally-active banks and information asymmetries

While global financial integration has been long associated with the expansion of trade (Hertzel et al., 2018), the financing of trade operations through cross-border banking is subjected to material market frictions, primarily due to information asymmetries both between trade partners as well as between them and banks often located in different jurisdictions. Previous findings point to these frictions as a key obstacle for a stable flow of funding across borders (Gelos and Wei, 2005).

To the extent that global banks have a physical presence across borders, being often closer to both exporters and importers, we may expect them to play a role in moderating such information frictions. This argument is supported by the investors' recognition hypothesis (see, e.g., Cen et al., 2015), which suggests that in our setting Brazilian importers may be perceived by global banks as less risky if they trade with reputed customers of the same banking group abroad. This information channel could lead to lower interest rates, more lenient covenants, and generally to more stable credit flows. We therefore conjecture that a global bank active in both the importing municipality in Brazil and the exporting country, is more likely to overcome information asymmetries and keep a sustained flow of credit supply to trading firms.[11]

We explore this hypothesis by testing whether Brazilian affiliates of European banks mitigate shocks to flows imports from Europe. We focus this test on imports from Europe to exploit the widespread presence of European banks in Brazil, including banks such as Santander, Credit Suisse, or Societe Generale. The focus on Europe allows us testing whether imports from Europe are particularly sensitive to the presence of European-owned banks in a given municipality. As a comparison, we test the effect on Non-European imports in the same subset of municipalities hosting European banks. We therefore restrict the sample to either European or Non-European imports and to municipalities hosting European banks. We then replicate our benchmark specification to assess the impact of global banks' presence on imports when trade flows originate in the same country in which foreign banks are headquartered.

Table 6 summarizes these tests. On column 1 we find that the triple interaction term of interest is positive and significant (at the 10 percent level). That is, imports from Europe seem to benefit from a larger presence of European banks within a Brazilian municipality. When comparing this result to the estimation of Non-European imports on column 2, we find the size of the coefficient of interest to be approximately four times smaller (albeit a

[11] In addition, we note that globally-active banks with branches in several countries are more likely to have the required expertise to address risks associated with the enforcement of trade contracts.

Table 6 Import flows and banks' home countries

	(1)	(2)
	$\Delta Imports$	
	European countries	Non-european countries
$Stringency \times Post$	-0.0744**	-0.0129
	(0.0340)	(0.0117)
$Stringency \times Global_i^A$	-0.0251	-0.0158
	(0.0264)	(0.0139)
$Stringency \times Post \times Global_i^A$	0.115*	0.0409*
	(0.0613)	(0.0226)
$Constant$	0.0145***	0.0102***
	(0.00106)	(0.00284)
Observations	339,775	851,600
R-squared	0.061	0.026

Notes: The table presents the results on the month-on-month log change in imports. Column 1 shows the results for the baseline specification subsampling to municipalities that simultaneously comply with two conditions: i) import goods from European countries, ii) have local branches of European banks. Column 2 exhibits the results for a subsample of municipalities that meet two conditions: i) import goods from non-European countries, ii) have branches from European countries. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

higher precision in the estimate). This result suggests that the presence of European banks is important for dampening the effect of trade shocks on imports from Europe. Thus, the effect of globally-active banks in making trade more resilient can also be associated with their physical presence close to importers and exporters, arguably alleviating informational frictions between them.

7 Heterogeneous effects across regions and products

In this section, we explore the heterogeneous effects of globally-integrated banks on COVID-induced import shocks across regions and product categories. In our context, import shocks to Brazilian municipalities are stemming from the exogenous implementation of COVID-19

Table 7 Results in areas with high and low financial development

	(1)	(2)	(3)	(4)
	Credit-to-GDP Ratio		Credit-deposit rate spread	
	(< p50)	(≥ p50)	(< p50)	(≥ p50)
Stringency × *Post*	-0.0119	-0.0247***	-0.0222***	-0.0100
	(0.0095)	(0.0068)	(0.0083)	(0.0078)
Stringency × $Global_i^A$	-0.0040	-0.0319***	-0.0344***	0.0071
	(0.0071)	(0.0082)	(0.0080)	(0.0070)
Stringency × *Post* × $Global_i^A$	0.0167	0.0575***	0.0507***	0.0125
	(0.0143)	(0.0130)	(0.0147)	(0.0124)
Constant	0.0098***	0.0117***	0.0117***	0.0088***
	(0.0014)	(0.0012)	(0.0013)	(0.0012)
Observations	1,028,975	1,059,975	1,007,025	1,081,925
R-squared	0.0340	0.0311	0.0337	0.0318

