Trade Disruptions and Global Banking *

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Abstract

Does global banking alleviate or exacerbate the transmission of major disruptions in global trade? Using novel data linking regional banking markets with import flows to Brazil, we document that the presence of global 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 broader access to US dollar funding. This evidence highlights a strong link between global banking 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 how production is organized worldwide. Despite falling slightly 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 solid 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 unprecedented economic and political risks have threaded trade flows, the question of whether global banking can enhance trade resilience is, therefore, of paramount importance.

This paper estimates the effect of global banking integration on the resilience of import flows to an emerging country. This is done through the lens of a difference-in-difference approach that exploits municipal-level variation both in global banks' market penetration and in the exposure to exogenous disruptions in import flows. We use 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 – defined as those banks with a related entity in the U.S. – makes import flows more resilient in the context of trade disruptions triggered by pandemic-related lockdowns abroad.

The identification strategy focuses on observing bilateral trade relationships between each Brazilian municipality and the countries where 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 global 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 global 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 global 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 Brazilian Ministry of Economy to construct a panel at the municipality-country level recording import and export monthly trade flows on a bilateral basis. We merge the trade panel with our regional banking database aggregated at the municipal level, ending 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 primary dataset, obtaining a measure of countries' exposure to lockdown policies. The final sample consists of 2,597 municipalities importing goods monthly from a total of 180 countries from 2019 to 2021, adding up to 1,983,875 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 similar 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 and 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 the ex-ante asset market share of global 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

[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.

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 global 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 0.55 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., 2023). From another perspective, Bruno and Shin (2015b) and Bruno and Shin (2015a) highlight mechanisms through which global banks can cut cross-border credit when the US Dollar appreciates. Using a variety of tests, we find evidence that the results can be better explained by global banks having privileged access to FX funding abroad.

In a final set of results, we explore market heterogeneities to shed light on the implications of our findings, reaching two 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.

We provide an exhaustive set of additional tests corroborating our findings and addressing multiple identification concerns. 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, the results remain in place when including municipality or country characteristics in a competing triple-interaction fashion. 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.

The results provide novel evidence of how global banking can make trade flows more resilient when trade becomes globally impaired. This finding highlights a positive interaction between real and financial integration, building on previous evidence on the role of global 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 banking can play a key role in making import-dependent firms more resilient.[2]

[2] Bruno and Shin (2023) highlight a different dimension of how exports and firms' dependence on US dollar debt may interact. Using data from Mexican firms, they show that firms' exposure to US dollar credit negatively affects exports in periods of large appreciations of the US dollar, reflecting tighter credit-market conditions. Our findings suggest that when importing firms' conditions worsen due to shocks originated in the real sector abroad, the access to US Dollar debt can make trade relationships more resilient.

Our findings speak to several strands of literature related to the interaction between global banking and international trade, particularly in emerging countries. We build on previous literature unraveling channels through which global banking 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), which 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 global banks, regardless of their ownership status, can facilitate trade when real-sector shocks occur.[3]

Our approach is closer to studies exploring the relationship between banks' lending behavior and trade during times of economic turmoil, mainly 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 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 global bank-

[3]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.

ing 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 global banking 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 global banking, 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 global banking on the resilience of international supply chains.

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 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.[4]

Armed with these 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 with 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 global, with 36 of them being

[4]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).

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, 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 79,355 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.

Our final sample consists of 2,597 municipalities importing goods from a total of 180 countries. The average municipality reports 16 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 1,983,875 observations and 79,355 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 specification is formalized in Eq. (1):

$$\begin{aligned}\Delta Imports_{i,j,t} =& \alpha + \beta_1 \left[Stringency_j \times Post_t\right] + \beta_2 Post_t + \beta_3 Stringency_j \\ &+ \beta_4 Global_i^A + \beta_5 \left[Stringency_j \times Global_i^A\right] + \beta_6 \left[Post_t \times Global_i^A\right] \\ &+ \beta_7 \left[Stringency_j \times Post_t \times Global_i^A\right] + \mu_{i,t} + \gamma_j + \varepsilon_{i,j,t}\end{aligned} \tag{1}$$

In Eq. (1) we estimate the log change on imports month-on-month (originally reported in US Dollars). The dummy variable $Post_t$ takes value 1 for the period after the pandemic's outbreak in March 2020 and 0 for the year before[5]. 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

[5]It should be highlighted that the $Post_t$ dummy is required to account for pre-existing differential trends during the 12 months before the pandemic.

with high exposure to COVID-related lockdowns[6]. Finally, we incorporate the ex-ante market share of global banks[7] ($Global_i^A$) between January 2019 and February 2020 for each municipality j. We cluster standard errors at the country level, taking into account a potential serial correlation of import flows originated in the same country. Thus, β_7 captures whether the presence of global banks affects the pass-through of lockdown policies in country j to weaker trade flows to municipality i. The estimated equation includes 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.

This model estimates unbiased results assuming that the growth rate of imports was following a similar trend, before March 2020, when comparing countries differentially exposed to COVID-related restrictions. We verify this parallel trend assumption in Table A.13 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.

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

[6]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.20.

[7]Global banks are defined as those banking institutions with a related entity active in the U.S., including both Brazilian- and foreign-owned banks. The municipal market share is computed as the ratio of global banks' assets (credit) to total bank assets (credit) per municipality.

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 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 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 3 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 1,983,875 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 Tables 1 and 2 in the appendix.

4 Results

The baseline results for the triple difference estimation – including the respective t-tests in parentheses – are shown in Table 4. 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 global banks active in the United States ($Global^A$), 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 statistically significant (column 1)[8]. This suggests that the presence of global banks helps to alleviate the transmission of shocks to imports from countries with stringent COVID-19 policies [9]. Importantly, the results remain significant when controlling for municipality-time and country fixed effects which effectively absorb import demand factors (column 3).[10] In addition to having a significant effect on the intensive margin, Table A.1 shows that the coefficient is also positive and significant for a binary measure of global bank presence (extensive margin).

To assess the sensibility of the results to the definition of market shares, Table A.2 in the Appendix replicates the estimations in Table 4 for the credit-market share from global

[8]Table A.15 shows that these results are robust to alternative thresholds for the stringency index. In this study we are interested in the effect from COVID-related lockdowns that is to say countries with a particularly high value for the stringency index.

[9]Table A.17 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 measured 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.

[10]We also control for the potential presence of seasonality in the data by including common-quarter fixed effects as shown in Table A.19. The results are robust to different combinations of common-quarter fixed effects.

banks active in the United States ($Global^C$). The interaction term of interest remains positive and significant in this alternative specification[11]. This result confirms the finding that import shocks to Brazilian municipalities are mitigated by a higher degree of global banking presence.

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 $Global^A$ and $Global^C$. The upward slope for the marginal effects provides further evidence that the presence of global banks 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 0.55 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.

Figure 4 assesses the validity of the parallel trends hypothesis. In this figure, each estimated coefficient results from a separate regression following Equation 1, 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 global 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 5 months after the supply shock takes place.

Next we re-estimate the specification in column 3 (Table 4) 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 6 (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-

[11] Table A.3 shows that the results also are robust to the inclusion of a binary variable for the municipalities with above-median credit-market share of global banks active in the United States (extensive margin).

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[12].

To examine if specific countries or global regions are driving our findings, we conduct estimations excluding one country or region at a time to assess the sensitivity of our results. Table 7 shows that the interaction term with $Global^A$ 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.

Finally, we conduct a horse race between our global bank variable and the market share of foreign, US, European, or Latin American banks. The results displayed in Table 10 show that the coefficient for global banks remains positive and significant in all specifications corroborating the relevance of our bank definition.

5 Robustness tests

We conduct several robustness checks to examine the sensitivity of the baseline results. First, 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 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 verify whether our results

[12]In Table A.14, we conduct a placebo test for the post-period. The results indicate that the coefficient for the triple interaction term is only positive and significant for the March 2020 post-period.

hold when controlling for these factors. Table A.4 in the Appendix displays the results for the horse race with seven 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.4. The coefficient for the triple interaction term with $Global^A$ 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.7. The results indicate that the coefficient for interaction term with $Global^A$ 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 global banking 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 higher levels of economic development could be more attractive for global banks, leading to an omitted variable bias. To address this concern, we include in column 3 in Table A.4 a competing interaction term with municipalities' GDP per capita, measured as of 2019. The coefficient for the interaction term with $Global^A$ 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 global banks has a strong and independent role in alleviating the transmission of trade shocks.

Our 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 global 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 in Table A.4. The coefficient for HHI is positive but not significant at conventional levels while the interaction term with $Global^A$ remains significant.[13]

Domestic trade frictions could potentially explain why some municipalities are more affected than others by trade disruptions from COVID-related lockdowns abroad. We control for this factor by including a measure of the distance from the center of a municipality to the closest major harbour. The results shown in column 7 in Table A.4 indicate that the coefficient is positive but not significant.

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 intensity, a measure of fiscal support measures during the pandemic, and a the distance to Brazil. The results shown in Table A.5 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[14].

Moreover, we check whether the results hold for an alternative measure of COVID-19

[13]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.

[14]Another concern is that the results could be driven by large domestic banks or banks that are more exposed to credit risk. To control for this factor, we perform a horse race test with bank characteristics shown in Table A.6. The results indicate that neither the market share of large domestic banks (column 3) or riskier banks (column 7) are significant. However, the findings show that banks with a higher ratio of short-term liabilities (column 6) exacerbate the effect on imports from trade shocks.

lockdowns. To this end, we use the Google COVID-19 Community Mobility Reports as an alternative to the stringency index. Table A.10 (column 2) shows that the triple differences term with this mobility index is positive and significant at the 10 percent level.[15]

Finally, in Table A.18, 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, global banks do not only attenuate trade shocks on the intensive margin but also on the extensive margin.

6 Global banks provide US dollar trade financing

The effect of global banks' presence on trade resilience is consistent with evidence pointing to a privileged access to US dollar funding (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. (2023) 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 provide 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

[15]In addition, we also report in Table A.16 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 5 months after a peak in the Stringency index, with the size of the coefficient of interest increasing with the lags.

results could be explained by global 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).[16]

To explore this channel, we adjust our baseline specification in Eq. (1) 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^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 $Global^A$ by RFX^A in our baseline specification from Eq. (1). 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 global banks can have a privileged access to dollar funding and that this access explains the dampening effect of global banks' presence on the transmission of shocks to global value chains.[17]

While these results illustrate the importance of global banks' access to US Dollar markets as a driver of our main findings, global banks that belong to a foreign-owned conglomerate may represent a distinctive case of banks with a special access to US Dollar funding. This

[16] In addition, the presence of global 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).

[17] Table A.12 in the Appendix confirms that these results also hold when computing RFX^A using banks' credit-market shares per municipality.

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.11 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 global 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 global banking variable ($Global^A$). When using this dummy in the triple-differences regression in column 2, we find that the presence of foreign banks significantly decreases the negative impact of trade disruptions on imports compared to other rather autarkic regions. This result confirms that our broad global bank definition combines the effect of both *de facto* and *de jure* globalization mechanisms, represented by US dollar access and foreign ownership, respectively[18].

Finally, we also look at a complementary angle of global banking, 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 to global financial markets, those that host banks directly providing cross-border credit to

[18] An alternative channel that potentially could explain the findings for the presence of global banks is the informational channel. A hypothesis in the literature suggests that proximity to global banks could reduce information asymmetries between trade partners as well as between them and banks in different jurisdictions. By reducing information asymmetries global banks could potentially attenuate the effect of trade disruptions. To explore this hypothesis, we conduct estimations with imports from Europe and the average market share of European-owned banks in 2019 shown in Table A.9. The results show that the coefficient for the triple interaction term is negative and significant at the 10% level in column 2 but not significant in column 1. Thus, we do not find evidence supporting the informational channel as a mechanism explaining the attenuating effect of global banks in our setting.

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.8, 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.

7 Heterogeneous effects across regions and products

In this section, we explore the heterogeneous effects of global 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 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 global banking 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 global 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 8 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 global 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 global 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 9. Interestingly, only the triple interaction term of interest in the estimation with intermediate goods (column 3) is positive and significant. This finding indicates that the role of global banks in alleviating shocks to imports mainly applies to intermediate goods. 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 global 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 US dollar funding. 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 global 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 global banks. 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. 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 FX risks, 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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Tables