Notes: The table presents the effects on the month-on-month log change in imports. Columns 1 and 2 show the results from the baseline specification subsampling to municipalities with high (above the 50th percentile) and low (below the 50th percentile) Credit-to-GDP ratios, respectively. Columns 3 and 4 present the results from the baseline specification subsampling to municipalities with high (above the 50th percentile) and low (below the 50th percentile) Credit-deposit rate spreads, respectively. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

policies in exporting countries. We are therefore interested in extending our benchmark specification to shed light on possible drivers of credit reallocation across municipalities, as these may carry consequences for the local economies.

We begin by investigating if the effect of cross-border banking integration on import shocks is different depending on the level of financial development at the municipality level. Due to the likely presence of "flight to safety" during the COVID-19 pandemic, we may expect that the positive impact of globally-active banks previously identified could be more pronounced in municipalities with higher financial development. We explore this conjecture using the municipal-level credit-to-GDP ratio and average credit-deposit rate spread as proxies for financial development. We then split our sample according to the median of these variables and re-run our estimation, assessing whether the impact of hosting global banks differs depending on the stance of financial market development.

The results reported in Table 7 show that the triple interaction term of interest is positive and significant only for the upper half of municipalities with the highest credit-to-GDP ratio (column 1 vs column 2). Moreover, for the credit-deposit rate spread only the coefficient for the triple interaction term for the bottom half of the municipalities with the lowest spread (column 3) is positive and significant. That is, the effect of global banks increases with the relative size of the local credit market and with the presence of weaker financial market frictions, as proxied by the credit-deposit spread. These findings can be interpreted as suggesting a more intense reaction – in terms of sustaining credit supply – of globally-active banks in regions with higher degrees of financial development, in line with a reallocation of capital towards less risky and well-functioning markets.

We next explore whether our results differ across different types of imported goods, in particular consumption and intermediate goods. Hertzel et al. (2018) provide evidence that firms joining global supply chains increase their access to cross-border financing after creating new supply chains. The reason for this is that by being part of a global supply chain a firm becomes more visible, reducing informational obstacles to financing. Building on this argument, we may expect firms importing intermediate goods as part of a global supply chain to be particularly benefited from the presence of globally active banks.

We explore this question by differentiating in our sample between imported products categorized into consumption and intermediate goods, with the latter import flows being associated to global supply chains in which Brazilian firms participate. We conduct separate estimations for import flows in each type of product category replicating our benchmark specification. The results are reported in Table 8. Interestingly, only the triple interaction term of interest in the estimation with intermediate goods (column 3) is positive and significant. This finding indicate that the role of global banks in alleviating shocks to imports

Table 8 HETEROGENEOUS EFFECTS ACROSS DIFFERENT TYPES OF GOODS

	(1)	(2)	(3)
		$\Delta Imports$	
	All	Consumption	Intermediate
$Stringency \times Post$	-0.0167**	-0.0079	-0.0146*
	(0.0066)	(0.0075)	(0.0076)
$Stringency \times Global_i^A$	-0.0153***	-0.0033	-0.0157***
	(0.0052)	(0.0092)	(0.0059)
$Stringency \times Post \times Global_i^A$	0.0332***	0.0185	0.0282**
	(0.0108)	(0.0167)	(0.0119)
$Constant$	0.0104***	0.0033***	0.0119***
	(0.0010)	(0.0011)	(0.0011)
Observations	2,088,950	1,061,075	1,762,275
R-squared	0.0326	0.0392	0.0365

NOTES: The table presents the results of the baseline specification subsampling to different types of goods following the Classification by Broad Economic Categories. The dependent variable in all regressions is the month-on-month log change in imports. Column 1 presents the results for all type of products, column 2 show the results for consumption goods, and column 3 exhibit the results for intermediate goods. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

mainly applies to intermediate goods, a result consistent with the fact that firms that are part of global value chains can be seen by banks as less risky and more valuable customers. Moreover, this result highlights an important implication of our findings, namely that the presence of global banks in emerging countries can make global value chains more resilient in periods of widespread trade disruptions.

8 Conclusion

This paper quantifies the effect of cross-border banking integration on the resilience of international trade when global supply chains become disrupted. Our key finding is that a larger presence of globally-integrated banks – i.e., those with related entities in the U.S. – led to a smaller decrease in import flows to Brazilian municipalities from countries exposed to pandemic-related lockdowns. This result arises when comparing municipalities with different degrees of global banks' presence ex-ante.