Table 1 VARIABLES DEFINITION - MUNICIPALITY LEVEL

Variable	Definition	Source
$Global^A$	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
$Global^C$	As $Global^A$, with the difference that the municipal market share is computed as the ratio of global banks' outstanding credit to total bank credit per municipality.	Brazilian Central Bank
RFX^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^C	As RFX^A, with the difference that this variable is computed as the municipality-level average of banks' ratio of foreign interbank liabilities to total credit.	Brazilian Central Bank
$Foreign^A$	Market share of foreign-owned banks at the municipality level. The municipal market share is computed as the ratio of foreign-owned banks' assets to total bank assets per municipality.	Brazilian Central Bank
$European^A$	Market share of European banks at the municipality level. The municipal market share is computed as the ratio of European banks' assets to total bank assets per municipality.	Brazilian Central Bank
US^A	Market share of US banks at the municipality level. The municipal market share is computed as the ratio of US banks' assets to total bank assets per municipality.	Brazilian Central Bank
$Close^A$	Market share of "close" banks (Spanish, Portuguese, and Latin American) banks at the municipality level. The municipal market share is computed as the ratio of "close" banks' assets to total bank assets per municipality.	Brazilian Central Bank
$Latam^A$	Market share of banks from Latin America (except Brazil) at the municipality level. The municipal market share is computed as the ratio of European banks' assets to total bank assets per municipality.	Brazilian Central Bank
$srankf^A$	Market share of large domestic banks (domestic banks within top-10 in size) at the municipality level.	Brazilian Central Bank
$srank^A$	Market share of large banks (all banks within top-10 in size) at the municipality level.	Brazilian Central Bank
$crank^A$	Market share of banks with the largest deposit-to-asset ratio (top 10 rank) at the municipality level.	Brazilian Central Bank
$crank^A$	Market share of banks with the largest capital-to-asset ratio (top 10 rank) at the municipality level.	Brazilian Central Bank
$bsfrank^A$	Market share of banks with the largest short-term to total liabilities ratio (top 10 rank) at the municipality level.	Brazilian Central Bank
$riskrank^A$	Market share of banks with the largest non-A to total credit ratio (top 10 rank) at the municipality level.	Brazilian Central Bank
$\log(GDP_{pre})$	Average log GDP (current US$) in the municipality i between 2018 and 2019.	Brazilian Institute of Geography and Statistics
$\log(GDP\_per_{pre})$	Average log GDP per capita (current US$) in the municipality i between 2018 and 2019.	Brazilian Institute of Geography and Statistics
$Exports/GDP_{pre}$	Average exports-to-GDP ratio in the municipality i between 2018 and 2019.	Brazilian Ministry of Economy and Brazilian Institute of Geography and Statistics
$\log(population_{pre})$	Average log population in the municipality i between 2018 and 2019.	Brazilian Institute of Geography and Statistics
$\log(X\_partners_{pre})$	Log number of export partners from the municipality i between 2018 and 2019.	Authors' calculations using data from the Brazilian Ministry Economy
$\log(HHI_{pre})$	Average Hirschman Herfindahl Index at the municipality i between 2018 and 2019 (diversity of exported products by a certain municipality).	Authors' calculations using data from the Brazilian Ministry Economy
$Dist\_harbour$	Minimum distance in km between a municipality (captured by its centroid) and one of Brazil's top-10 harbours in size, as measured by their volume of imports.	Brazilian Institute of Geography and Statistics
$Urban$	Share of a municipality's geographical area in km2 defined as urban for administrative purposes in Brazil	Brazilian Institute of Geography and Statistics

Table 2 Variables definition - country level

Variable	Definition	Source
$\log(GDP_{pre})$	Average log GDP (current US$) in the country c between 2018 and 2019.	World Bank
$\log(GDP\_per_{pre})$	Average log GDP per capita (current US$) in the country c between 2018 and 2019.	World Bank
$(Exports/GDP)_{pre}$	Average exports-to-GDP ratio in country c between 2018 and 2019.	World Bank
$Econ\_supp\_index_t$	Economic Support Index from country c in month t.	Oxford Coronavirus Government Response Tracker
$Stringency_t$	Average stringency index at country c in month t.	Oxford Coronavirus Government Response Tracker
$Mobility_t$	Average community mobility indicator (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)

Table 3 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
Global banks presence							
$Global^A$	0.50	0.36	0.21	0.45	0.88	0	1
$Global^C$	0.59	0.35	0.34	0.59	0.98	0	1
RFX^A	0.01	0.01	0.01	0.01	0.02	0	0.06
RFX^C	0.02	0.01	0.01	0.01	0.03	0	0.05
Lockdowns							
Stringency index	48.5	21.7	32.8	48.2	65.3	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 per capita (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 per capita (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
Distance to harbour	381	215	216	352	526	0	1484
Urban area	0.73	0.33	0.50	1	1	0	1
Financial development (municipalities)							
Credit-to-GDP ratio	0.22	0.20	0.08	0.19	0.32	0	3.95
Credit-deposit rate spread	-109.1	6302	0	0	0	-364957	1581.3

NOTES: This table reports the summary statistics for the working sample. Variables definitions are presented in Table 1. 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.

Table 4 Effects of global banks on offsetting stringency, with increasingly strong controls and fixed effects

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
Post	0.0297***	-	-	-	-
	(7.8639)				
Stringency	0.0055*	0.0066**	-	-	-
	(1.7524)	(2.0453)			
$Stringency \times Post$	-0.0118*	-0.0143*	-0.0143*	-	-
	(-1.6577)	(-1.9263)	(-1.9263)		
$Global^A$	0.0066*	-	-	-	-
	(1.8567)				
$Stringency \times Global^A$	-0.0112**	-0.0139**	-0.0149***	-0.0145**	-
	(-1.9813)	(-2.4683)	(-2.6955)	(-2.5984)	
$Post \times Global^A$	-0.0218***	-	-	-	-
	(-3.5705)				
$Stringency \times Post \times Global^A$	0.0271**	0.0335***	0.0335***	0.0326***	0.0326***
	(2.4891)	(2.8100)	(2.8100)	(2.7307)	(2.7307)
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	1,983,875	1,976,675	1,976,675	1,976,650	1,976,650
R-squared	0.0000	0.0337	0.0337	0.0360	0.0380

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 $Global^A$ measures the presence of global banks at the municipality level in 2019. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 Test of the channel of access to US dollars

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0317***	-	-	-	-
	(8.1723)				
$Stringency$	0.0054	0.0059*	-	-	-
	(1.5629)	(1.6806)			
$Stringency \times Post$	-0.0134*	-0.0148*	-0.0148*	-	-
	(-1.7893)	(-1.8615)	(-1.8615)		
RFX^A	0.2135	-	-	-	-
	(1.4370)				
$Stringency \times RFX^A$	-0.4105	-0.4586*	-0.5090**	-0.4933*	-
	(-1.5971)	(-1.7580)	(-2.1320)	(-1.9152)	
$Post \times RFX^A$	-1.0012***	-	-	-	-
	(-4.0976)				
$Stringency \times Post \times RFX^A$	1.1566**	1.2831***	1.2831***	1.2530**	1.2530**
	(2.5834)	(2.7030)	(2.7030)	(2.5607)	(2.5607)
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	1,983,875	1,976,675	1,976,675	1,976,650	1,976,650
R-squared	0.0000	0.0337	0.0337	0.0360	0.0380

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^A measures the presence of global banks at the municipality level in 2019. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6 Results for different post-estimation windows

	(1)	(2)	(3)	(4)	(5)
	3 months	6 months	9 months	12 months	24 months
			$\Delta Imports$		
$Post$	-	-	-	-	-
$Stringency$	-	-	-	-	-
$Stringency \times Post$	-0.0542***	-0.0178*	-0.0120	-0.0143*	-0.0091
	(-3.1980)	(-1.8629)	(-1.3787)	(-1.9263)	(-1.6019)
$Global^A$	-	-	-	-	-
$Stringency \times Global^A$	-0.0137**	-0.0146**	-0.0144**	-0.0149***	-0.0149***
	(-2.3816)	(-2.5967)	(-2.5719)	(-2.6955)	(-2.6776)
$Post \times Global^A$	-	-	-	-	-
$Stringency \times Post \times Global^A$	0.0788***	0.0390***	0.0339**	0.0335***	0.0237***
	(4.3225)	(2.6969)	(2.5689)	(2.8100)	(2.8253)
Observations	1,264,480	1,501,570	1,739,474	1,976,675	2,927,588
R-squared	0.0342	0.0339	0.0337	0.0337	0.0331

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7 ROBUSTNESS TO REMOVING VARIOUS KEY TRADING PARTNER COUNTRIES

	(1)	(2)	(3)	(4)	(5)
	$\Delta Imports$				
	All	Ex. China	Ex. US	Ex-Europe	Ex-Asia-China
$Post$	-	-	-	-	-
$Stringency$	-	-	-	-	-
$Stringency \times Post$	-0.0143*	-0.0174**	-0.0136*	-0.0081	-0.0174**
	(-1.9263)	(-2.2608)	(-1.8360)	(-1.0492)	(-2.0010)
$Global^A$	-	-	-	-	-
$Stringency \times Global^A$	-0.0149***	-0.0149**	-0.0143**	-0.0163**	-0.0178***
	(-2.6955)	(-2.4916)	(-2.5381)	(-2.4479)	(-2.8915)
$Post \times Global^A$	-	-	-	-	-
$Stringency \times Post \times Global^A$	0.0335***	0.0326**	0.0324***	0.0312**	0.0436***
	(2.8100)	(2.4563)	(2.6609)	(2.4765)	(3.5059)
Num. of countries	180	179	179	137	134
Observations	1,976,675	1,925,125	1,929,100	1,377,550	1,453,700
R-squared	0.0337	0.0318	0.0334	0.0428	0.0433

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8 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)
Post	-	-	-	-
Stringency	-	-	-	-
Stringency × *Post*	-0.0083	-0.0241***	-0.0207**	-0.0069
	(-0.7813)	(-3.2131)	(-2.1850)	(-0.8154)
$Global^A$	-	-	-	-
Stringency × $Global^A$	-0.0029	-0.0335***	-0.0370***	0.0098
	(-0.3805)	(-3.7808)	(-4.2554)	(1.3698)
Post × $Global^A$	-	-	-	-
Stringency × *Post* × $Global^A$	0.0152	0.0614***	0.0523***	0.0120
	(0.9733)	(4.3951)	(3.1841)	(0.9259)
Observations	975,150	1,001,525	952,850	1,023,825
R-squared	0.0350	0.0322	0.0348	0.0328

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9 HETEROGENEOUS EFFECTS ACROSS DIFFERENT TYPES OF GOODS

	(1)	(2)	(3)
		$\Delta Imports$	
	All	Consumption	Intermediate
$Post$	-	-	-
$Stringency$	-	-	-
$Stringency \times Post$	-0.0143*	-0.0069	-0.0118
	(-1.9263)	(-0.8536)	(-1.4217)
$Global^A$	-	-	-
$Stringency \times Global^A$	-0.0149***	-0.0041	-0.0148**
	(-2.6955)	(-0.4168)	(-2.3761)
$Post \times Global^A$	-	-	-
$Stringency \times Post \times Global^A$	0.0335***	0.0211	0.0267**
	(2.8100)	(1.1529)	(2.0513)
Observations	1,976,675	1,009,900	1,683,100
R-squared	0.0337	0.0402	0.0374

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10 Horse race results - bank characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Imports$					
$Stringency \times Post \times Global^A$	0.0335***	0.0323**	0.0344***	0.0327**	0.0339**	0.0324**
	(2.8100)	(2.4237)	(2.8785)	(2.4558)	(2.5606)	(2.4244)
$Stringency \times Post \times Foreign^A$		0.0057				
		(0.2521)				
$Stringency \times Post \times US^A$			-0.1957			
			(-0.6733)			
$Stringency \times Post \times European^A$				0.0041		
				(0.1782)		
$Stringency \times Post \times Close^A$					-0.0031	
					(-0.1295)	
$Stringency \times Post \times Latam^A$						-0.0053
						(-0.2366)
Observations	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675
R-squared	0.0337	0.0337	0.0337	0.0337	0.0337	0.0337

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 bank explanatory variables. Specifically, we use the market share of foreign, European, "close" (Spanish, Portuguese, and Latin American banks), Latin American, and US banks. A detailed definition of variables is presented in Table 1. All specifications include municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figures