This finding is robust to an exhaustive set of alternative specifications, remaining in place even when controlling for import demand and different definitions of global banking integration. Furthermore, we find that the benefit of global banks' presence can be attributed to swifter access to U.S. dollar funding and to an alleviation of financial frictions between importers and exporters, explained by global banks' presence in multiple jurisdictions. We find the effect on import flows to be stronger for intermediate goods, highlighting the importance of the documented mechanism for the resilience of global value chains.

We draw these conclusions by exploiting a combination of administrative data from Brazil, including balance sheet information at the level of municipal bank branches and bilateral trade records between firms in each municipality and individual countries. We merge these data with information on the extent of pandemic-related lockdowns in Brazil's trade partners, exploiting these policies as an exogenous trigger of trade flows' disruptions to Brazil. The identification strategy rests on a difference-in-difference model estimating the effect of countries' experiencing restrictive lockdowns on import flows. We rely on a triple interaction estimation to condition the effect on municipalities' ex-ante market share of globally-active banks. By saturating this model with municipality-month fixed effects, we can control for unobserved heterogeneity across import flows from multiple countries, allowing us to isolate a supply-driven effect.

Our findings highlight that global supply chains can become more resilient to trade shocks if supported by cross-border banking integration. This conclusion underscores a previously unexplored synergy between financial and real-sector globalization, bridging the gap between studies exploring the fragility of global supply chains and those unraveling the real effects of global banking integration. Data limitations prevent us from further exploring whether the benefit of global banks' presence can be attributed to different lending technologies, a better capacity to hedge F.X. risk, or individual banks' specialization in specific product categories. In addition, we do not explore the role of firm characteristics in shaping the results, for example, through more diversified supply chains or by having the capacity to raise direct firm-to-firm funding abroad. We leave these further questions to future work.

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A Appendix: Additional figures and tables

Table A.1 Results - Credit Market Share

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0350***				
	(0.0046)				
$Stringency$	0.0040	0.0046			
	(0.0039)	(0.0040)			
$Stringency \times Post$	-0.0156**	-0.0175**	-0.0175**		
	(0.0075)	(0.0081)	(0.0081)		
$Global_i^C$	0.0072*				
	(0.0039)				
$Stringency \times Global_i^C$	-0.0075	-0.0088	-0.0114*	-0.0099	
	(0.0066)	(0.0068)	(0.0063)	(0.0068)	
$Post \times Global_i^C$	-0.0292***				
	(0.0066)				
$Stringency \times Post \times Global_i^C$	0.0263**	0.0295**	0.0295**	0.0266**	0.0266**
	(0.0107)	(0.0116)	(0.0116)	(0.0123)	(0.0123)
$Constant$	-0.0059**	0.0084***	0.0102***	0.0075***	0.0060***
	(0.0027)	(0.0008)	(0.0013)	(0.0004)	(0.0009)
Municipality-month FE	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	No	No
Country-month FE	No	No	No	Yes	Yes
Country-municipality FE	No	No	No	No	Yes
Observations	2,096,150	2,088,950	2,088,950	2,088,825	2,088,825
R-squared	0.0000	0.0326	0.0326	0.0352	0.0372

Notes: The table exhibits the effects on the month-on-month log change in imports using different sets of fixed effects. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable $Global_i^C$ measures the presence of global banks at the municipality level in 2019. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2 Horse race results - municipality characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Imports$					
$Stringency \times Post \times Global_i^A$	0.0332***	0.0327***	0.0356***	0.0328***	0.0300***	0.0334***
	(0.0108)	(0.0114)	(0.0110)	(0.0111)	(0.0113)	(0.0108)
$Stringency \times Post \times Exports/GDP_{m,pre}$		-0.0116				
		(0.0118)				
$Stringency \times Post \times \log(GDP\_per_{m,pre})$			-0.0113**			
			(0.0052)			
$Stringency \times Post \times \log(population_{m,pre})$				-0.0003		
				(0.0021)		
$Stringency \times Post \times \log(X\_partners_{m,pre})$					-0.0027	
					(0.0034)	
$Stringency \times Post \times \log(HHI_{m,pre})$						0.0059
						(0.0050)
Constant	0.0104***	0.0103***	0.0043	0.0127**	0.0108***	0.0148**
	(0.0010)	(0.0011)	(0.0085)	(0.0049)	(0.0026)	(0.0068)
Observations	2,088,950	2,033,925	2,088,950	2,088,950	2,033,925	2,033,925
R-squared	0.0326	0.0282	0.0326	0.0326	0.0282	0.0282