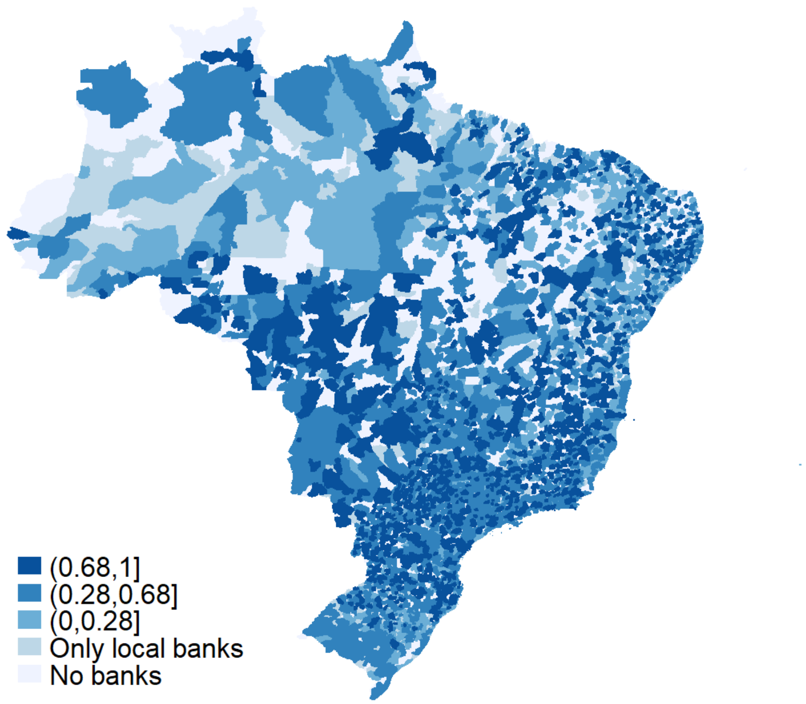


Figure 1 Presence of global banks in Brazil

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

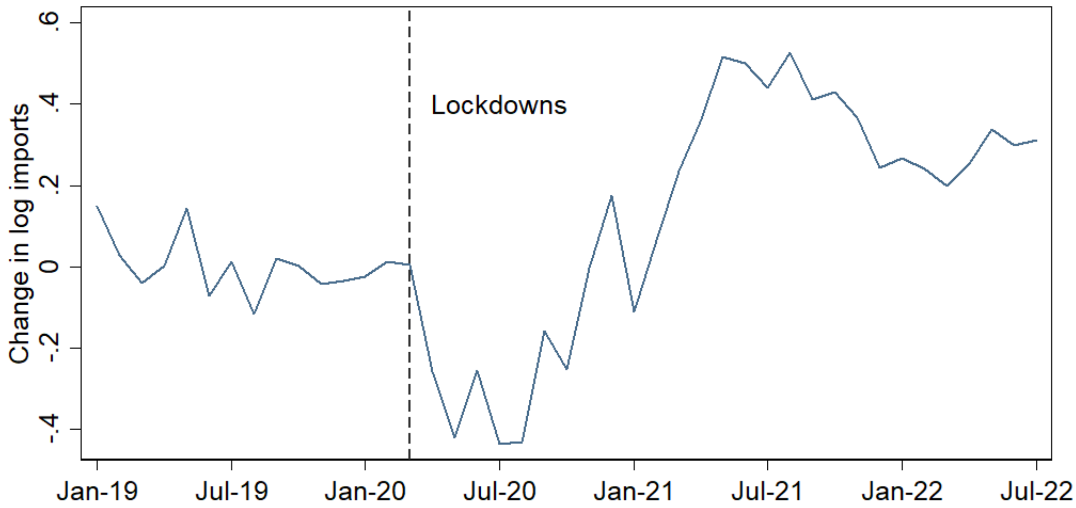
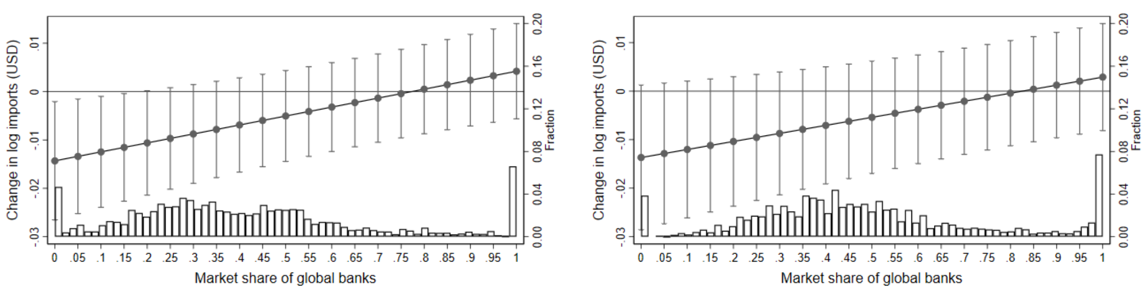


Figure 2 Brazil's imports during the pandemic

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.



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

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: $Global^A$ for Panel (a) and $Global^C$ for Panel (b).

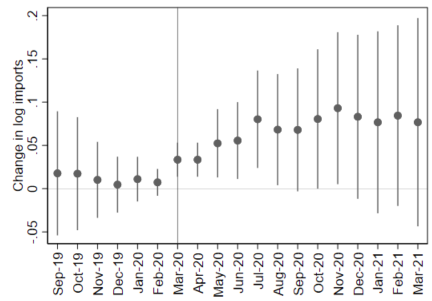


Figure 4 Assessing the parallel trends hypothesis

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.

A Appendix: Additional figures and tables

Table A.1 Extensive margin results - effects on imports in the presence of global banks

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0233***	-	-	-	-
	(7.8474)				
$Stringency$	0.0032	0.0035	-	-	-
	(1.2207)	(1.2768)			
$Stringency \times Post$	-0.0058	-0.0070	-0.0070	-	-
	(-1.0082)	(-1.1500)	(-1.1500)		
$\mathbf{I}(Global^A > p_{50})$	0.0020	-	-	-	-
	(1.1337)				
$Stringency \times \mathbf{I}(Global^A > p_{50})$	-0.0048	-0.0054*	-0.0057*	-0.0056*	-
	(-1.5935)	(-1.7559)	(-1.8493)	(-1.8277)	
$Post \times \mathbf{I}(Global^A > p_{50})$	-0.0052	-	-	-	-
	(-1.5190)				
$Stringency \times Post \times \mathbf{I}(Global^A > p_{50})$	0.0104*	0.0130**	0.0130**	0.0128**	0.0128**
	(1.8039)	(2.1542)	(2.1542)	(2.1304)	(2.1304)
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	1,983,875	1,976,675	1,976,675	1,976,650	1,976,650
R-squared	0.0000	0.0337	0.0337	0.0360	0.0380

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. $\mathbf{I}(Global^A > p_{50})$ is a binary variable taking the value of one for municipalities with a market share of global banks above the 50th percentile (the 50th percentile is calculated over the distribution of the market share of global banks on all municipalities in 2019). Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.2 RESULTS - CREDIT MARKET SHARE

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
Post	0.0350***	-	-	-	-
	(7.5408)				
Stringency	0.0044	0.0051	-	-	-
	(1.0198)	(1.1482)			
$Stringency \times Post$	-0.0118	-0.0137	-0.0137	-	-
	(-1.4092)	(-1.5097)	(-1.5097)		
$Global^C$	0.0072*	-	-	-	-
	(1.8585)				
$Stringency \times Global^C$	-0.0073	-0.0087	-0.0103	-0.0095	-
	(-1.0113)	(-1.1972)	(-1.5273)	(-1.3101)	
$Post \times Global^C$	-0.0292***	-	-	-	-
	(-4.4003)				
$Stringency \times Post \times Global^C$	0.0231*	0.0269**	0.0269**	0.0254*	0.0254*
	(1.9654)	(2.1089)	(2.1089)	(1.9001)	(1.9001)
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	1,983,875	1,976,675	1,976,675	1,976,650	1,976,650
R-squared	0.0000	0.0337	0.0337	0.0360	0.0380

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 $Global^C$ measures the presence of global banks at the municipality level in 2019. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.3 Extensive margin results - Credit Market Share

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0269***	-	-	-	-
	(7.7425)				
$Stringency$	0.0027	0.0028	-	-	-
	(0.8095)	(0.8112)			
$Stringency \times Post$	-0.0063	-0.0068	-0.0068	-	-
	(-0.9624)	(-0.9836)	(-0.9836)		
$\mathbf{I}(Global^C > p_{50})$	0.0025	-	-	-	-
	(1.1115)				
$Stringency \times \mathbf{I}(Global^C > p_{50})$	-0.0037	-0.0040	-0.0044	-0.0042	-
	(-0.9569)	(-0.9965)	(-1.1644)	(-1.0486)	
$Post \times \mathbf{I}(Global^C > p_{50})$	-0.0124***	-	-	-	-
	(-3.0999)				
$Stringency \times Post \times \mathbf{I}(Global^C > p_{50})$	0.0115*	0.0125*	0.0125*	0.0120*	0.0120*
	(1.7086)	(1.8204)	(1.8204)	(1.6951)	(1.6951)
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	1,983,875	1,976,675	1,976,675	1,976,650	1,976,650
R-squared	0.0000	0.0337	0.0337	0.0360	0.0380

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. $\mathbf{I}(Global^C > p_{50})$ is a binary variable taking the value of one for municipalities with a market share of global banks above the 50th percentile (the 50th percentile is calculated over the distribution of the market share of global banks on all municipalities in 2019). Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.4 Horse race results - municipality characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Imports$							
$Stringency \times Post \times Global^A$	0.0335***	0.0331***	0.0330***	0.0342***	0.0309**	0.0306**	0.0323***	0.0334***
	(2.8100)	(2.6404)	(2.7404)	(2.7552)	(2.4631)	(2.4541)	(2.7161)	(2.7549)
$Stringency \times Post \times Exports/GDP_{pre}$		-0.0137						
		(-1.0205)						
$Stringency \times Post \times \log(GDP_{pre})$			-0.0005					
			(-0.1838)					
$Stringency \times Post \times \log(population_{pre})$				0.0006				
				(0.2105)				
$Stringency \times Post \times \log(X\_partners_{pre})$					-0.0009			
					(-0.2353)			
$Stringency \times Post \times \log(HHI_{pre})$						0.0036		
						(0.5933)		
$Stringency \times Post \times Dist\_harbour$							0.0019	
							(1.0637)	
$Stringency \times Post \times Urban$								0.0049
								(0.4940)
Observations	1,976,675	1,922,050	1,976,675	1,976,675	1,922,050	1,922,050	1,971,050	1,972,125
R-squared	0.0337	0.0292	0.0337	0.0337	0.0292	0.0292	0.0336	0.0337

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. Variables definitions are presented in Table 1. All specifications include country and municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5 Horse race results - country characteristics

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Stringency \times Post \times Global^A$	0.0335***	0.0342***	0.0351**	0.1068***	0.0322***
	(2.8100)	(2.8141)	(2.5376)	(3.3057)	(2.6610)
$Stringency \times Post \times \log(GDP\_per_{pre})$		-0.0002			
		(-0.0336)			
$Stringency \times Post \times (Exports/GDP)_{pre}$			-0.0056		
			(-0.3553)		
$Stringency \times Post \times Econ\_supp\_index_t$				0.0071*	
				(1.7849)	
$Stringency \times Post \times Distance_{Bra,c}$					0.0000
					(0.5689)
Observations	1,976,675	1,934,100	1,657,025	1,184,445	1,910,150
R-squared	0.0337	0.0340	0.0381	0.0338	0.0341

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. Variables definitions are presented in Table 2. All specifications include municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.6 Horse race results - bank characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$\Delta Imports$						
$Stringency \times Post \times Global^A$	0.0335***	0.0373***	0.0338***	0.0336***	0.0340***	0.0324***	0.0324***
	(2.8100)	(3.0604)	(2.8502)	(2.8265)	(2.8652)	(2.7305)	(2.7150)
$Stringency \times Post \times srank^A$		-0.0202					
		(-1.1724)					
$Stringency \times Post \times srankf^A$			-0.0145				
			(-0.9519)				
$Stringency \times Post \times drank^A$				0.6726			
				(0.6338)			
$Stringency \times Post \times crank^A$					1.2561		
					(1.1618)		
$Stringency \times Post \times bsfrank^A$						-0.4086**	
						(-2.1519)	
$Stringency \times Post \times riskrank^A$							1.7506
							(1.0889)
Observations	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675
R-squared	0.0337	0.0337	0.0337	0.0337	0.0337	0.0337	0.0337

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 bank explanatory variables (e.g., banks' size, domestic banks, banks' risk, etc.). Variables definitions are presented in Table 1. All specifications include municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.7 Effects for high and low exporter municipalities

	(1)	(2)
	$\Delta Imports$	
	Low export (<p25)	High export (>p75)
$Post$	-	-
$Stringency$	-	-
$Stringency \times Post$	-0.0498**	-0.0180
	(-2.0275)	(-1.6292)
$Global^A$	-	-
$Stringency \times Global^A$	-0.0217	-0.0085
	(-1.0061)	(-0.9343)
$Post \times Global^A$	-	-
$Stringency \times Post \times Global^A$	0.0968***	0.0293*
	(2.7203)	(1.6918)
Observations	152,700	751,000
R-squared	0.0718	0.0203

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.8 EFFECTS FROM FINANCIALLY DISCONNECTED COUNTRIES

	(1)	(2)	(3)	(4)
	$\Delta Imports$			
	Loans*	No loans*	Loans* $\geq$ p75	Loans* $<$ p75
$Stringency$	-	-	-	-
$Post$	-	-	-	-
$Stringency \times Post$	-0.0142	-0.0298***	0.0132	-0.0214**
	(-1.3019)	(-2.8099)	(0.7250)	(-2.1612)
RFX^A	-	-	-	-
$Stringency \times RFX^A$	-0.3606	-1.3674***	0.6779	-0.7792***
	(-1.1469)	(-3.8399)	(1.0510)	(-2.9228)
$Post$	-	-	-	-
$Stringency \times Post \times RFX^A$	1.1456*	2.3696***	-0.0056	1.5100**
	(1.8240)	(3.1290)	(-0.0086)	(2.3410)
Observations	1,345,025	275,750	447,700	1,172,225
R-squared	0.0437	0.0921	0.1138	0.0400

NOTES: The Table shows the results of estimating Eq. (1) 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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.9 IMPORT FLOWS AND BANKS' HOME COUNTRIES