Notes: The table shows the effects on the month-on-month log change in imports. Results from the baseline specification are in column 1. The rest of the columns present a horse race with other potential explanatory variables at the municipality level. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.3 HORSE RACE RESULTS - COUNTRY CHARACTERISTICS

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Imports$					
$Stringency \times Post \times Global_i^A$	0.0332***	0.0345***	0.0326***	0.0348**	0.1052***	0.0324***
	(0.0108)	(0.0113)	(0.0113)	(0.0136)	(0.0323)	(0.0114)
$Stringency \times Post \times \log(GDP_{c,pre})$		-0.0031				
		(0.0042)				
$Stringency \times Post \times \log(GDP\_per_{c,pre})$			0.0007			
			(0.0013)			
$Stringency \times Post \times (Exports/GDP)_{c,pre}$				-0.0041		
				(0.0152)		
$Stringency \times Post \times Econ\_supp\_index_{c,t}$					0.0057*	
					(0.0033)	
$Stringency \times Post \times Distance_{Bra,c}$						0.0000
						(0.0000)
$Constant$	0.0084***	-0.0071	-0.0499***	0.0071***	0.0176***	0.0068***
	(0.0008)	(0.0059)	(0.0077)	(0.0017)	(0.0043)	(0.0021)
Observations	2,088,950	2,007,300	2,007,300	1,671,200	1,185,300	1,974,025
R-squared	0.0326	0.0333	0.0333	0.0379	0.0337	0.0334

NOTES: The table shows the effects on the month-on-month log change in imports. Results from the baseline specification are in column 1. The rest of the columns present a horse race with other potential explanatory variables at the country level. All specifications include municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.4 Effects for high and low exporter municipalities

	(1)	(2)
	$\Delta Imports$	
	Low export (≤p25)	High export (≥p75)
$Stringency \times Post$	-0.0453*	-0.0201**
	(0.0235)	(0.0097)
$Stringency \times Global_i^A$	-0.0176	-0.0093
	(0.0212)	(0.0080)
$Stringency \times Post \times Global_i^A$	0.0875**	0.0284*
	(0.0350)	(0.0153)
$Constant$	0.0086**	0.0106***
	(0.0034)	(0.0016)
Num. of countries	194	252
Observations	154,975	802,325
R-squared	0.0713	0.0192

Notes: The Table shows the effects on the month-on-month log change in imports. Column 1 shows the estimates for the baseline specification in low-exporter municipalities (the exports-to-GDP ratio was below the 25th percentile during 2018-2019). Column 2 shows the estimates for the baseline specification in high-exporter municipalities (the exports-to-GDP ratio was above the 75th percentile during 2018-2019). All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5 Effects from financially disconnected countries

	(1)	(2)	(3)	(4)
	$\Delta Imports$			
	Loans*	No loans*	Loans* $\geq$ p75	Loans* $<$ p75
$Stringency \times Post$	-0.0142	-0.0293**	0.0066	-0.0198**
	(0.0096)	(0.0128)	(0.0132)	(0.0096)
$Stringency \times Global_i^A$	-0.0133*	-0.0248*	-0.0008	-0.0164**
	(0.0068)	(0.0142)	(0.0102)	(0.0075)
$Stringency \times Post \times Global_i^A$	0.0305**	0.0576*	0.0135	0.0346**
	(0.0145)	(0.0309)	(0.0165)	(0.0164)
$Constant$	0.0122***	0.0083***	0.0099***	0.0119***
	(0.0013)	(0.0021)	(0.0012)	(0.0015)
Observations	1,350,975	287,700	450,525	1,187,275
R-squared	0.0436	0.0897	0.1134	0.0396

Notes: The Table shows the results of estimating Eq. (2) by differentiating between countries with different degrees of financial integration with Brazil. Columns 1 and 2 split the sample according to whether banks operating from the exporting countries provide or not cross-border credits to Brazilian firms and banks, as measured by cross-border credit flows from the BIS Locational Banking Statistics. In columns 3 and 4 we split the sample according to whether cross-border credit flows from country j to Brazil are above the 75th percentile of the share of total cross-border credit flows to Brazil (column 3), or below this threshold (column 4). These variables are computed from average credit volumes in 2018 and 2019. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.6 Results - the community mobility indicator

	(1)	(2)
	$\Delta Imports$	
$Stringency_{str} \times Post$	-0.0167**	
	(0.0066)	
$Stringency_{str} \times Global_i^A$	-0.0153***	
	(0.0052)	
$Stringency_{str} \times Post \times Global_i^A$	0.0332***	
	(0.0108)	
$Stringency_{mob} \times Post$		-0.0137**
		(0.0068)
$Stringency_{mob} \times Global_i^A$		-0.0103
		(0.0065)
$Stringency_{mob} \times Post \times Global_i^A$		0.0195*
		(0.0116)
$Constant$	0.0104***	0.0108***
	(0.0010)	(0.0015)
Observations	2,088,950	2,088,950
R-squared	0.0326	0.0326

Notes: The table exhibits the effects on the month-on-month log change in imports. Column 1 presents the baseline specification results. Column 2 shows the results using the Google COVID-19 Community Mobility Reports to determine the treatment status. Treated units correspond to import flows from countries that scored above the 75th percentile in the distribution of the change in movement to and from retail, recreational, and workplaces. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.7 The role of foreign-owned banks

	(1)	(2)	(3)
		$\Delta Imports$	
$Treat \times Post \times Foreign_i$	0.0257		
	(0.0179)		
$Treat \times Post \times D.Foreign_i^{50}$		0.0134*	
		(0.0080)	
$Treat \times Post \times D.Foreign_i^{25}$			0.0170*
			(0.0098)
$Constant$	0.0077***	0.0071***	0.0065***
	(0.0003)	(0.0007)	(0.0011)
Observations	2,088,825	1,157,675	957,150
R-squared	0.0372	0.0388	0.0377

Notes: The table exhibits the effects on the month-on-month log change in imports. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable $Foreign_i$ measures the presence of foreign banks at the municipality level in 2019. $D.Foreign_i^{50}$ is a dummy variable that takes the value of one if there is presence of foreign banks in the municipality i, and the presence of globally active banks is high, that is, above the 50th percentile of the presence of global banks distribution ($Global^A$), and zero otherwise. $D.Foreign_i^{25}$ is a dummy variable that takes the value of one just as the variable $D.Foreign_i^{50}$, and zero if there is no presence of foreign banks in the municipality i, and the presence of globally active banks is low, that is, below the 25th percentile of the presence of global banks distribution ($Global^A$). All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.8 Banks US Dollar access and import flows

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0365***				
	(0.0048)				
$Stringency$	0.0039	0.0039			
	(0.0043)	(0.0046)			
$Stringency \times Post$	-0.0172**	-0.0182**	-0.0182**		
	(0.0080)	(0.0086)	(0.0086)		
RFX_i^C	0.2734*				
	(0.1650)				
$Stringency \times RFX_i^C$	-0.2724	-0.2808	-0.3889	-0.3317	
	(0.2867)	(0.3053)	(0.2735)	(0.3072)	
$Post \times RFX_i^C$	-1.2225***				
	(0.2674)				
$Stringency \times Post \times RFX_i^C$	1.1196**	1.1776**	1.1776**	1.0677**	1.0677**
	(0.4402)	(0.4664)	(0.4664)	(0.5116)	(0.5116)
$Constant$	-0.0059**	0.0084***	0.0100***	0.0072***	0.0059***
	(0.0029)	(0.0008)	(0.0015)	(0.0006)	(0.0010)
Municipality-month FE	No	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	No	No
Country-month FE	No	No	No	Yes	Yes
Country-municipality FE	No	No	No	No	Yes
Observations	2,096,150	2,088,950	2,088,950	2,088,825	2,088,825
R-squared	0.0000	0.0326	0.0326	0.0352	0.0372

Notes: The table exhibits the effects on the month-on-month log change in imports using different sets of fixed effects. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable RFX_i^C measures the presence of global banks at the municipality level in 2019. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.9 ASSESSING THE PARALLEL TRENDS ASSUMPTION

	(1)	(2)
	$\Delta Imports$	
Stringency	0.0017	0.0016
	(0.0015)	(0.0018)
Constant	-0.0010	-0.0009
	(0.0011)	(0.0011)
Municipality-month FE	No	Yes
Observations	922,306	918,771
R-squared	0.0000	0.0310

NOTES: The table exhibits the effects on the month-on-month log change in imports in the pre-period, between March 2019 and February 2020. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. Column 1 presents the results without using fixed effects, while column 2 employs municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