	(1)	(2)
	Δ *Imports from EU*	
Post	-	-
Stringency	-	-
Stringency $\times$ *Post*	-0.0156**	-0.0194
	(-2.068)	(-1.246)
$\mathbf{I}(EU^A > p_{50})$	-	
Stringency $\times\ \mathbf{I}(EU^A > p_{50})$	-0.00328	
	(-0.318)	
Post $\times\ \mathbf{I}(EU^A > p_{50})$	-	
Stringency $\times$ *Post* $\times\ \mathbf{I}(EU^A > p_{50})$	-0.0151	
	(-0.917)	
EU^A		-
Stringency $\times\ EU^A$		0.0492**
		(2.290)
Post $\times\ EU^A$		-
Stringency $\times$ *Post* $\times\ EU^A$		-0.0577*
		(-1.872)
Observations	339,775	851,600
R-squared	0.061	0.026

NOTES: The table presents the effects on the month-on-month log change in imports from Europe. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The treated observations (*Stringecy*) correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. EU^A is the average market share of European-owned banks per municipality in 2019. $\mathbf{I}(EU^A > 0)$ is a dummy variable taking the value of one for municipalities having the presence of European-owned banks in 2019. All specifications include country and municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.10 RESULTS - THE COMMUNITY MOBILITY INDICATOR

	(1)	(2)
	$\Delta Imports$	
$Stringency_{str}$	-	-
$Stringency_{mob}$	-	-
$Post$	-	-
$Global^A$	-	-
$Stringency_{str} \times Post$	-0.0167**	
	(0.0066)	
$Stringency_{str} \times Global^A$	-0.0153***	
	(0.0052)	
$Stringency_{str} \times Post \times Global^A$	0.0332***	
	(0.0108)	
$Stringency_{mob} \times Post$		-0.0137**
		(0.0068)
$Stringency_{mob} \times Global^A$		-0.0103
		(0.0065)
$Stringency_{mob} \times Post \times Global^A$		0.0195*
		(0.0116)
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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.11 The role of foreign-owned banks

	(1)	(2)
	$\Delta Imports$	
$Post$	-	-
$Stringency$	-	-
$Stringency \times Post$	-	-
$Foreign$	-	
$Stringency \times Foreign$	-0.0140	
	(-1.2518)	
$Post \times Foreign$	-	
$Stringency \times Post \times Foreign$	0.0290	
	(1.5432)	
$D.Foreign^{50}$		-
$Stringency \times D.Foreign^{50}$		-0.0126**
		(-2.4460)
$Post \times D.Foreign^{50}$		-
$Stringency \times Post \times D.Foreign^{50}$		0.0173*
		(1.9734)
Observations	1,976,650	1,099,250
R-squared	0.0360	0.0375

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. $Foreign$ is the market share of foreign-owned banks per municipality. $D.Foreign^{50}$ is a dummy variable that takes the value of one for municipalities with a large presence of foreign-owned banks and zero for municipalities without the presence of foreign banks and where there is a low presence of global banks (below the median of $Global^{A}$). All specifications include country and municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.12 BANKS US DOLLAR ACCESS AND IMPORT FLOWS

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
$Post$	0.0365***	-	-	-	-
	(7.6300)				
$Stringency$	0.0046	0.0049	-	-	-
	(0.9461)	(0.9576)			
$Stringency \times Post$	-0.0137	-0.0148	-0.0148	-	-
	(-1.5070)	(-1.5232)	(-1.5232)		
RFX^C	0.2734*	-	-	-	-
	(1.6558)				
$Stringency \times RFX^C$	-0.2926	-0.3137	-0.3752	-0.3503	-
	(-0.9206)	(-0.9417)	(-1.2538)	(-1.0494)	
$Post \times RFX^C$	-1.2225***	-	-	-	-
	(-4.5671)				
$Stringency \times Post \times RFX^C$	1.0188**	1.1034**	1.1034**	1.0554*	1.0554*
	(2.0764)	(2.1400)	(2.1400)	(1.8862)	(1.8862)
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	1,983,875	1,976,675	1,976,675	1,976,650	1,976,650
R-squared	0.0000	0.0337	0.0337	0.0360	0.0380

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^C measures the presence of global banks at the municipality level in 2019. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.13 Assessing the parallel trends assumption

	(1)	(2)
	$\Delta Imports$	
Stringency	-0.0008	-0.0002
	(-0.4514)	(-0.1215)
Municipality-month FE	No	Yes
Observations	744,150	740,533
R-squared	0.0000	0.0357

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.14 POST-PERIOD PLACEBO TEST

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
Stringency	-	-	-	-	-
Post	-	-	-	-	-
Stringency × *Post*	-0.0143*	-0.0126*	0.0025	-0.0030	0.0028
	(-1.9263)	(-1.7820)	(0.4140)	(-0.3175)	(0.4542)
$Global^A$	-	-	-	-	-
Stringency × $Global^A$	-0.0149***	-0.0110	-0.0002	0.0001	0.0108*
	(-2.6955)	(-1.4160)	(-0.0252)	(0.0142)	(1.7269)
Post × $Global^A$	-	-	-	-	-
Stringency × *Post* × $Global^A$	0.0335***	0.0074	0.0004	0.0125	-0.0043
	(2.8100)	(0.5430)	(0.0363)	(0.8814)	(-0.3863)
Observations	1,976,675	1,969,000	1,975,750	1,978,100	1,978,100
R-squared	0.0337	0.0324	0.0331	0.0334	0.0326
Post-period	Mar-2020	Mar-2019	Sep-2019	Mar-2021	Sep-2021

NOTES: The table exhibits the effects on the month-on-month for different post-period definitions. The treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. The variable $Global^A$ measures the presence of global banks at the municipality level in 2019. Column 1 shows the benchmark results, in which the post-period is between March 2020 and March 2021. In column 2, the post-period is defined from March 2019 and 12 months after. In column 3, the post-period is defined from March 2021 onwards, and column 4 shows the results defining the post-period from September 2021. All specifications include country and municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.15 RESULTS FOR DIFFERENT TREATMENT THRESHOLDS

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta Imports$					
	75	50	60	70	80	90
Stringency	-	-	-	-	-	-
Post	-	-	-	-	-	-
Stringency × *Post*	-0.0143*	0.0007	-0.0081	-0.0069	-0.0080	-0.0014
	(-1.9263)	(0.1032)	(-1.1479)	(-0.8839)	(-1.0278)	(-0.1221)
$Global^A$	-	-	-	-	-	-
Stringency × $Global^A$	-0.0149***	0.0039	-0.0037	-0.0083	-0.0083	-0.0068
	(-2.6955)	(0.6298)	(-0.6103)	(-1.3021)	(-1.6022)	(-1.0605)
Post × $Global^A$						
Stringency × *Post* × $Global^A$	0.0335***	-0.0027	0.0154	0.0212*	0.0207*	0.0188
	(2.8100)	(-0.2412)	(1.3343)	(1.6679)	(1.7722)	(1.2776)
Observations	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675
R-squared	0.0337	0.0337	0.0337	0.0337	0.0337	0.0337