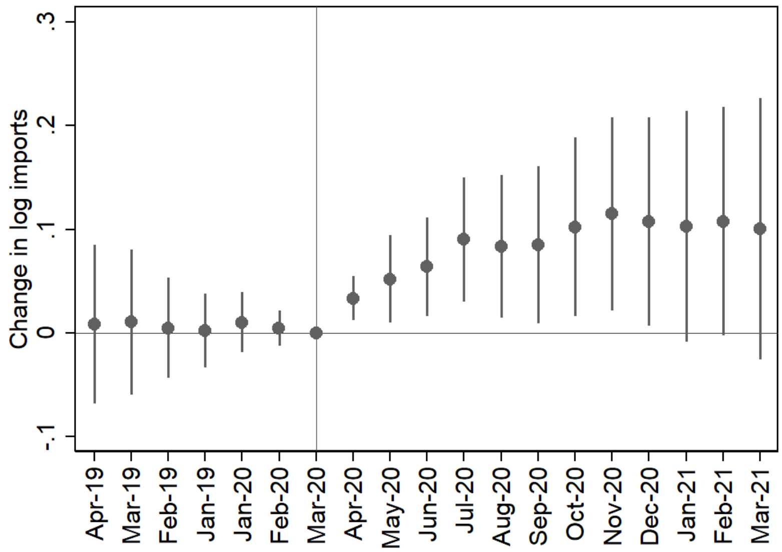

Figure A.1 Assessing the parallel trends hypothesis

NOTES: The Figure depicts the effects on imports t periods after/before the supply shock. Each coefficient results from a separate regression where the outcome is the difference between imports in March 2020 and t periods after/before the COVID-19 measures took place. The graph also displays 90% confidence intervals of the estimates.

Table A.10 Effects on imports t months ahead

	(1)	(2)	(3)	(4)	(5)
	$\Delta Imports_t$				
	1 month	3 months	6 months	9 months	12 months
$Stringency \times Post$	-0.0167**	-0.0329	-0.0566	-0.0784	-0.0863
	(0.0066)	(0.0210)	(0.0469)	(0.0624)	(0.0669)
$Stringency \times Global_i^A$	-0.0153***	-0.0280**	-0.0413**	-0.0466*	-0.0355
	(0.0052)	(0.0114)	(0.0201)	(0.0271)	(0.0365)
$Stringency \times Post \times Global_i^A$	0.0332***	0.0636***	0.0852**	0.1073**	0.1004
	(0.0108)	(0.0244)	(0.0386)	(0.0512)	(0.0642)
$Constant$	0.0104***	0.0242***	0.0386***	0.0490***	0.0530***
	(0.0010)	(0.0032)	(0.0073)	(0.0097)	(0.0106)
Observations	2,088,950	2,088,950	2,088,950	2,088,950	2,088,950
R-squared	0.0326	0.0351	0.0383	0.0394	0.0398

Notes: The table presents the effects on the imports t months after lockdown measures were implemented. The outcome is the log difference of the imports t months ahead and February 2020. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.11 Effects when excluding sporadic trade relationships

	(1)	(2)	(3)	(4)
	$\Delta Imports$			
	All	t≥p10	t≥p25	t≥p50
$Stringency \times Post$	-0.0167**	-0.0244*	-0.0187	-0.0146
	(0.0066)	(0.0128)	(0.0154)	(0.0219)
$Stringency \times Global_i^A$	-0.0153***	-0.0347***	-0.0321*	-0.0264
	(0.0052)	(0.0122)	(0.0180)	(0.0284)
$Stringency \times Post \times Global_i^A$	0.0332***	0.0773***	0.0737**	0.0799
	(0.0108)	(0.0256)	(0.0348)	(0.0498)
$Constant$	0.0104***	0.0186***	0.0219***	0.0280***
	(0.0010)	(0.0015)	(0.0018)	(0.0028)
Observations	2,088,950	1,046,475	818,250	537,475
R-squared	0.0326	0.0543	0.0659	0.0886

Notes: The table shows the effects on the month-on-month log change in imports. Column 1 presents the baseline results. Column 2 presents the results when removing sporadic import relationships. That is, excluding municipality-country relationships with import records below 4% of all the periods (10th percentile). Columns 3 and 4 do the same analysis but exclude trade relationships below the 25th (8% of all periods) and 50th (24% of all periods) percentiles. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.12 THE ROLE OF GLOBAL BANKS IN PRESERVING IMPORT FLOWS

	(1)	(2)	(3)	(4)	(5)
	$\Pr(Imports > 0)$				
	t	t+3	t+6	t+9	t+12
$Treat$	-0.1719	-0.1718	-0.1716	-0.1707	-0.1726
	(0.1644)	(0.1647)	(0.1656)	(0.1641)	(0.1636)
$Post$	-0.0175***	0.0064	0.0439***	0.0479***	0.0604***
	(0.0048)	(0.0051)	(0.0054)	(0.0053)	(0.0060)
$Treat \times Post$	-0.0009	-0.0007	0.0014	0.0081	-0.0020
	(0.0077)	(0.0077)	(0.0091)	(0.0097)	(0.0149)
$us.asset$	-0.3146***	-0.3082***	-0.2993***	-0.2959***	-0.3016***
	(0.0294)	(0.0298)	(0.0295)	(0.0290)	(0.0294)
$Treat \times us.asset$	-0.0074	-0.0116	-0.0093	-0.0028	0.0089
	(0.0614)	(0.0625)	(0.0626)	(0.0595)	(0.0572)
$Post \times us.asset$	0.0123*	0.0020	-0.0139*	-0.0160*	-0.0097
	(0.0071)	(0.0077)	(0.0084)	(0.0082)	(0.0116)
$Treat \times Post \times us.asset$	0.0175	0.0316*	0.0337*	0.0151	0.0139
	(0.0129)	(0.0169)	(0.0197)	(0.0174)	(0.0272)
$Constant$	-0.8180***	-0.8305***	-0.8470***	-0.8493***	-0.8402***
	(0.0581)	(0.0580)	(0.0579)	(0.0575)	(0.0571)
Observations	2,096,150	1,844,612	1,593,074	1,341,536	1,089,998

NOTES: Using a probit model and following the baseline specification, this table examines the role of global banks in preserving trade relationships across municipalities and countries t months after the supply shock. The outcome is a binary variable taking the value of one if imports between country c and municipality m are positive in month t. All specifications include country and municipality-month fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.13 Results addressing seasonality

	(1)	(2)	(3)	(4)
	$\Delta Imports$			
$Treat$	0.0048*			
	(0.0029)			
$Post$	0.0290***	0.0290***	0.0287***	0.0287***
	(0.0038)	(0.0038)	(0.0038)	(0.0038)
$Treat \times Post$	-0.0145**	-0.0145**	-0.0135**	-0.0135**
	(0.0064)	(0.0064)	(0.0065)	(0.0065)
$Treat \times us.asset$	-0.0114**	-0.0130***	-0.0129***	
	(0.0050)	(0.0049)	(0.0049)	
$Post \times us.asset$	-0.0215***	-0.0215***	-0.0214***	-0.0214***
	(0.0061)	(0.0061)	(0.0061)	(0.0061)
$Treat \times Post \times us.asset$	0.0288***	0.0288***	0.0287***	0.0287***
	(0.0098)	(0.0098)	(0.0099)	(0.0099)
$Constant$	-0.0020	-0.0004	-0.0004	-0.0020*
	(0.0013)	(0.0011)	(0.0011)	(0.0010)
Municipality-quarter FE	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	No
Country-quarter FE	No	No	Yes	Yes
Country-municipality FE	No	No	No	Yes
Observations	2,096,150	2,096,150	2,096,150	2,096,150
R-squared	0.0023	0.0023	0.0025	0.0045

Notes: The table exhibits the effects on the month-on-month log change in imports using different sets of fixed effects. Quarter fixed effects refer to common-quarter fixed effects (e.g., 2019q1-2020q1-2021q1; 2019q2-2020q2-2021q2; and so forth). The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable $Global_i^A$ measures the presence of global banks at the municipality level in 2019. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.14 RESULTS WHEN CLUSTERING THE STANDARD ERRORS AT DIFFERENT LEVELS