NOTES: The table exhibits the effects on the month-on-month log change in imports for different percentile treatment thresholds. The pre-period is between March 2019 and February 2020; the post-period is between March 2020 and March 2021. The variable $Global^A$ measures the presence of global banks at the municipality level in 2019. In Column 1, the treated observations correspond to import flows from countries that scored above the 75th percentile in the distribution of the stringency index. For the rest of the columns, we use other thresholds to define treated and untreated units. For instance, column 2 uses the 50th percentile; column 3 uses the 60th percentile, etc. All specifications include country and municipality-month fixed effects. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.16 EFFECTS ON IMPORTS t MONTHS AHEAD

	(1)	(2)	(3)	(4)	(5)
	1 month	3 months	6 months	9 months	12 months
			$\Delta Imports$		
$Post$	-	-	-	-	-
$Stringency$	-	-	-	-	-
$Stringency \times Post$	-0.0143*	-0.0187	-0.0147	-0.0215	-0.0380
	(-1.9263)	(-0.7966)	(-0.2817)	(-0.3103)	(-0.5026)
$Global^A$	-	-	-	-	-
$Stringency \times Global^A$	-0.0149***	-0.0226*	-0.0297	-0.0300	-0.0173
	(-2.6955)	(-1.8322)	(-1.3362)	(-1.0097)	(-0.4262)
$Post \times Global^A$	-	-	-	-	-
$Stringency \times Post \times Global^A$	0.0335***	0.0556**	0.0679	0.0831	0.0767
	(2.8100)	(2.0679)	(1.5807)	(1.4493)	(1.0542)
Observations	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675
R-squared	0.0337	0.0363	0.0396	0.0407	0.0411

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.17 Effects when excluding sporadic trade relationships

	(1)	(2)	(3)	(4)
	$\Delta Imports$			
	All	x≥p10	x≥p25	x≥p50
Post	-	-	-	-
Stringency	-	-	-	-
Stringency × *Post*	-0.0143*	-0.0210	-0.0186	-0.0123
	(-1.9263)	(-1.2319)	(-0.8877)	(-0.4642)
$Global^A$	-	-	-	-
Stringency × $Global^A$	-0.0149***	-0.0287*	-0.0380	-0.0302
	(-2.6955)	(-1.6630)	(-1.6326)	(-0.8044)
Post × $Global^A$	-	-	-	-
Stringency × *Post* × $Global^A$	0.0335***	0.0808**	0.0810*	0.0832
	(2.8100)	(2.2977)	(1.8152)	(1.3808)
Observations	1,976,675	808,475	630,250	416,800
R-squared	0.0337	0.0689	0.0822	0.1046

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.18 THE ROLE OF GLOBAL BANKS IN PRESERVING IMPORT FLOWS

	(1)	(2)	(3)	(4)	(5)
	$\Pr(Imports > 0)$				
	t+1	t+3	t+6	t+9	t+12
Stringency	0.0599	0.0639	0.0641	0.0629	0.0593
	(0.3428)	(0.3668)	(0.3666)	(0.3628)	(0.3442)
Post	-0.0169***	0.0095	0.0573***	0.0693***	0.0832***
	(-2.7567)	(1.4409)	(9.5487)	(11.1131)	(12.5304)
$Stringency \times Post$	-0.0017	-0.0076	-0.0029	0.0018	-0.0070
	(-0.1720)	(-0.8057)	(-0.2632)	(0.1512)	(-0.3747)
$Global^{A}$	-0.2563***	-0.2490***	-0.2374***	-0.2370***	-0.2468***
	(-7.6717)	(-7.5173)	(-7.2550)	(-7.1705)	(-7.3461)
$Stringency \times Global^{A}$	-0.1088	-0.1157*	-0.1149*	-0.1061*	-0.0919
	(-1.5599)	(-1.6985)	(-1.7118)	(-1.6803)	(-1.5056)
$Post \times Global^{A}$	0.0042	-0.0088	-0.0279***	-0.0359***	-0.0414***
	(0.5024)	(-1.0993)	(-4.0195)	(-4.1259)	(-3.1543)
$Stringency \times Post \times Global^{A}$	0.0239	0.0411**	0.0423**	0.0359**	0.0401
	(1.1199)	(2.0201)	(2.0979)	(2.4177)	(1.4683)
Observations	1,904,520	1,745,810	1,507,745	1,269,680	1,031,615

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. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.19 RESULTS ADDRESSING SEASONALITY

	(1)	(2)	(3)	(4)
	$\Delta Imports$			
Post	0.0290***	0.0290***	0.0287***	0.0287***
	(7.7030)	(7.7030)	(7.6313)	(7.6313)
Stringency	0.0053*	-	-	-
	(1.6777)			
$Stringency \times Post$	-0.0118*	-0.0118*	-0.0107	-0.0107
	(-1.6570)	(-1.6570)	(-1.4950)	(-1.4950)
$Global^A$	-	-	-	-
$Stringency \times Global^A$	-0.0108**	-0.0118**	-0.0118**	-
	(-2.0189)	(-2.2875)	(-2.2729)	
$Post \times Global^A$	-0.0215***	-0.0215***	-0.0215***	-0.0215***
	(-3.5156)	(-3.5156)	(-3.5141)	(-3.5141)
$Stringency \times Post \times Global^A$	0.0275**	0.0275**	0.0273**	0.0273**
	(2.5450)	(2.5450)	(2.5311)	(2.5311)
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	1,983,875	1,983,875	1,983,875	1,983,875
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 $Global^A$ measures the presence of global banks at the municipality level in 2019. Heteroskedasticity-robust t-statistics clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.20 Results when clustering the standard errors at different levels

	(1)	(2)	(3)	(4)	(5)
			$\Delta Imports$		
Post	-	-	-	-	-
Stringency	-	-	-	-	-
$Stringency \times Post$	-0.0143*	-0.0143**	-0.0143*	-0.0143	-0.0143
	(-1.9263)	(-2.1466)	(-1.8576)	(-1.2357)	(-0.8804)
$Global^A$	-	-	-	-	-
$Stringency \times Global^A$	-0.0149***	-0.0149**	-0.0149**	-0.0149***	-0.0149***
	(-2.6955)	(-2.0148)	(-2.5122)	(-11.7502)	(-3.3962)
$Post \times Global^A$	-	-	-	-	-
$Stringency \times Post \times Global^A$	0.0335***	0.0335***	0.0335***	0.0335***	0.0335***
	(2.8100)	(2.7293)	(2.7336)	(9.8657)	(3.8777)
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	1,976,675	1,976,675	1,976,675	1,976,675	1,976,675
R-squared	0.0337	0.0337	0.0337	0.0337	0.0337

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.