	(1)	(2)	(3)	(4)	(5)
	$\Delta Imports$				
$Stringency \times Post$	-0.0167**	-0.0167***	-0.0167**	-0.0167	-0.0167
	(0.0066)	(0.0059)	(0.0068)	(0.0144)	(0.0172)
$Stringency \times Global_i^A$	-0.0153***	-0.0153**	-0.0153***	-0.0153**	-0.0153***
	(0.0052)	(0.0066)	(0.0054)	(0.0069)	(0.0022)
$Stringency \times Post \times Global_i^A$	0.0332***	0.0332***	0.0332***	0.0332***	0.0332***
	(0.0108)	(0.0109)	(0.0109)	(0.0108)	(0.0112)
$Constant$	0.0104***	0.0104***	0.0104***	0.0104***	0.0104***
	(0.0010)	(0.0010)	(0.0010)	(0.0021)	(0.0022)
Robust SE clustered - Country	Yes	No	Yes	Yes	No
Robust SE clustered - Municipality	No	Yes	Yes	No	Yes
Robust SE clustered - Time	No	No	No	Yes	Yes
Observations	2,088,950	2,088,950	2,088,950	2,088,950	2,088,950
R-squared	0.0326	0.0326	0.0326	0.0326	0.0326

NOTES: The table shows the effects on the month-on-month log change in imports. Column 1 presents the baseline results clustering standard errors at the country level. Column 2 exhibits the results for the baseline specification when standard errors are clustered at the municipality level. Column 3 shows the results when standard errors are clustered at the country and municipality level. Column 4 displays results for the baseline specification clustering at the country-month level. Finally, column 5 presents the results when clustering at the municipality and month level. All specifications include country and municipality-month fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

Table A.15 VARIABLES DEFINITION

Variable	Definition	Source
$Global_i^A$	This variable represents the total market share of globally-integrated banks per municipality, computed as an average between 2018-2019. Globally-integrated banks are defined as those banking institutions with a related entity active in the U.S., including both Brazilian- or foreign-owned banks. The municipal market share is computed as the ratio of global banks' assets to total bank assets per municipality.	Brazilian Central Bank
$Global_i^C$	This variable represents the total market share of globally-integrated banks per municipality, computed as an average between 2018-2019. Globally-integrated banks are defined as those banking institutions with a related entity active in the U.S., including both Brazilian- or foreign-owned banks. The municipal market share is computed as the ratio of global banks' outstanding credit to total bank credit per municipality.	Brazilian Central Bank
RFX_i^A	This variable is computed as the municipality-level average of banks' ratio of foreign interbank liabilities to total assets. This average is weighted by banks' market shares in each municipality. The ratio of foreign interbank liabilities captures the volume of outstanding liabilities held abroad in foreign currency by Brazilian banks and is reported at the banking-group level.	Brazilian Central Bank
RFX_i^C	This variable is computed as the municipality-level average of banks' ratio of foreign interbank liabilities to total credit. This average is weighted by banks' market shares in each municipality. The ratio of foreign interbank liabilities captures the volume of outstanding liabilities held abroad in foreign currency by Brazilian banks and is reported at the banking-group level.	Brazilian Central Bank
$Exports/GDP_{m,pre}$	Average exports-to-GDP ratio in the municipality m between 2018 and 2019.	Brazilian Ministry of Economy and Brazilian Institute of Geography and Statistics
$\log(GDP\_per_{m,pre})$	Average log GDP per capita (current US$) in the municipality m between 2018 and 2019.	Brazilian Institute of Geography and Statistics
$\log(population_{m,pre})$	Average log population in the municipality m between 2018 and 2019.	Brazilian Institute of Geography and Statistics
$\log(X\_partners_{m,pre})$	Log number of export partners from the municipality m between 2018 and 2019.	Authors' calculations using data from the Brazilian Ministry Economy
$\log(HHI_{m,pre})$	Average Hirschman Herfindahl Index at the municipality m between 2018 and 2019 (diversity of exported products by a certain municipality).	Authors' calculations using data from the Brazilian Ministry Economy
$\log(GDP_{c,pre})$	Average log GDP (current US$) in the country c between 2018 and 2019.	World Bank
$\log(GDP\_per_{c,pre})$	Average log GDP per capita (current US$) in the country c between 2018 and 2019.	World Bank
$(Exports/GDP)_{c,pre}$	Average exports-to-GDP ratio in country c between 2018 and 2019.	World Bank
$Econ\_supp\_index_{c,t}$	Economic Support Index from country c in month t.	Oxford Coronavirus Government Response Tracker
$Stringency_{c,t}$	Average stringency index at country c in month t.	Oxford Coronavirus Government Response Tracker
$Mobility_{c,t}$	Average community mobility indicators for public transport stations, parks and outdoor spaces, and workplaces at country c in month t.	Google COVID-19 Community Mobility Trends
$Distance_{Bra,c}$	Distance between the capital from country c and Brasilia.	Center for Prospective Studies and International Information (CEPII)